



# seaperch

## COURSE BUILD

2020 SEASON



# Introduction

Similar to past seasons, this year's competition will include two in-pool components: an obstacle course and a challenge course.

**The Obstacle Course** tests high-speed maneuverability and requires your SeaPerch to navigate the course as quickly as possible. The SeaPerch operator must develop the skill to turn and adjust the vertical position (dive or ascend) while driving in full or near full speed and must also be able to quickly reverse the SeaPerch to make corrections if it is off course. Please note: there is no guarantee of the position of the obstacle course hoops at competitions, so operators should not try to memorize actions such as in playing a video game but should instead practice a variety of general high-speed maneuvers.

**The Mission Course** will incorporate a mission that teams must complete with their SeaPerch related to Waterway Cleanup.

In **Mission: Waterway Cleanup**, SeaPerch teams will be asked to assist with cleanup efforts in a particularly polluted waterway. Teams must disarm and secure underwater mines, remove trash floating on the water's surface, and dispose of submerged waste in an underwater vault. Specific technical challenges will include:

1. **The Active Mine:** A simulated active mine is submerged in the water and must be disarmed. The mine can be disarmed by rotating the arming device affixed to the mine. Additional points can be obtained by removing the arming device and disposing it on a platform in the vault. *(Please note, while we hope that this year's challenge will be "explosive," there will be no actual explosive materials used in the challenge.)*
2. **The Disposal Vault:** A disposal vault will be used to dispose of sunken trash, unexploded mines, and the active mine arming device. Specific tasks will include:
  - a. **Opening the Vault:** The vault will be closed at the start of the challenge must be opened by rotating a latch.
  - b. **Closing the Vault:** The disposal vault can be closed by hooking an unexploded mine onto the vault gate's closing arm. Additional points can be obtained by latching the gate after it is closed.
3. **The "Garbage Patch":** A debris field containing multiple pieces of floating trash will be confined by a floating containment ring. The trash must be removed from this ring and transported to the pool deck.
4. **Sunken Waste:** A platform will contain sunken trash and unexploded mines simulated by weighted balls with rope loops. Waste must be removed from the platform and transported to the disposal vault. Waste can be deposited on the disposal platform (without entering the vault) or released into the disposal vault for additional points.



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| Drawing Part Number                        | Item                                                       | Unit | Qty. | Est. Cost Each | Extended Cost | Suggested Vendor    | Part Number | Vendor Link                         |
|--------------------------------------------|------------------------------------------------------------|------|------|----------------|---------------|---------------------|-------------|-------------------------------------|
| <b>Pool Floor Obstacle Course</b>          |                                                            |      |      |                |               |                     |             |                                     |
| BA1                                        | 1/2" Sch 40PVC Elbow                                       | Each | 2    | \$ 0.20        | \$ 0.40       | PVC Fittings Online | 406-005     | <a href="#">PVC Fittings Online</a> |
| BC1                                        | 1/2" Sch 40 PVC Cross                                      | Each | 4    | \$ 0.74        | \$ 2.96       | PVC Fitting Online  | 420-005     | <a href="#">PVC Fittings Online</a> |
| BB1                                        | 1/2" Sch 40 PVC Tee                                        | Each | 3    | \$ 0.24        | \$ 0.72       | PVC Fittings Online | 401-005     | <a href="#">PVC Fittings Online</a> |
| AA6                                        | 1/2" Sch 40 PVC Pipe X 6" Lg                               | Each | 2    | \$ 0.11        | \$ 0.22       | Local/Home Depot    |             | <a href="#">Home Depot</a>          |
| AA24                                       | 1/2" Sch 40 PVC Pipe X 24" Lg                              | Each | 10   | \$ 0.44        | \$ 4.40       | Local/Home Depot    |             | <a href="#">Home Depot</a>          |
| AA12                                       | 1/2" Sch 40 PVC Pipe X 12" Lg                              | Each | 9    | \$ 0.22        | \$ 1.98       | Local/Home Depot    |             | <a href="#">Home Depot</a>          |
| EA24                                       | #4 Rebar (1/2" Dia.) X 24" Lg                              | Each | 4    | \$ 2.25        | \$ 9.00       | Local/Home Depot    | 106151      | <a href="#">Home Depot</a>          |
| DA1                                        | #8 X 1/2" Stainless Steel Flanged Head Self-Tapping Screw  | Each | 42   | \$ 0.06        | \$ 2.52       | McMaster            | 90286A194   | <a href="#">McMaster Carr</a>       |
| <b>Suspended Obstacle Course</b>           |                                                            |      |      |                |               |                     |             |                                     |
| BD1                                        | 3/4" X 1/2" Sch 40 PVC Reducing Bushing                    | Each | 5    | \$ 0.20        | \$ 1.00       | PVC Fittings Online | 437-101     | <a href="#">PVC Fittings Online</a> |
| BH2                                        | 3/4" Formufit 5-Way PVC Furniture Grade Cross              | Each | 5    | \$ 2.09        | \$ 10.45      |                     |             | <a href="#">PVC Fittings Online</a> |
| AA12                                       | 1/2" Sch 40 PVC Pipe X 12" Lg                              | Each | 3    | \$ 0.22        | \$ 0.66       | Local/Home Depot    |             | <a href="#">Home Depot</a>          |
| AA24                                       | 1/2" Sch 40 PVC Pipe X 24" Lg                              | Each | 2    | \$ 0.44        | \$ 0.88       | Local/Home Depot    |             | <a href="#">Home Depot</a>          |
| AB48                                       | 3/4" Sch 40 PVC Pipe X 48" Lg                              | Each | 4    | \$ 1.08        | \$ 4.34       | Local/Home Depot    |             | <a href="#">Home Depot</a>          |
| AB36                                       | 3/4" Sch 40 PVC Pipe X 36" Lg                              | Each | 10   | \$ 0.81        | \$ 8.13       | Local/Home Depot    |             | <a href="#">Home Depot</a>          |
| DA2                                        | #8 X 5/8" Stainless Steel Flanged Head Self-Drilling Screw | Each | 28   | \$ 0.07        | \$ 1.96       | McMaster Carr       | 90822A345   | <a href="#">McMaster Carr</a>       |
| <b>Obstacle Course Hoops (per hoop)</b>    |                                                            |      |      |                |               |                     |             |                                     |
| BB1                                        | 1/2" Sch 40 PVC Tee                                        | Each | 1    | \$ 0.24        | \$ 0.24       | PVC Fittings Online | 401-005     | <a href="#">PVC Fittings Online</a> |
| AA1                                        | 1/2" Sch 40 PVC Pipe X 1" Lg                               | Each | 2    | \$ 0.02        | \$ 0.04       | Local/Home Depot    |             | <a href="#">Home Depot</a>          |
| AAP57                                      | 1/2" PEX Tubing (Red) X 57" Lg                             | Each | 1    | \$ 1.82        | \$ 1.82       | Local/Home Depot    | 1004706347  | <a href="#">Home Depot</a>          |
| DA2                                        | #8 X 5/8" Stainless Steel Flanged Head Self-Drilling Screw | Each | 2    | \$ 0.07        | \$ 0.14       | McMaster Carr       | 90822A345   | <a href="#">McMaster Carr</a>       |
| <b>2019 Mission Course Reconfiguration</b> |                                                            |      |      |                |               |                     |             |                                     |
| BL2                                        | 1" X 1/2" Sch 40 PVC Reducer Coupling                      | Each | 2    | \$ 0.81        | \$ 1.62       | PVC Fittings Online | 429-130     | <a href="#">PVC Fittings Online</a> |
| BF1                                        | 1/2" Sch 40 PVC Snap-on Saddle Tee                         | Each | 2    | \$ 0.44        | \$ 0.88       | PVC Fittings Online | 463-005     | <a href="#">PVC Fittings Online</a> |
| BA1                                        | 1/2" Sch 40 PVC Elbow                                      | Each | 4    | \$ 0.20        | \$ 0.80       | PVC Fittings Online | 406-005     | <a href="#">PVC Fittings Online</a> |
| BC1                                        | 1/2" Sch 40 PVC Cross                                      | Each | 2    | \$ 0.74        | \$ 1.48       | PVC Fitting Online  | 420-005     | <a href="#">PVC Fittings Online</a> |
| AA2                                        | 1/2" Sch 40 PVC Pipe X 2" Lg                               | Each | 1    | \$ 0.46        | \$ 0.46       | Local/Home Depot    |             | <a href="#">Home Depot</a>          |
| AA18                                       | 1/2" PVC Sch 40 Pipe X 18" Lg                              | Each | 2    | \$ 0.33        | \$ 0.66       | Local/Home Depot    |             | <a href="#">Home Depot</a>          |
| AA28                                       | 1/2" PVC Sch 40 Pipe X 28" Lg                              | Each | 2    | \$ 0.51        | \$ 1.03       | Local/Home Depot    |             | <a href="#">Home Depot</a>          |
| AA36                                       | 1/2" Sch 40 PVC Pipe X 36" Lg                              | Each | 2    | \$ 0.66        | \$ 1.32       | Local/Home Depot    |             | <a href="#">Home Depot</a>          |
| AC12                                       | 1" Sch 40 PVC Pipe X 12" Lg                                | Each | 2    | \$ 0.40        | \$ 0.79       | Local/Home Depot    |             | <a href="#">Home Depot</a>          |
| <b>Ropes (Qty is per rope assembly)</b>    |                                                            |      |      |                |               |                     |             |                                     |
| G3                                         | 5/16" X 3" Spring Link Carabiner                           | Each | 2    | \$ 0.98        | \$ 1.96       | Home Depot          | 1001280784  | <a href="#">Home Depot</a>          |
| C8                                         | 8" Cable Tie (Buy per total qty needed)                    | Each | 2    | \$ 0.02        | \$ 0.04       | Local/Home Depot    | 748726      |                                     |
| H1                                         | 5/32" Polypropylene Diamond Braid Rope, 9'                 | Ft   | 9    | \$ 0.05        | \$ 0.41       | Home Depot          | 285501      | <a href="#">Home Depot</a>          |



| Drawing Part Number                                          | Item                                                            | Unit | Qty. | Est. Cost Each | Extended Cost | Suggested Vendor    | Part Number | Vendor Link                         |
|--------------------------------------------------------------|-----------------------------------------------------------------|------|------|----------------|---------------|---------------------|-------------|-------------------------------------|
| <b>Disposal Platform</b>                                     |                                                                 |      |      |                |               |                     |             |                                     |
| F36x36                                                       | Polypropylene Sheet, .157 Thk, 36.0" X 36.0"                    | Each | 1    | \$ 6.99        | \$ 6.99       | Home Depot          | 527147      | <a href="#">Home Depot</a>          |
| BF3                                                          | 1" Sch 40 PVC Snap-on Saddle Tee                                | Each | 1    | \$ 0.93        | \$ 0.93       | PVC Fittings Online | 463-010     | <a href="#">Home Depot</a>          |
| BD2                                                          | 1" X 1/2" PVC Reducing Bushing                                  | Each | 1    | \$ 0.37        | \$ 0.37       | PVC Fittings Online | 437-130     | <a href="#">PVC Fittings Online</a> |
| AC24                                                         | 1" Sch 40 PVC Pipe X 24" Lg                                     | Each | 1    | \$ 0.79        | \$ 0.79       | Local/Home Depot    |             | <a href="#">PVC Fittings Online</a> |
| AA20.75                                                      | 1/2" Sch 40 PVC Pipe X 20.75" Lg                                | Each | 1    | \$ 0.38        | \$ 0.38       | Local/Home Depot    |             | <a href="#">Home Depot</a>          |
| C8                                                           | 8" Cable Tie (Buy per total qty needed)                         | Each | 13   | \$ 0.02        | \$ 0.26       | Local/Home Depot    | 748726      |                                     |
| <b>Waste Platform</b>                                        |                                                                 |      |      |                |               |                     |             |                                     |
| F36x36                                                       | Polypropylene Sheet, .157 Thk, 36.0" X 36.0"                    | Each | 1    | \$ 6.99        | \$ 6.99       | Home Depot          | 527147      | <a href="#">Home Depot</a>          |
| BF3                                                          | 1" Sch 40 PVC Snap-on Saddle Tee                                | Each | 1    | \$ 0.93        | \$ 0.93       | PVC Fittings Online | 463-010     | <a href="#">Home Depot</a>          |
| AC52                                                         | 1" Sch40 PVC Pipe X 52.0"                                       | Each | 2    | \$ 1.72        | \$ 3.44       | Local/Home Depot    |             | <a href="#">PVC Fittings Online</a> |
| C8                                                           | 8" Cable Tie (Buy per total qty needed)                         | Each | 12   | \$ 0.02        | \$ 0.24       | Local/Home Depot    | 748726      |                                     |
| <b>Platform Frame (2 per lane)</b>                           |                                                                 |      |      |                |               |                     |             |                                     |
| BB3                                                          | 1" Sch 40 PVC Tee (DURA)                                        | Each | 8    | \$ 0.51        | \$ 4.08       | PVC Fittings Online |             | <a href="#">PVC Fittings Online</a> |
| AC16.5                                                       | 1" Sch 40 PVC Pipe X 16.5" Lg                                   | Each | 12   | \$ 0.55        | \$ 6.55       | Local/Home Depot    |             | <a href="#">Home Depot</a>          |
| DA2                                                          | #8 X 5/8" Stainless Steel Flanged Head Self-Drilling Screw      | Each | 20   | \$ 0.07        | \$ 1.43       | McMaster Carr       | 90822A345   | <a href="#">McMaster Carr</a>       |
| <b>Active Mine Arming Device</b>                             |                                                                 |      |      |                |               |                     |             |                                     |
| BC4                                                          | 1-1/4" Sch 40 PVC Cross (try to find the Dura brand locally)    | Each | 1    | \$ 2.02        | \$ 2.02       | PVC Fittings Online | 420-012     | <a href="#">PVC Fittings Online</a> |
| M12                                                          | 12mm Diameter X 3.0mm Thick Neodymium Magnet                    | Each | 3    | \$ 0.71        | \$ 2.14       | Amazon              |             | <a href="#">Amazon</a>              |
| <b>Beacon Assembly (Does not include circuit components)</b> |                                                                 |      |      |                |               |                     |             |                                     |
| BC2R                                                         | 3/4" Sch 40 PVC Coupler                                         | Each | 1    | \$ 0.18        | \$ 0.18       | PVC Fittings Online | 429-007     | <a href="#">PVC Fittings Online</a> |
| BC2P                                                         | 3/4" Sch 40 PVC Cap                                             | Each | 1    | \$ 0.21        | \$ 0.21       | PVC Fittings Online | 447-007     | <a href="#">PVC Fittings Online</a> |
| BA1                                                          | 1/2" Sch 40 PVC Elbow                                           | Each | 1    | \$ 0.20        | \$ 0.20       | PVC Fittings Online | 406-005     | <a href="#">PVC Fittings Online</a> |
| BF1                                                          | 1/2" PVC Sch 40 Snap-on Saddle Tee                              | Each | 1    | \$ 0.44        | \$ 0.44       | PVC Fittings Online | 463-005     | <a href="#">Home Depot</a>          |
| BD2                                                          | 1" X 1/2" Sch 40 PVC Reducing Bushing                           | Each | 1    | \$ 0.37        | \$ 0.37       | PVC Fittings Online | 437-130     | <a href="#">PVC Fittings Online</a> |
| BD3                                                          | 1" X 3/4" Sch 40 PVC Reducing Bushing                           | Each | 1    | \$ 0.37        | \$ 0.37       | PVC Fitting Online  | 437-131     | <a href="#">Home Depot</a>          |
| BK3                                                          | 1" Spears PVC Compression Coupling S110-10                      | Each | 1    | \$ 4.74        | \$ 4.74       | PVC Fittings Online |             | <a href="#">PVC Fittings Online</a> |
| AB4C                                                         | 3/4" Sch 40 CLEAR PVC Pipe 4" Lg (see Beacon Guide for options) | Each | 1    | \$ 0.74        | \$ 0.74       | PVC Fittings Online |             | <a href="#">Home Depot</a>          |
| AA3                                                          | 1/2" Sch 40 PVC Pipe X 3" Lg                                    | Each | 1    | \$ 0.06        | \$ 0.06       | Local/Home Depot    |             | <a href="#">PVC Fittings Online</a> |
| AA2                                                          | 1/2" Sch 40 PVC Pipe X 2" Lg                                    | Each | 1    | \$ 0.04        | \$ 0.04       | Local/Home Depot    |             | <a href="#">PVC Fittings Online</a> |
| AB8                                                          | 3/4" Sch 40 PVC Pipe X 8" Lg                                    | Each | 1    | \$ 0.41        | \$ 0.41       | Local/Home Depot    |             | <a href="#">PVC Fittings Online</a> |
| AAP10                                                        | 1/2" PEX Pipe X 10" Lg                                          | Each | 1    | \$ 0.32        | \$ 0.32       | Local/Home Depot    | 1004706347  | <a href="#">Home Depot</a>          |

| Drawing Part Number     | Item                                                                      | Unit | Qty. | Est. Cost Each | Extended Cost | Suggested Vendor    | Part Number  | Vendor Link                         |
|-------------------------|---------------------------------------------------------------------------|------|------|----------------|---------------|---------------------|--------------|-------------------------------------|
| <b>Vault</b>            |                                                                           |      |      |                |               |                     |              |                                     |
| F18x19                  | Polypropylene Sheet, .157 Thk, 18.0" X 19.0" (can use 18" x 18")          | Each | 1    | \$ 5.98        | \$ 5.98       | Home Depot          | 628843       | <a href="#">Home Depot</a>          |
| C8                      | 8" Cable Tie (Buy per total qty needed)                                   | Each | 6    | \$ 0.02        | \$ 0.12       | Local/Home Depot    | 748726       |                                     |
| <b>Vault Hoop</b>       |                                                                           |      |      |                |               |                     |              |                                     |
| BC1                     | 1/2" Sch 40 PVC Cross                                                     | Each | 1    | \$ 0.74        | \$ 0.74       | PVC Fitting Online  | 420-005      | <a href="#">Home Depot</a>          |
| BL1                     | 3/4" X 1/2" Sch 40 PVC Reducing Coupling                                  | Each | 1    | \$ 0.30        | \$ 0.30       | PVC Fitting Online  | 429-101      | <a href="#">Home Depot</a>          |
| BD3                     | 1" X 3/4" Sch 40 PVC Reducing Bushing                                     | Each | 1    | \$ 0.37        | \$ 0.37       | PVC Fitting Online  | 437-131      | <a href="#">Home Depot</a>          |
| AB18                    | 3/4" Sch 40 PVC Pipe X 18" Lg                                             | Each | 1    | \$ 0.41        | \$ 0.41       | Local/Home Depot    |              | <a href="#">PVC Fittings Online</a> |
| AA2                     | 1/2" Sch 40 PVC Pipe X 2" Lg                                              | Each | 2    | \$ 0.04        | \$ 0.07       | Local/Home Depot    |              | <a href="#">PVC Fittings Online</a> |
| AA4                     | 1/2" Sch 40 PVC Pipe X 4" Lg                                              | Each | 2    | \$ 0.07        | \$ 0.15       | Local/Home Depot    |              | <a href="#">PVC Fittings Online</a> |
| AAP72                   | PEX Tubing (Red), 1/2" X 72" Lg                                           | Each | 1    | \$ 2.27        | \$ 2.27       | Local/Home Depot    | 1004706347   | <a href="#">Home Depot</a>          |
| DA2                     | #8 X 5/8" Stainless Steel Flanged Head Self-Drilling Screw                | Each | 8    | \$ 0.07        | \$ 0.57       | McMaster Carr       | 90822A345    | <a href="#">McMaster Carr</a>       |
| <b>Vault Gate Frame</b> |                                                                           |      |      |                |               |                     |              |                                     |
| BA1                     | 1/2" Sch 40 PVC Elbow                                                     | Each | 6    | \$ 0.20        | \$ 1.20       | PVC Fittings Online | 406-005      | <a href="#">Home Depot</a>          |
| BB1                     | 1/2" Sch 40 PVC Tee                                                       | Each | 3    | \$ 0.24        | \$ 0.72       | PVC Fittings Online | 401-005      | <a href="#">PVC Fittings Online</a> |
| BG1                     | 1/2" PVC Furniture Grade Sling Tee                                        | Each | 3    | \$ 1.90        | \$ 5.70       | PVC Fittings Online |              | <a href="#">Home Depot</a>          |
| BC1R                    | 1/2" Sch 40 PVC Coupler                                                   | Each | 1    | \$ 0.14        | \$ 0.14       | PVC Fittings Online | 429-005      | <a href="#">PVC Fittings Online</a> |
| AA1.5                   | 1/2" Sch 40 PVC Pipe X 1.5" Lg                                            | Each | 2    | \$ 0.33        | \$ 0.66       | Local/Home Depot    |              | <a href="#">PVC Fittings Online</a> |
| AA2.5                   | 1/2" Sch 40 PVC Pipe X 2.5" Lg                                            | Each | 3    | \$ 0.05        | \$ 0.14       | Local/Home Depot    |              | <a href="#">Home Depot</a>          |
| AA2.75                  | 1/2" Sch 40 PVC Pipe X 2.75" Lg                                           | Each | 1    | \$ 0.05        | \$ 0.05       | Local/Home Depot    |              | <a href="#">Home Depot</a>          |
| AA3                     | 1/2" Sch 40 PVC Pipe X 3" Lg                                              | Each | 1    | \$ 0.06        | \$ 0.06       | Local/Home Depot    |              | <a href="#">Home Depot</a>          |
| AA4                     | 1/2" Sch 40 PVC Pipe X 4" Lg                                              | Each | 1    | \$ 0.07        | \$ 0.07       | Local/Home Depot    |              | <a href="#">Home Depot</a>          |
| AA4.25                  | 1/2" Sch 40 PVC Pipe X 4.25" Lg                                           | Each | 2    | \$ 0.16        | \$ 0.31       | Local/Home Depot    |              | <a href="#">Home Depot</a>          |
| AA17                    | 1/2" Sch 40 PVC Pipe X 17" Lg                                             | Each | 2    | \$ 0.31        | \$ 0.62       | Local/Home Depot    |              | <a href="#">Home Depot</a>          |
| AA3R                    | 1/2" Sch 40 PVC Pipe X 3" Lg (Red) (can use plain pipe and paint or tape) | Each | 1    | \$ 0.37        | \$ 0.37       | Home Depot          | P001FGP-RD-5 | <a href="#">PVC Fittings Online</a> |
| DA2                     | #8 X 5/8" Stainless Steel Flanged Head Self-Drilling Screw                | Each | 5    | \$ 0.07        | \$ 0.36       | McMaster Carr       | 90822A345    | <a href="#">McMaster Carr</a>       |
| <b>Gate Closing Arm</b> |                                                                           |      |      |                |               |                     |              |                                     |
| BF1                     | 1/2" PVC Sch 40 Snap-on Saddle Tee                                        | Each | 1    | \$ 0.44        | \$ 0.44       | PVC Fittings Online | 463-005      | <a href="#">PVC Fittings Online</a> |
| BA1                     | 1/2" Sch 40 PVC Elbow                                                     | Each | 2    | \$ 0.20        | \$ 0.40       | PVC Fittings Online | 406-005      | <a href="#">Home Depot</a>          |
| AA1.5                   | 1/2" Sch 40 PVC Pipe X 1.5" Lg                                            | Each | 1    | \$ 0.03        | \$ 0.03       | Local/Home Depot    |              | <a href="#">Home Depot</a>          |
| AA7                     | 1/2" Sch 40 PVC Pipe X 7" Lg                                              | Each | 1    | \$ 0.13        | \$ 0.13       | Local/Home Depot    |              | <a href="#">PVC Fittings Online</a> |
| DA2                     | #8 X 5/8" Stainless Steel Flanged Head Self-Drilling Screw                | Each | 4    | \$ 0.07        | \$ 0.29       | McMaster Carr       | 90822A345    | <a href="#">McMaster Carr</a>       |

| Drawing<br>Part Number             | Item                                                        | Unit | Qty. | Est. Cost<br>Each | Extended<br>Cost | Suggested Vendor     | Part Number       | Vendor Link                         |
|------------------------------------|-------------------------------------------------------------|------|------|-------------------|------------------|----------------------|-------------------|-------------------------------------|
| <b>Garbage Patch Ring</b>          |                                                             |      |      |                   |                  |                      |                   |                                     |
| BB1                                | 1/2" Sch 40 PVC Tee                                         | Each | 2    | \$ 0.24           | \$ 0.48          | PVC Fittings Online  | 401-005           | <a href="#">PVC Fittings Online</a> |
| BC1                                | 1/2" Sch 40 PVC Cross                                       | Each | 3    | \$ 0.74           | \$ 2.22          | PVC Fitting Online   | 420-005           | <a href="#">PVC Fittings Online</a> |
| AAP76.0                            | 1/2" PEX Pipe X 76" Lg                                      | Each | 2    | \$ 2.43           | \$ 4.86          | Local/Home Depot     | 1004706347        | <a href="#">Home Depot</a>          |
| AA1                                | 1/2" Sch 40 PVC Pipe 1" Lg                                  | Each | 4    | \$ 0.02           | \$ 0.07          | Local/Home Depot     |                   | <a href="#">Home Depot</a>          |
| AA12                               | 1/2" Sch 40 Pipe X 12" Lg                                   | Each | 2    | \$ 0.07           | \$ 0.14          | Local/Home Depot     |                   | <a href="#">Home Depot</a>          |
| DA2                                | #8 X 5/8" Stainless Steel Flanged Head Self-Drilling Screw  | Each | 6    | \$ 0.07           | \$ 0.43          | McMaster Carr        | 90822A345         | <a href="#">McMaster Carr</a>       |
| C8                                 | 8" Cable Tie (Buy per total qty needed                      | Each | 3    | \$ 0.02           | \$ 0.06          | Local/Home Depot     | 748726            |                                     |
| N2.5                               | Float, 2.5" Dia. X 2.5" Lg (Pool Noodle)                    | Each | 1    |                   |                  | Buy Locally          |                   |                                     |
| N2                                 | Float, 2.5" Dia. X 2" Lg (Pool Noodle)                      | Each | 2    |                   |                  | Buy Locally          |                   |                                     |
| <b>Weighted Wiffle Ball (each)</b> |                                                             |      |      |                   |                  |                      |                   |                                     |
| W2.86                              | 2.86 DIA. Wiffle Ball                                       | Each | 1    | \$ 0.78           | \$ 0.78          | Amazon or Conn Store | Connecticut Store | <a href="#">Amazon</a>              |
| W3.86                              | 3.75 to 3.86 DIA. Wiffle Ball                               | Each | 1    | \$ 0.80           | \$ 0.80          | Amazon or Conn Store | Connecticut Store | <a href="#">Amazon</a>              |
| P1                                 | 1/4" X 1.5" Dia. X .055" Thk. Stainless Steel Fender Washer | Each | 6    | \$ 0.22           | \$ 1.33          | McMaster or Amazon   | McMaster          | <a href="#">Amazon</a>              |
| H2                                 | 1/4 in. x 14" Polypropylene Twist Rope, Yellow              | Each | 1    | \$ 0.48           | \$ 0.48          | Home Depot           |                   | <a href="#">Home Depot</a>          |
| C8                                 | 8" Cable Tie (Buy per total qty needed)                     | Each | 5    | \$ 0.02           | \$ 0.10          | Local/Home Depot     | 748726            |                                     |

4

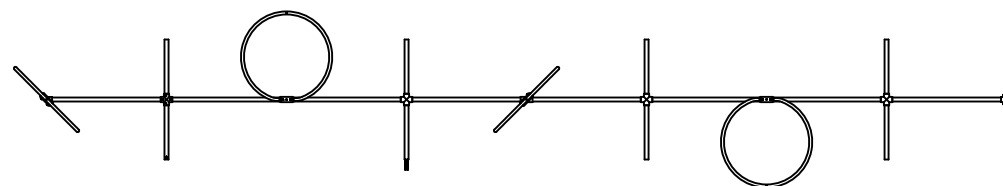
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2

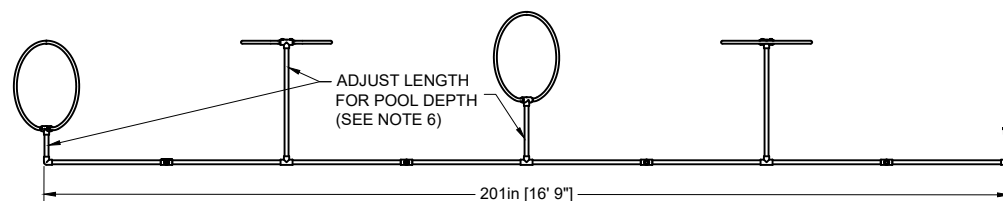
1

## PARTS LIST

| ITEM | QTY | PART NUMBER | DESCRIPTION                                                  | MATERIAL        |
|------|-----|-------------|--------------------------------------------------------------|-----------------|
| 1    | 2   | BA1         | 1/2" SCH 40PVC ELBOW                                         | PVC-PIPING      |
| 2    | 2   | AA6         | 1/2" SCH 40 PVC PIPE X 6" LG                                 | PVC-PIPING      |
| 3    | 10  | AA24        | 1/2" SCH 40 PVC PIPE X 24" LG                                | PVC-PIPING      |
| 4    | 4   | BC1         | 1/2" SCH 40 PVC CROSS                                        | PVC-PIPING      |
| 5    | 3   | BB1         | 1/2" SCH 40 PVC TEE                                          | PVC-PIPING      |
| 6    | 9   | AA12        | 1/2" SCH 40 PVC PIPE X 12" LG                                | PVC-PIPING      |
| 7    | 4   | EA24        | #4 REBAR (.5" DIA.) X 24" LG                                 | STEEL           |
| 8    | 42  | DA1         | FLANGED HEX HEAD NO 8 SHEET METAL SCREW (MCMASTER 90286A194) | STAINLESS STEEL |
| 9    | 3   |             | OBSTACLE COURSE VERTICAL HOOP ASSEMBLY                       |                 |
| 10   | 2   |             | OBSTACLE COURSE HORIZONTAL HOOP ASSEMBLY                     |                 |

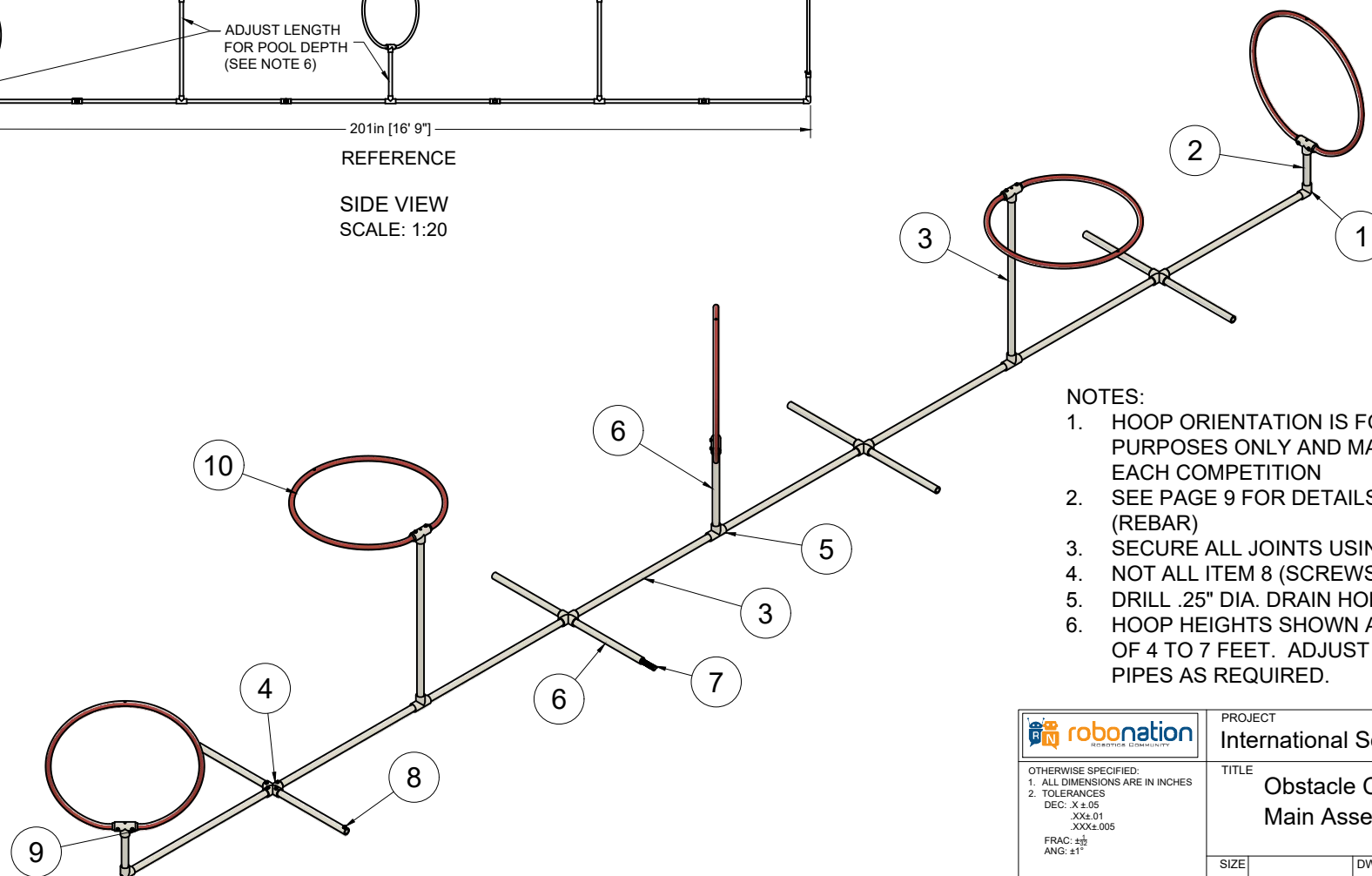


TOP VIEW  
SCALE: 1:20



REFERENCE

SIDE VIEW  
SCALE: 1:20



## NOTES:

1. HOOP ORIENTATION IS FOR ILLUSTRATIVE PURPOSES ONLY AND MAY BE DIFFERENT AT EACH COMPETITION
2. SEE PAGE 9 FOR DETAILS ON SECURING ITEM 7 (REBAR)
3. SECURE ALL JOINTS USING ITEM 8
4. NOT ALL ITEM 8 (SCREWS) SHOWN IN DRAWING
5. DRILL .25" DIA. DRAIN HOLE IN ITEM 1
6. HOOP HEIGHTS SHOWN ARE FOR POOL DEPTHS OF 4 TO 7 FEET. ADJUST HOOP CONNECTING PIPES AS REQUIRED.



OTHERWISE SPECIFIED:  
1. ALL DIMENSIONS ARE IN INCHES  
2. TOLERANCES  
DEC: X ± .05  
XX: .01  
XXX: .005  
FRAC:  $\frac{1}{16}$   
ANG: ± 1°

DATE 10/13/18

## PROJECT

International SeaPerch Challenge

## TITLE

Obstacle Course - Floor  
Main Assembly

SIZE  
C

DWG NO  
SPCXX-F-Obstacle-01

REV

SCALE 1:10

SHEET 1/2

4

3

2

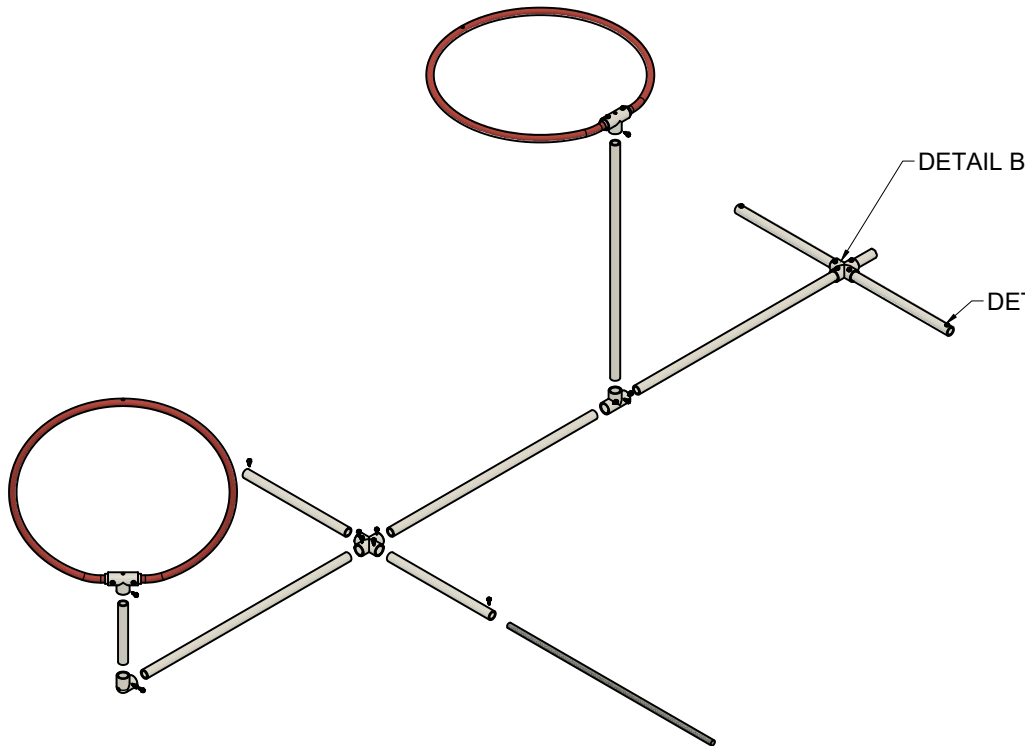
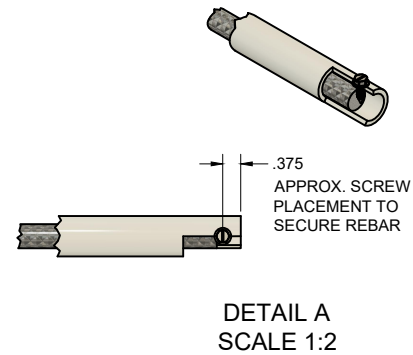
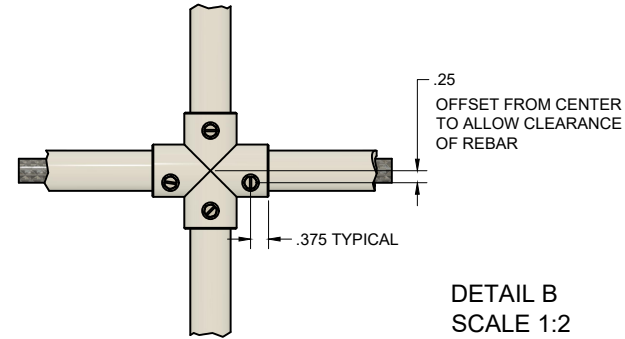
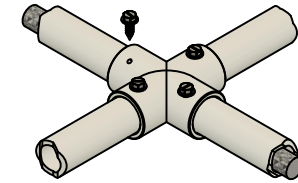
1

D

C

B

A



PARTIAL EXPLODED VIEW



OTHERWISE SPECIFIED:  
1. ALL DIMENSIONS ARE IN INCHES  
2. TOLERANCES  
DEC:  $X \pm .05$   
XXX:  $.01$   
XXX:  $\pm .005$   
FRAC:  $\frac{1}{8}$   
ANG:  $\pm 1^\circ$

DATE 10/30/18

PROJECT

International SeaPerch Challenge

TITLE

Obstacle Course - Floor  
Main Assembly Details

SIZE  
C

DWG NO

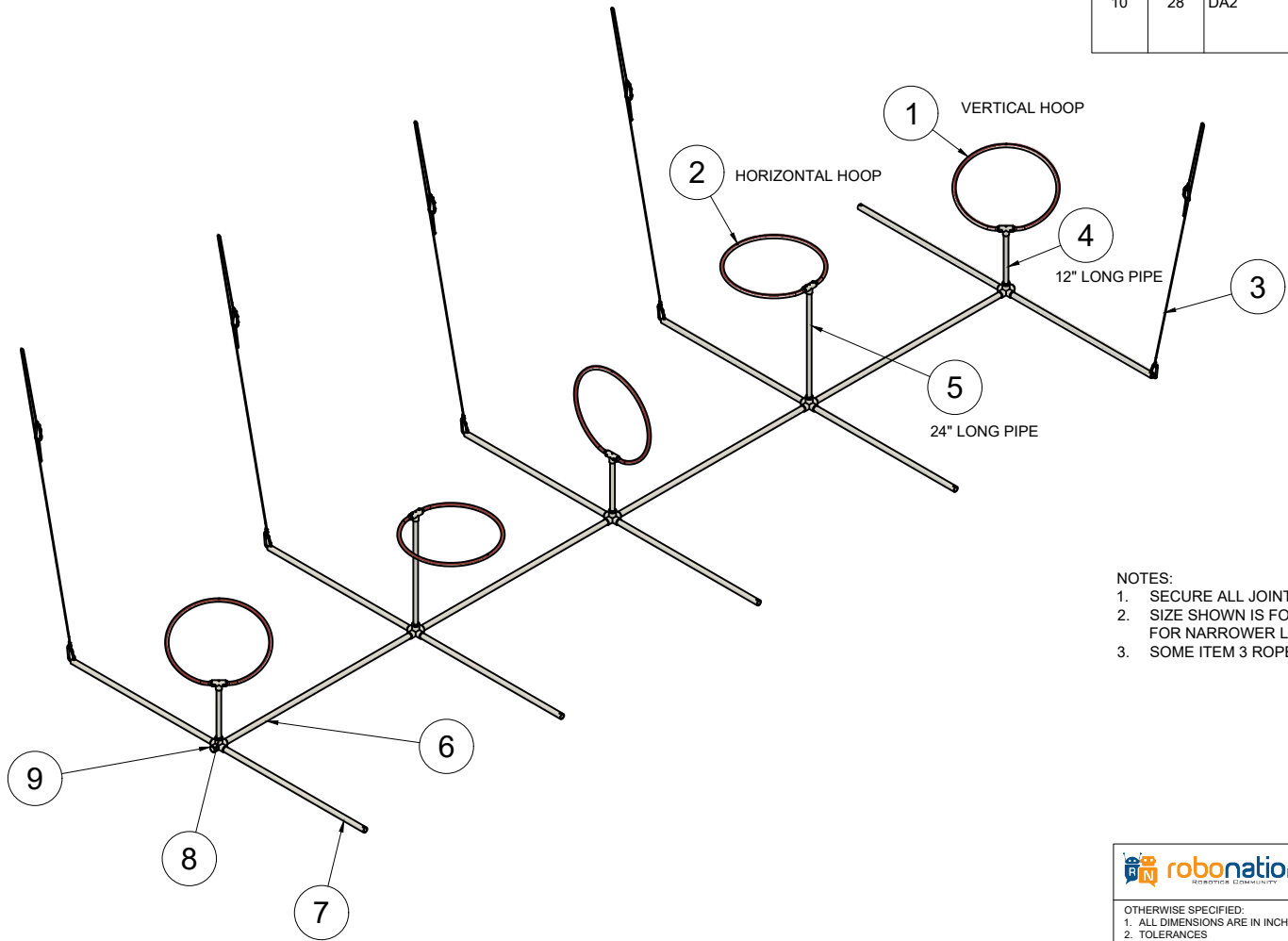
SPCXX-F-Obstacle-01

REV

SCALE 1:8

SHEET 2/2

| REFERENCE | PARTS LIST |     |             |                                                            |                 |
|-----------|------------|-----|-------------|------------------------------------------------------------|-----------------|
|           | ITEM       | QTY | PART NUMBER | DESCRIPTION                                                | MATERIAL        |
| Page 13   | 1          | 3   |             | OBSTACLE COURSE VERTICAL HOOP ASSEMBLY                     |                 |
| Page 14   | 2          | 2   |             | OBSTACLE COURSE HORIZONTAL HOOP ASSEMBLY                   |                 |
| Page 20   | 3          | 10  |             | SUSPENSION ROPE ASSEMBLY                                   |                 |
|           | 4          | 3   | AA12        | PVC SCH 40 PIPE, 1/2" X 12" LG                             | PVC-PIPING      |
|           | 5          | 2   | AA24        | 1/2" SCH 40 PVC PIPE X 24" LG                              | PVC-PIPING      |
|           | 6          | 4   | AB48        | 3/4" SCH 40 PVC PIPE X 48" LG                              | PVC-PIPING      |
|           | 7          | 10  | AB36        | 3/4" SCH 40 PVC PIPE X 36" LG                              | PVC-PIPING      |
|           | 8          | 5   | BD1         | 3/4" X 1/2" SCH 40 PVC REDUCING BUSHING                    | PVC-PIPING      |
|           | 9          | 5   | BH2         | 3/4" FORMUFIT 5-WAY PVC CROSS                              | PVC-PIPING      |
|           | 10         | 28  | DA2         | #8 X 5/8" STAINLESS STEEL FLANGED HEAD SELF-DRILLING SCREW | STAINLESS STEEL |



- NOTES:
- 1. SECURE ALL JOINTS USING ITEM 10 SCREWS (NOT SHOWN).
  - 2. SIZE SHOWN IS FOR 6' TO 9' WIDE LANES. ADJUST LENGTH OF ITEM 7 PIPES FOR NARROWER LANES.
  - 3. SOME ITEM 3 ROPES REMOVED FOR DRAWING CLARITY.

|                                                                                       |                                                    |           |  |
|---------------------------------------------------------------------------------------|----------------------------------------------------|-----------|--|
|  | PROJECT<br>International SeaPerch Challenge        |           |  |
|                                                                                       | TITLE<br>Obstacle Course - Suspended Main Assembly |           |  |
| SIZE<br>C                                                                             | DWG NO<br>SPCXX-S-Obstacle-01                      | REV       |  |
| DATE<br>9/7/19                                                                        | SCALE<br>1:20                                      | SHEET 1/3 |  |

4

3

2

1

D

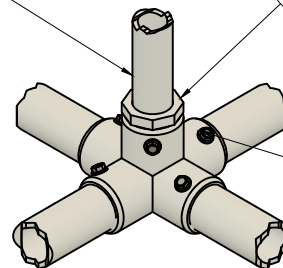
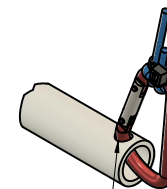
D

HOOP SUPPORT PIPE

8

 $\frac{3}{4}$ " x  $\frac{1}{2}$ " REDUCING BUSHING

10

#8 X  $\frac{5}{8}$ " FLANGED HEAD  
SEAL-DRILLING SCREWSRECOMMENDED FRAME  
CONNECTION JOINT  
SCALE: 1:2

3

SUSPENSION ROPE  
ASSEMBLYSUSPENSION ROPE  
CONNECTION

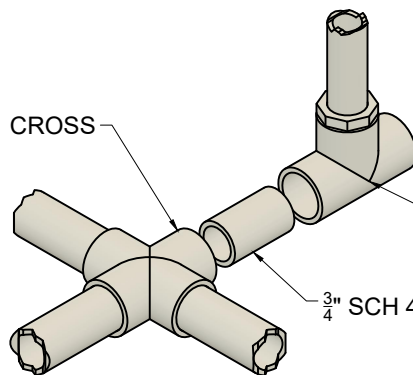
7

OUTRIGGER  
PIPESDRILL  $.375$  ( $\frac{3}{8}$ )  
DIA. THRU TOP  
WALL ONLY

.38

CARABINER HOLE DETAILS  
SCALE: 1:1

CROSS



TEE

 $\frac{3}{4}$ " SCH 40 PVC PIPE X 1.75" LGOPTIONAL JOINT MAKEUP REPLACING 5-WAY CROSS  
(USING 5-WAY CROSSES REQUIRES FEWER PARTS  
AND LESS TIME TO ASSEMBLE)  
SCALE: 1:2

C

C

B

B

A

A



OTHERWISE SPECIFIED:  
1. ALL DIMENSIONS ARE IN INCHES  
2. TOLERANCES  
DEC:  $X \pm .05$   
XX:  $.01$   
XXX:  $\pm .005$   
FRAC:  $\frac{1}{16}$   
ANG:  $\pm 1^\circ$

DATE 9/8/19

PROJECT

International SeaPerch Challenge

TITLE

Obstacle Course - Suspended  
Main Assembly Details

SIZE

C

DWG NO

SPCXX-S-Obstacle-01

REV

SCALE 1:1

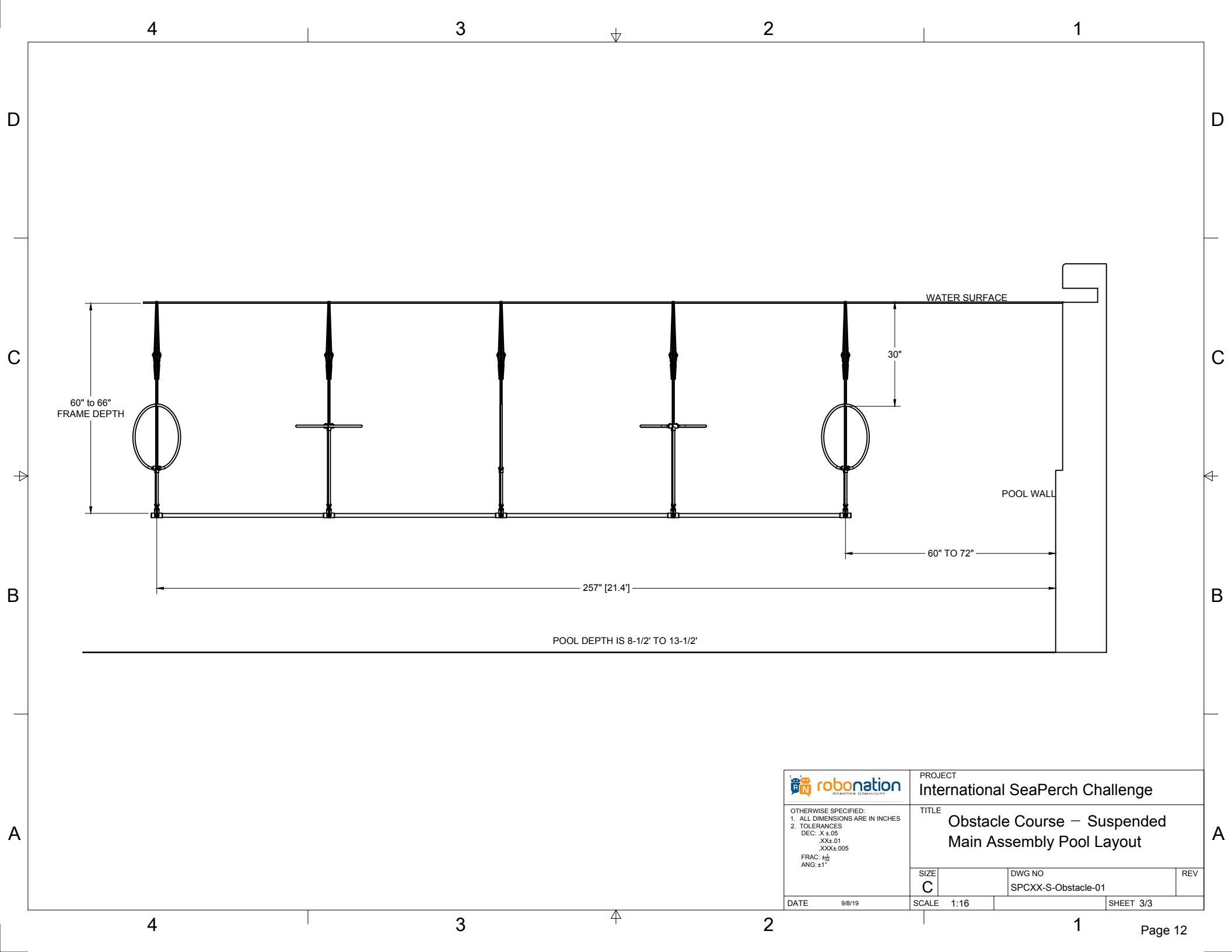
SHEET 2/3

4

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1



|                                                                                                                                                                                                                                                      |               |                                                                   |           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------------------------------------------------------------|-----------|
|                                                                                                                                                                 |               | PROJECT<br>International SeaPerch Challenge                       |           |
| <p>OTHERWISE SPECIFIED:<br/>1. ALL DIMENSIONS ARE IN INCHES<br/>2. TOLERANCES<br/>DEC: <math>X \pm .05</math><br/>XXX: <math>.01</math><br/>XXX: <math>\pm .005</math><br/>FRAC: <math>\pm \frac{1}{32}</math><br/>ANG: <math>\pm 1^\circ</math></p> |               | TITLE<br>Obstacle Course – Suspended<br>Main Assembly Pool Layout |           |
|                                                                                                                                                                                                                                                      |               | SIZE<br>C                                                         | REV       |
| DATE<br>9/8/19                                                                                                                                                                                                                                       | SCALE<br>1:16 | DWG NO<br>SPCXX-S-Obstacle-01                                     | SHEET 3/3 |



4

3

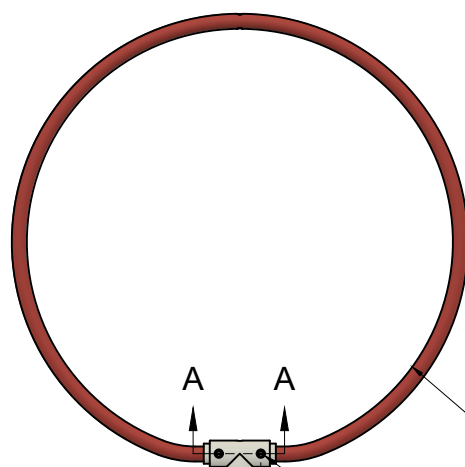
2

1

| PARTS LIST |     |             |                                                            |                            |
|------------|-----|-------------|------------------------------------------------------------|----------------------------|
| ITEM       | QTY | PART NUMBER | DESCRIPTION                                                | MATERIAL                   |
| 1          | 1   | BB1         | 1/2" SCH 40 PVC TEE                                        | PVC-PIPING                 |
| 2          | 2   | AA1         | 1/2" SCH 40 PVC PIPE X 1" LG                               | PVC-PIPING                 |
| 3          | 1   | AAP57       | 1/2" PEX TUBING (RED) X 57" LG                             | POLYETHYLENE, HIGH DENSITY |
| 4          | 2   | DA2         | #8 X 5/8" STAINLESS STEEL FLANGED HEAD SELF-DRILLING SCREW | STAINLESS STEEL            |



TOP VIEW



.375 TYPICAL  
(DRILL  $\frac{3}{32}$ " PILOT  
2 PLACES)

FRONT VIEW

SECTION A-A  
SCALE 1:2

ITEM 3 (PEX PIPE)  
FULLY INSERTED IN  
ITEM 2 (1" LONG PVC  
PIPE)

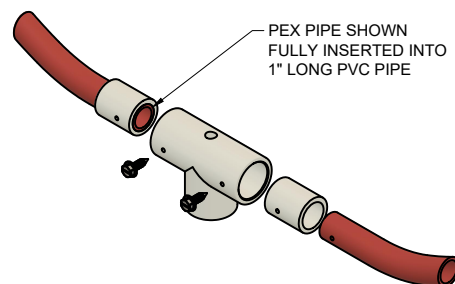
3

1

2

DRILL .09375 ( $\frac{3}{32}$ ") DIA. HOLE  
THRU ONE WALL ONLY  
(DRAIN HOLE,  
LOCATION NOT CRITICAL)

DRILL .25 DIA. HOLE  
(DRAIN HOLE,  
LOCATION NOT CRITICAL)

EXPLODED ASSEMBLY  
DETAIL  
SCALE 1:2

PEX PIPE SHOWN  
FULLY INSERTED INTO  
1" LONG PVC PIPE

## NOTES:

1. PEX PIPE MAY NOT SLIDE EASILY INTO PVC PIPE. PVC PIPE CAN BE DRILLED USING .625 DIA DRILL BIT.



OTHERWISE SPECIFIED:  
1. ALL DIMENSIONS ARE IN INCHES  
2. TOLERANCES  
DEC:  $X \pm .05$   
XX:  $.01$   
XXX:  $\pm .005$   
FRAC:  $\frac{1}{16}$   
ANG:  $\pm 1^\circ$

DATE 10/22/18

## PROJECT

International SeaPerch Challenge

## TITLE

Obstacle Course  
Vertical Hoop AssemblySIZE  
C

DWG NO

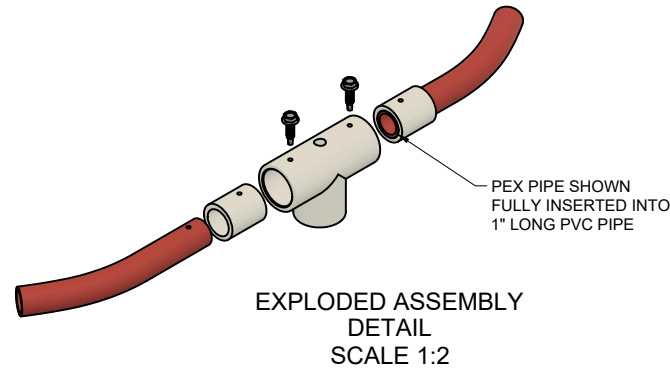
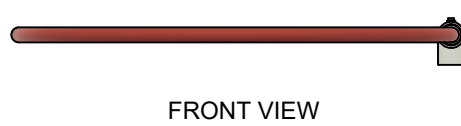
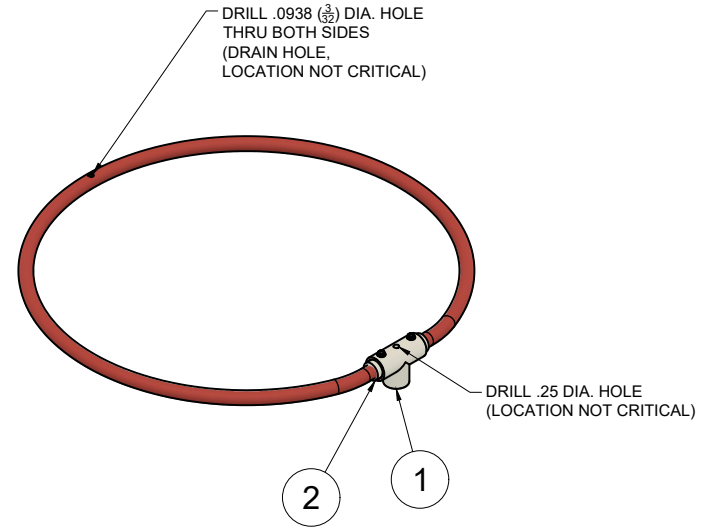
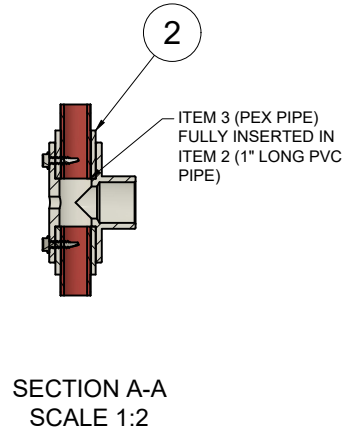
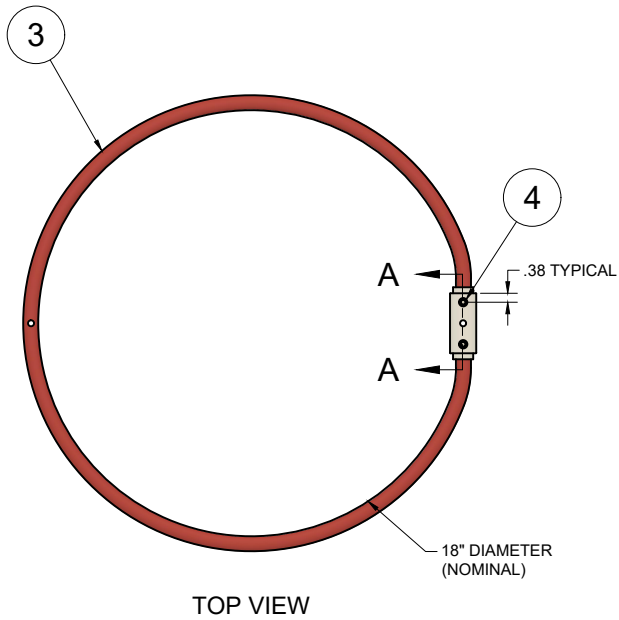
SPCXX-U-Obstacle-02

REV

SCALE 1:4

SHEET 1/1

| PARTS LIST |     |             |                                                            |                            |
|------------|-----|-------------|------------------------------------------------------------|----------------------------|
| ITEM       | QTY | PART NUMBER | DESCRIPTION                                                | MATERIAL                   |
| 1          | 1   | BB1         | 1/2" SCH 40 PVC TEE                                        | PVC-PIPING                 |
| 2          | 2   | AA1         | 1/2" SCH 40 PVC PIPE X 1" LG                               | PVC-PIPING                 |
| 3          | 1   | AAP57       | 1/2" PEX TUBING (RED) X 57" LG                             | POLYETHYLENE, HIGH DENSITY |
| 4          | 4   | DA2         | #8 X 5/8" STAINLESS STEEL FLANGED HEAD SELF-DRILLING SCREW | STAINLESS STEEL            |



#### NOTES:

1. PEX PIPE MAY NOT SLIDE EASILY INTO PVC PIPE. PVC PIPE CAN BE DRILLED USING .625 DIA DRILL BIT.



OTHERWISE SPECIFIED:  
1. ALL DIMENSIONS ARE IN INCHES  
2. TOLERANCES  
DEC: X ± .05  
XX: .01  
XXX: ± .005  
FRAC:  $\frac{1}{16}$   
ANG: ± 1°

DATE 10/22/18

#### PROJECT

International SeaPerch Challenge

#### TITLE

Obstacle Course  
Horizontal Hoop Assembly

SIZE  
C

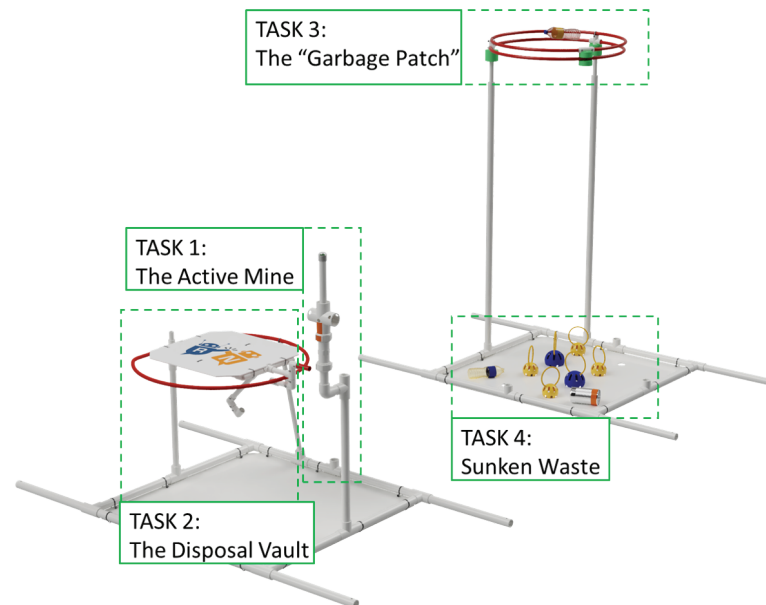
DWG NO  
SPCXX-U-Obstacle-03

REV

SCALE 1:2

SHEET 1/1

|                                                      |               |
|------------------------------------------------------|---------------|
| <b>4. Course Build Engineering Drawings.....</b>     | <b>8 - 37</b> |
| 4.2. <i>Mission Course Assembly</i> .....            | 15 - 25       |
| - <i>Main Assembly</i> .....                         | 16 - 25       |
| > <i>Reconfiguring the 2019 Mission Course</i> ..... | 17            |
| > <i>Suspended Assembly</i> .....                    | 18 - 20       |
| > <i>Task Platforms</i> .....                        | 21 - 25       |
| - <i>Task Assembly</i> .....                         | 26 - 37       |
| > <i>Task #1: Active Mine</i> .....                  | 26 - 30       |
| > <i>Task #2: Disposal Vault</i> .....               | 31 - 35       |
| > <i>Task #3: Garbage Patch</i> .....                | 36            |
| > <i>Task #4: Sunken Waste</i> .....                 | 37            |



4

3

2

1

| PARTS LIST |     |               |                                    |
|------------|-----|---------------|------------------------------------|
| ITEM       | QTY | REFERENCE     | DESCRIPTION                        |
| 1          | 1   | Page 19       | DISPOSAL PLATFORM ASSEMBLY         |
| 2          | 1   | Page 20       | WASTE PLATFORM ASSEMBLY            |
| 4          | 1   | Page 29       | DISPOSAL VAULT ASSEMBLY            |
| 5          | 1   | Pages 24 - 28 | ACTIVE MINE ASSEMBLY               |
| 6          | 1   | Pages 24 & 25 | ACTIVE MINE ARMING DEVICE ASSEMBLY |
| 7          | 1   | Page 34       | GARBAGE PATCH RING ASSEMBLY        |
| 8          | 2   | Page 35       | MEDIUM SIZE MINE ASSEMBLY          |
| 9          | 4   | Page 35       | LARGE SIZE MINE ASSEMBLY           |
| 10         | TBD |               | FLOATING DEBRIS                    |
| 11         | TBD |               | SUNKEN DEBRIS                      |

## NOTE:

1. THE MISSION COURSE CAN BE USED ON THE POOL FLOOR OR SUSPENDED BY USING SUSPENSION ROPES (SEE PAGE 18)

OUT RIGGER PIPES NOT  
NEEDED IF MISSION  
COURSE IS CONFIGURED  
FOR USE ON POOL FLOOR.



OTHERWISE SPECIFIED:  
1. ALL DIMENSIONS ARE IN INCHES  
2. TOLERANCES  
DEC:  $\pm .05$   
XXX: .01  
XXX:  $\pm .005$   
FRAC:  $\frac{1}{16}$   
ANG:  $\pm 1^\circ$

## PROJECT

International SeaPerch Challenge

## TITLE

Mission Course  
Main Assembly

SIZE  
C

DWG NO  
SPC20-X-Mission-01

REV

DATE 9/8/19

SCALE 1:10

SHEET 1/3

4

3

2

1

# RECONFIGURING 2019 MISSION COURSE FOR 2020 MISSION

2019 STANDALONE MISSION COURSE

IF COMBINED MISSION/OBSTACLE COURSE IS BEING USED THEN ADJUST AS NECESSARY.

REMOVE STAGING STATION

REMOVE GUSSETS

ADJUST LENGTH OF ITEM 10 PIPES FOR POOL DEPTH

REMOVE HOOP AND VERTICAL SUPPORT PIPE

CLOSING ARM HIDDEN FROM VIEW

ITEM 7 (1" PIPE) AND ITEM 9 (1/2" PIPE) ARE NOT RIGIDLY CONNECTED WHICH ALLOWS GARBAGE PATCH RING TO FLOAT ON SURFACE AND LIMITS HORIZONTAL MOVEMENT OF RING.

DEBRIS ITEMS AND QUANTITY ARE AT THE DISCRETION OF THE REGIONAL COORDINATORS

IF EXISTING VAULT GATE IS BEING USED, RETROFIT VAULT CLOSING ARM ASSEMBLY BY SNAPPING SNAP-ON SADDLE TEE TO FRONT OF FRAME. ADJUST TO 45° ANGLE. ADJUST FLOATATION SO GATE OPENS WHEN UNLATCHED AND CLOSURES WHEN WEIGHTED WIFFLE BALL IS HOOKED ON TO CLOSING ARM.

REPLACE ORIGINAL TEE WITH ITEM 12 (CROSS) AND ADD ITEM 14 (1/2" X 2" LG PVC PIPE. THIS PREVENTS THE GATE FROM OPENING TOO FAR.

ADD TO STABILIZE VAULT

NOTES:

1. SECURING PIPE JOINTS WITH #8 X 1/2" OR 5/8" LONG SELF DRILLING STAINLESS STEEL SCREWS IS RECOMMENDED.

## PARTS LIST

| ITEM | QTY | PART NUMBER | DESCRIPTION                            | MATERIAL   |
|------|-----|-------------|----------------------------------------|------------|
| 1    | 1   |             | VAULT GATE CLOSING ARM ASSEMBLY        |            |
| 2    | 1   |             | ACTIVE MINE AND ARMING DEVICE ASSEMBLY |            |
| 3    | 1   |             | GARBAGE PATCH RING ASSEMBLY            |            |
| 4    | 2   |             | MEDIUM SIZE MINE ASSEMBLY              |            |
| 5    | 1   |             | LARGE SIZE MINE ASSEMBLY               |            |
| 6    | 1   |             | FLOATING AND SUNKEN DEBRIS             |            |
| 7    | 2   | BD2         | 1" X 1/2" SCH 40 PVC REDUCING COUPLER  | PVC-PIPING |
| 8    | 2   | AC12        | 1" SCH 40 PVC PIPE X 12" LG            | PVC-PIPING |
| 9    | 3   | BF1         | 1/2" SCH 40 PVC SNAP-ON SADDLE         | PVC-PIPING |
| 10   | 2   | AA28        | 1/2" PVC SCH 40 PIPE X 28" LG          | PVC-PIPING |
| 11   | 2   | AA36        | 1/2" SCH 40 PVC PIPE X 36" LG          | PVC-PIPING |
| 12   | 4   | BA1         | 1/2" SCH 40 PVC ELBOW                  | PVC-PIPING |
| 13   | 2   | BC1         | 1/2" SCH 40 PVC CROSS                  | PVC-PIPING |
| 14   | 2   | AA18        | 1/2" PVC SCH 40 PIPE X 18" LG          | PVC-PIPING |
| 15   | 1   | AA2         | 1/2" SCH 40 PVC PIPE X 2" LG           | PVC-PIPING |
| 16   | 1   | AA30.25     | 1/2" PVC SCH 40 PIPE X 30.25" LG       | PVC-PIPING |
| 17   | 1   |             | 2019 BEACON STAND                      |            |
| 18   | 1   |             | 2019 VAULT                             |            |
| 19   | 1   |             | 2019 MISSION FRAME                     | PVC-PIPING |

ITEM 7 (1" PIPE) AND ITEM 9 (1/2" PIPE) ARE NOT RIGIDLY CONNECTED WHICH ALLOWS GARBAGE PATCH RING TO FLOAT ON SURFACE AND LIMITS HORIZONTAL MOVEMENT OF RING.

DRILL .25 DIA THRU HOLE IN END OF ITEM 16 PIPE. CABLE TIE PEX TUBING TO PIPE



OTHERWISE SPECIFIED:  
1. ALL DIMENSIONS ARE IN INCHES  
2. TOLERANCES  
DEC: X ± .05  
XXX: .01  
XXX ± .005  
FAC: ± .01  
ANG: ± 1°

PROJECT

International SeaPerch Challenge

TITLE

Mission Course  
Reconfiguring the 2019 Mission Course

SIZE  
C

DWG NO

SPC20-F-Mission-01

REV

DATE 9/10/19

SCALE 1:16

SHEET 1/1

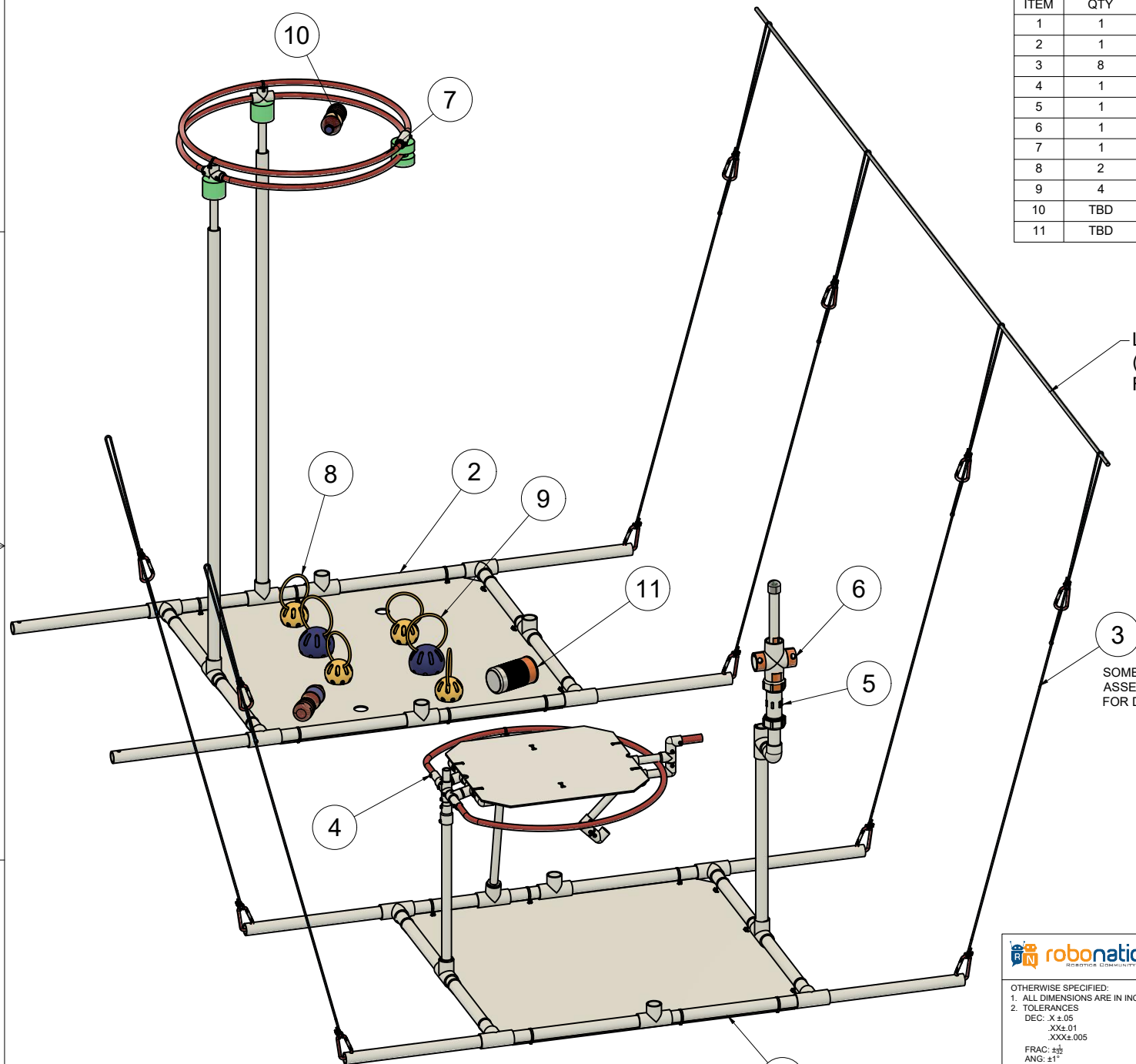
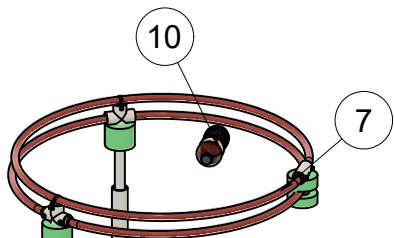
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| PARTS LIST |     |               |                                    |
|------------|-----|---------------|------------------------------------|
| ITEM       | QTY | REFERENCE     | DESCRIPTION                        |
| 1          | 1   | Page 19       | DISPOSAL PLATFORM ASSEMBLY         |
| 2          | 1   | Page 20       | WASTE PLATFORM ASSEMBLY            |
| 3          | 8   | Page 18       | SUSPENSION ROPES ASSEMBLY          |
| 4          | 1   | Page 29       | DISPOSAL VAULT ASSEMBLY            |
| 5          | 1   | Pages 24 - 28 | ACTIVE MINE ASSEMBLY               |
| 6          | 1   | Pages 24 & 25 | ACTIVE MINE ARMING DEVICE ASSEMBLY |
| 7          | 1   | Page 34       | GARBAGE PATCH RING ASSEMBLY        |
| 8          | 2   | Page 35       | MEDIUM SIZE MINE ASSEMBLY          |
| 9          | 4   | Page 35       | LARGE SIZE MINE ASSEMBLY           |
| 10         | TBD |               | FLOATING DEBRIS                    |
| 11         | TBD |               | SUNKEN DEBRIS                      |



LANE DIVIDER CABLES  
(LEFT SIDE CABLE REMOVED  
FOR DRAWING CLARITY)

SOME SUSPENSION ROPE  
ASSEMBLIES REMOVED  
FOR DRAWING CLARITY



OTHERWISE SPECIFIED:  
1. ALL DIMENSIONS ARE IN INCHES  
2. TOLERANCES  
DEC:  $X \pm .05$   
XXX:  $.01$   
XXX:  $\pm .005$   
FRAC:  $\frac{1}{16}$   
ANG:  $\pm 1^\circ$

PROJECT  
International SeaPerch Challenge

TITLE  
Mission Course - Suspended  
Main Assembly

SIZE  
C

DWG NO  
SPC20-S-Mission-01

REV

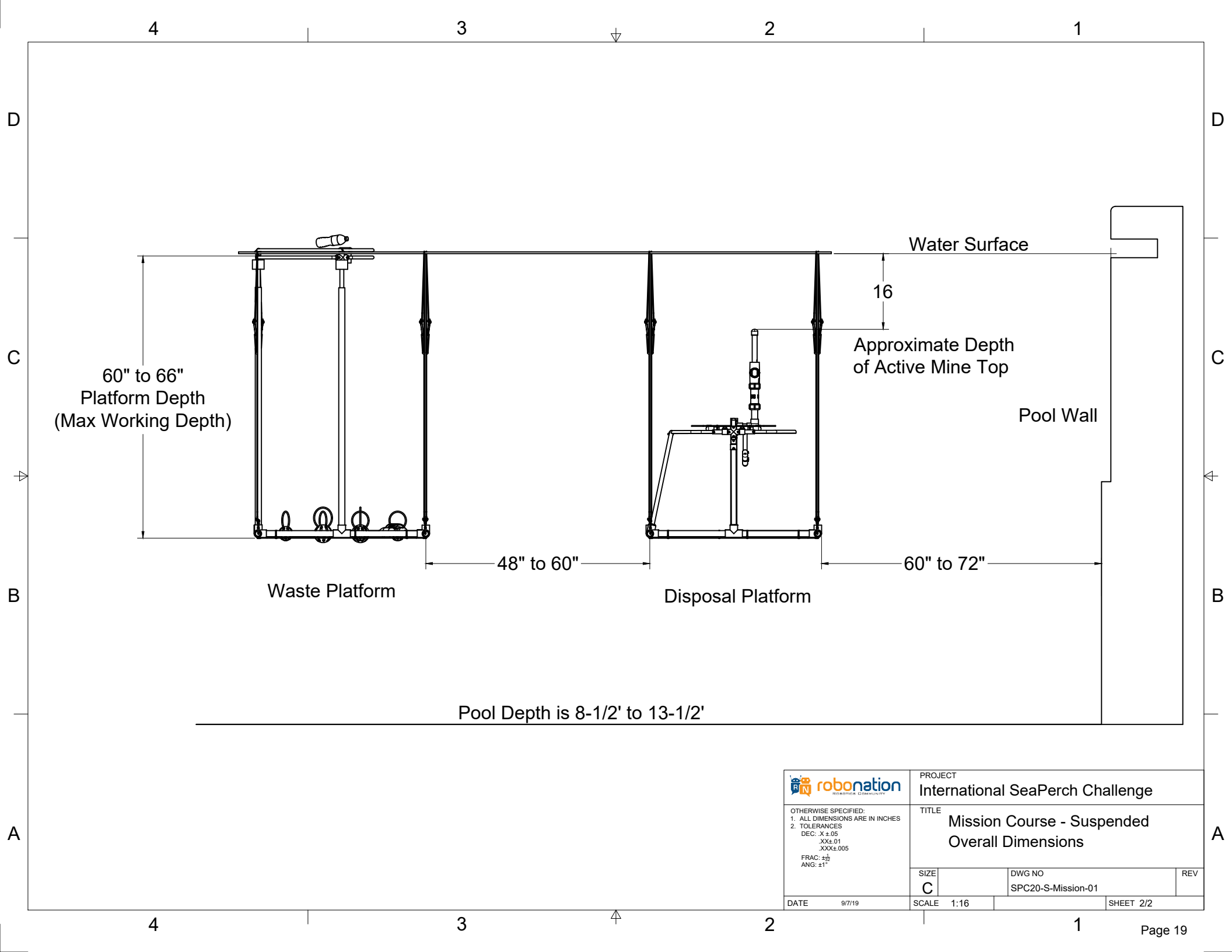
DATE 9/8/19 SCALE 1:10 SHEET 1/2

4

3

2

1



|                                                                                                                                                     |               |                                                           |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------------------------------------|-----|
|                                                                |               | PROJECT<br>International SeaPerch Challenge               |     |
| OTHERWISE SPECIFIED:<br>1. ALL DIMENSIONS ARE IN INCHES<br>2. TOLERANCES<br>DEC: X ±.05<br>XX: .01<br>XXX ±.005<br>FRAC: $\frac{1}{32}$<br>ANG: ±1° |               | TITLE<br>Mission Course - Suspended<br>Overall Dimensions |     |
| SIZE<br>C                                                                                                                                           |               | DWG NO<br>SPC20-S-Mission-01                              | REV |
| DATE<br>9/7/19                                                                                                                                      | SCALE<br>1:16 | SHEET 2/2                                                 |     |

4

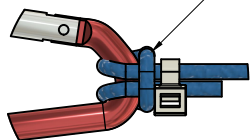
3

2

1

## PARTS LIST

| ITEM | QTY | PART NUMBER | DESCRIPTION                            | MATERIAL      |
|------|-----|-------------|----------------------------------------|---------------|
| 1    | 2   | G3          | 5/16" X 3" SPRING LINK CARABINER       | ALUMINUM      |
| 2    | 2   | C8          | 8" CABLE TIE                           | NYLON 6       |
| 3    | 1   | H1          | 5/32" POLYPROPYLENE DIAMOND BRAID ROPE | POLYPROPYLENE |

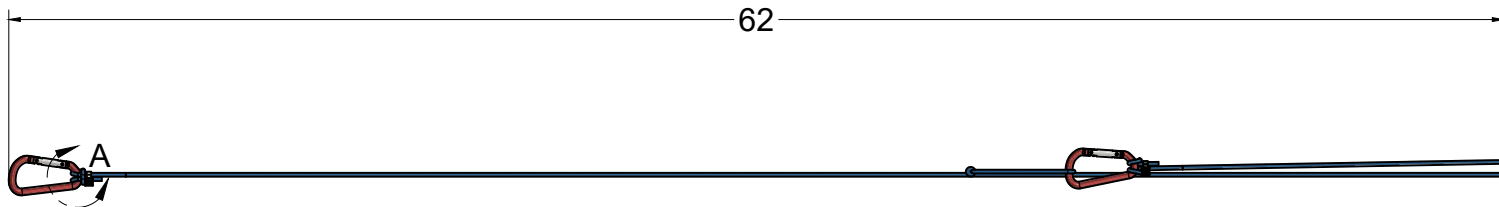


TIE ACCEPTABLE KNOT.  
SECURE USING CABLE TIE.

DETAIL A  
SCALE 1:1

ADJUST OVERALL LENGTH AS NECESSARY TO ACHIEVE  
DESIRED PLATFORM DEPTH. THIS LENGTH SHOULD BE HELD  
TO WITHIN .5" TO 1" BETWEEN ALL PLATFORM ROPES.

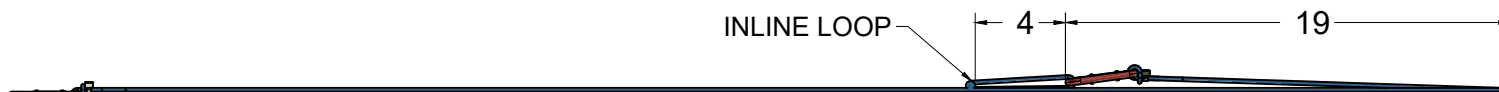
62



INLINE LOOP

4

19



THIS LENGTH IS NOT CRITICAL AND  
VARIATIONS BETWEEN ROPE SETS ARE  
ACCEPTABLE. THE OVERALL LENGTH  
DETERMINES THE PLATFORM DEPTH.



OTHERWISE SPECIFIED:  
1. ALL DIMENSIONS ARE IN INCHES  
2. TOLERANCES  
DEC:  $X \pm .05$   
XX:  $X \pm .01$   
XXX:  $X \pm .005$   
FRAC:  $\frac{1}{16}$   
ANG:  $\pm 1^\circ$

PROJECT

International SeaPerch Challenge

TITLE

Mission Course - Suspended  
Suspension Rope Assembly Details

SIZE

C

DWG NO

SPCXX-S-Mission-Ropes-01

REV

DATE 8/30/19

SCALE 1:5

SHEET 1/1

4

3

2

1



D

C

B

A

4

3

70  
REF39.5  
REF38  
REF

TOP VIEW

23  
REF

SIDE VIEW

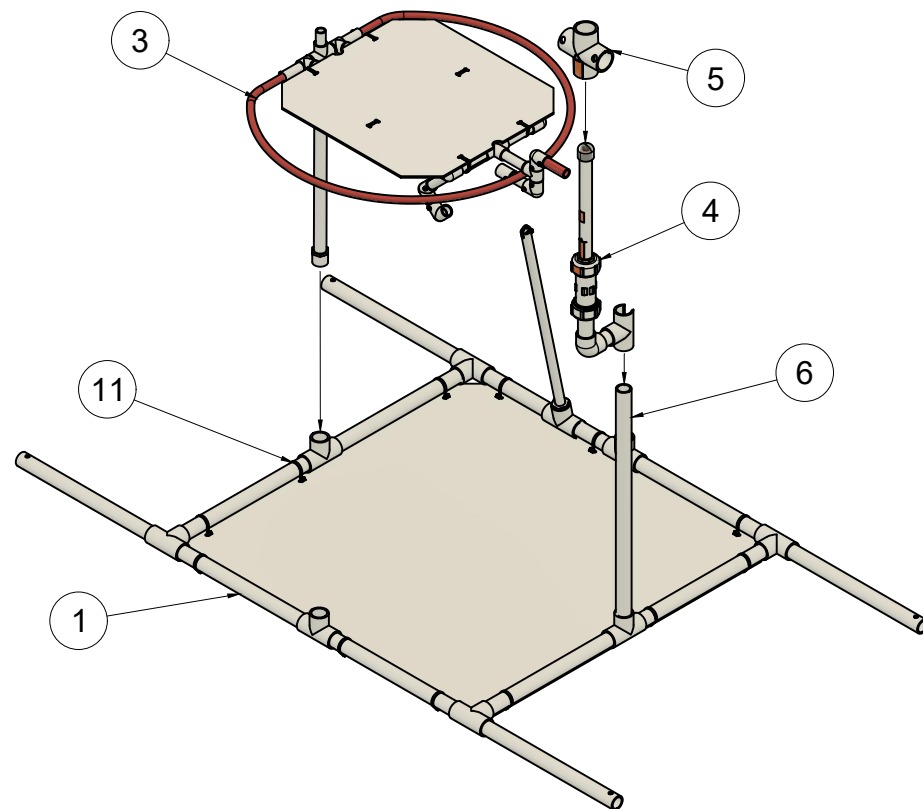
4

3

2

1

| REFERENCE | ITEM | QTY | PART NUMBER | PARTS LIST                                  |               |
|-----------|------|-----|-------------|---------------------------------------------|---------------|
|           |      |     |             | DESCRIPTION                                 | MATERIAL      |
| Page 23   | 1    | 1   |             | PLATFORM FRAME ASSEMBLY                     |               |
| Page 24   | 2    | 1   | F36X36      | POLYPROPYLENE SHEET, .157" THICK, 36" X 36" | POLYPROPYLENE |
| Page 31   | 3    | 1   |             | VAULT ASSEMBLY                              |               |
| Page 26   | 4    | 1   |             | ACTIVE MINE ASSEMBLY                        |               |
| Page 27   | 5    | 1   |             | ACTIVE MINE ARMING DEVICE                   |               |
|           | 6    | 1   | AA24        | 1" SCH 40 PVC PIPE X 24" LG                 | PVC-PIPING    |
|           | 7    | 1   | BF3         | 1" SCH 40 PVC SNAP-ON SADDLE TEE            | PVC-PIPING    |
|           | 8    | 1   | BD2         | 1" X 1/2" SCH 40 PVC REDUCING BUSHING       | PVC-PIPING    |
|           | 9    | 1   | AA20.75     | 1/2" SCH 40 PVC PIPE X 20.75" LG            | PVC-PIPING    |
|           | 10   | 1   | C8          | 8" CABLE TIE                                | NYLON 6       |
|           | 11   | 12  | C8          | 8" CABLE TIE                                | NYLON 6       |



OTHERWISE SPECIFIED:  
1. ALL DIMENSIONS ARE IN INCHES  
2. TOLERANCES  
DEC:  $X \pm .05$   
XX:  $.01$   
XXX:  $\pm .005$   
FRAC:  $\frac{1}{16}$   
ANG:  $\pm 1^\circ$

DATE 9/7/19

PROJECT  
International SeaPerch Challenge

TITLE  
Mission Course  
Disposal Platform Details

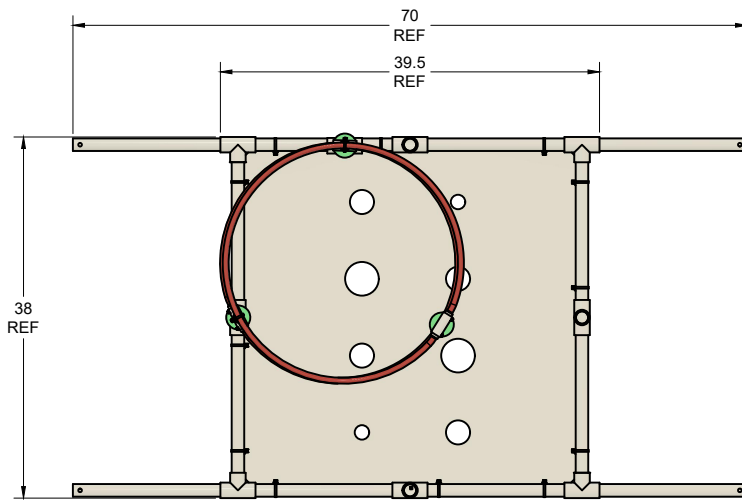
SIZE  
C

DWG NO  
SPC20-U-Mission-01

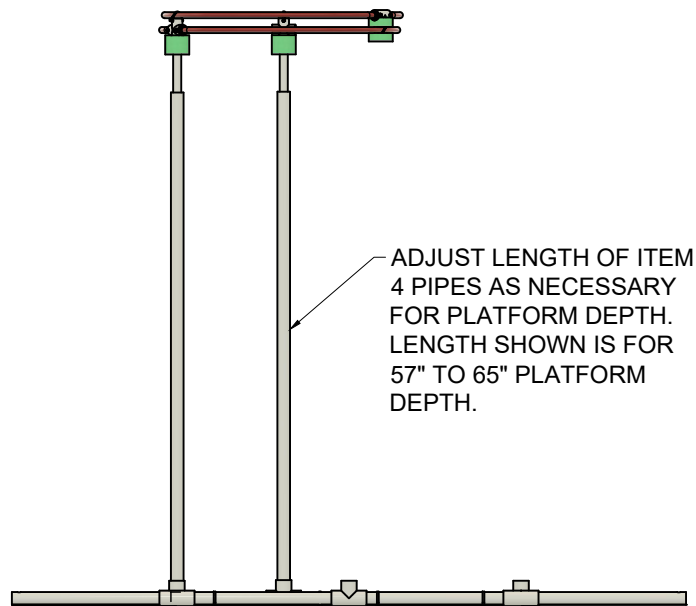
REV

SCALE 1:8

SHEET 2/3



TOP VIEW



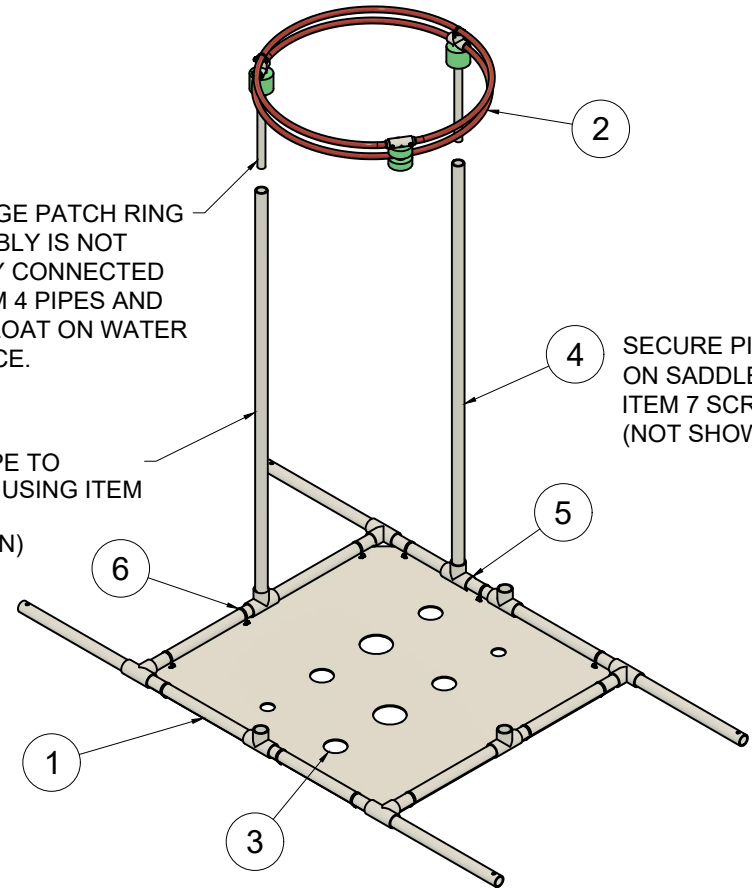
SIDE VIEW

| PARTS LIST     |      |     |             |                                                            |                 |
|----------------|------|-----|-------------|------------------------------------------------------------|-----------------|
| REFERENCE PAGE | ITEM | QTY | PART NUMBER | DESCRIPTION                                                | MATERIAL        |
| Page 23        | 1    | 1   |             | PLATFORM FRAME ASSEMBLY                                    |                 |
| Page 36        | 2    | 1   |             | GARBAGE PATCH RING ASSEMBLY                                |                 |
| Page 25        | 3    | 1   | F36X36      | POLYPROPYLENE SHEET, .157" THICK, 36" X 36"                | POLYPROPYLENE   |
|                | 4    | 2   | AC52        | 1" SCH 40 PVC PIPE X 52" LG                                | PVC-PIPING      |
|                | 5    | 1   | BF3         | 1" SCH 40 PVC SNAP-ON SADDLE TEE                           | PVC-PIPING      |
|                | 6    | 12  | C8          | 8" CABLE TIE                                               | NYLON 6         |
|                | 7    | 7   | DA2         | #8 X 5/8" STAINLESS STEEL FLANGED HEAD SELF-DRILLING SCREW | STAINLESS STEEL |

GARBAGE PATCH RING ASSEMBLY IS NOT RIGIDLY CONNECTED TO ITEM 4 PIPES AND WILL FLOAT ON WATER SURFACE.

SECURE PIPE TO FRAME TEE USING ITEM 7 SCREWS (NOT SHOWN)

SECURE PIPE TO SNAP ON SADDLE TEE USING ITEM 7 SCREWS (NOT SHOWN)



  
 OTHERWISE SPECIFIED:  
 1. ALL DIMENSIONS ARE IN INCHES  
 2. TOLERANCES  
 DEC: X ± .05  
 .XX ± .01  
 .XXX ± .005  
 FRAC:  $\frac{1}{16}$   
 ANG: ± 1°

PROJECT  
 International SeaPerch Challenge

TITLE  
 Mission Course  
 Waste Platform Details

|                |                              |              |
|----------------|------------------------------|--------------|
| SIZE<br>C      | DWG NO<br>SPC20-U-Mission-01 | REV          |
| DATE<br>9/7/19 | SCALE<br>1:10                | SHEET<br>3/3 |

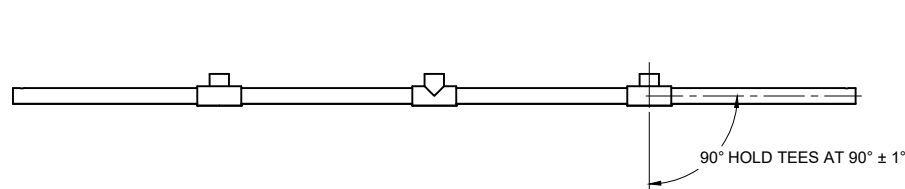
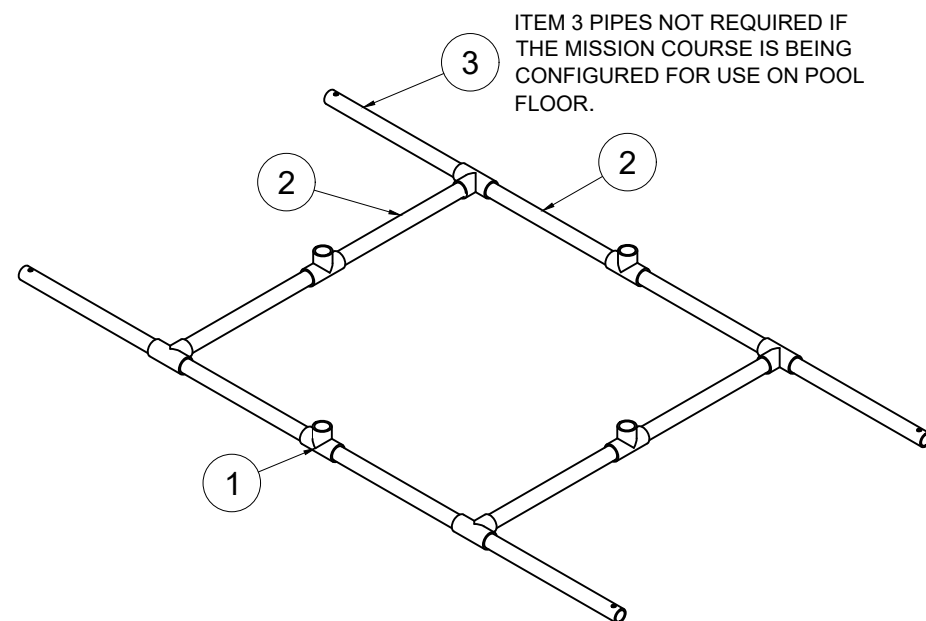
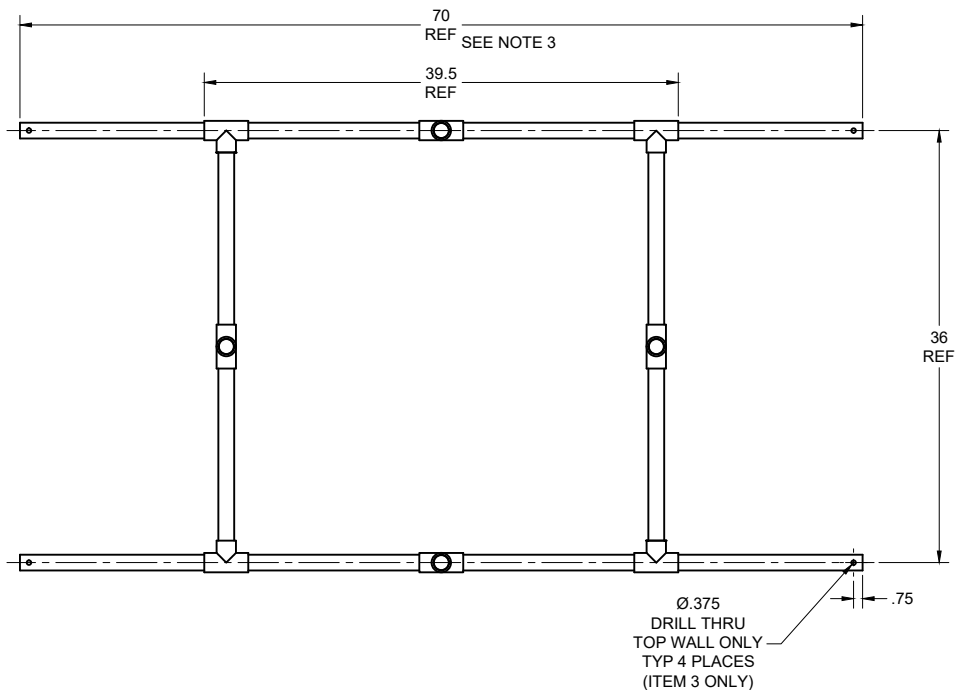
4

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| PARTS LIST |     |             |                                                            |                 |
|------------|-----|-------------|------------------------------------------------------------|-----------------|
| ITEM       | QTY | PART NUMBER | DESCRIPTION                                                | MATERIAL        |
| 1          | 8   | BB3         | 1" SCH 40 PVC TEE (DURA)                                   | PVC-PIPING      |
| 2          | 8   | AC16.5      | 1" SCH 40 PVC PIPE X 16.5" LG                              | PVC-PIPING      |
| 3          | 4   | AC16.5      | 1" SCH 40 PVC PIPE X 16.5" LG                              | PVC-PIPING      |
| 4          | 20  | DA2         | #8 X 5/8" STAINLESS STEEL FLANGED HEAD SELF-DRILLING SCREW | STAINLESS STEEL |



## NOTES:

1. SECURE ALL JOINTS USING ITEM 4 SCREWS (NOT SHOWN)
2. DEBUR ALL SHARP EDGES
3. SIZE SHOWN IS FOR 6' TO 9' WIDE LANES. ADJUST LENGTH OF ITEM 3 FOR NARROWER LANES.



OTHERWISE SPECIFIED:  
 1. ALL DIMENSIONS ARE IN INCHES  
 2. TOLERANCES  
 DEC:  $X \pm .125$   
 $.XX \pm .01$   
 $.XXX \pm .005$   
 FRAC:  $\frac{1}{16}$   
 ANG:  $\pm 1^\circ$

DATE 8/19/19

## PROJECT

International SeaPerch Challenge

## TITLE

Mission Course  
 Platform Frame Assembly Details

SIZE  
C

DWG NO

SPCXX-U-Mission-PlatformFrame-01

REV

SCALE 1:8

SHEET 1/1

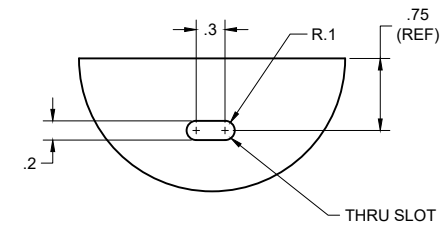
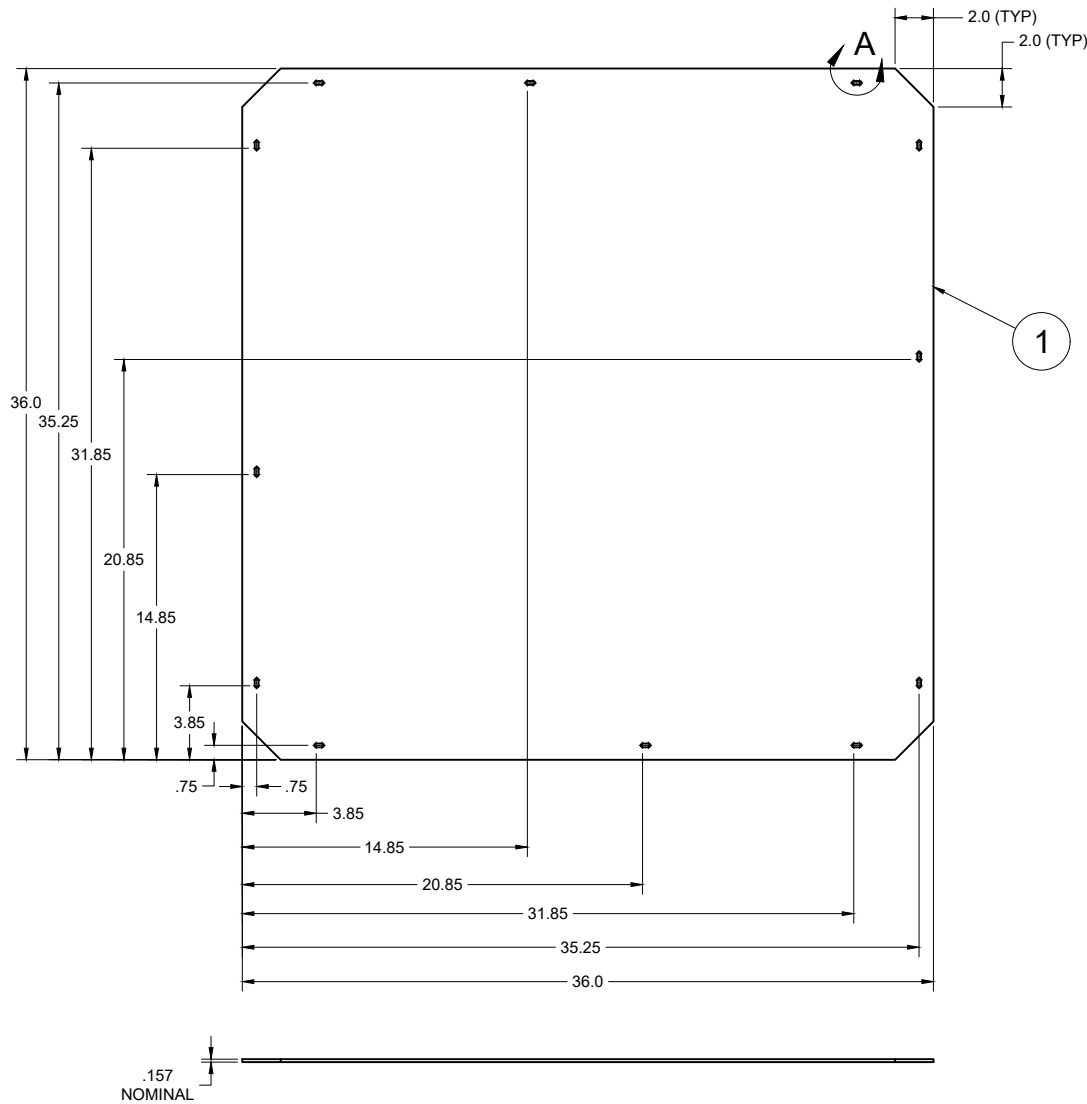
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2

1

| PARTS LIST |     |             |                                             |               |
|------------|-----|-------------|---------------------------------------------|---------------|
| ITEM       | QTY | PART NUMBER | DESCRIPTION                                 | MATERIAL      |
| 1          | 1   | F36X36      | POLYPROPYLENE SHEET, .157" THICK, 36" X 36" | POLYPROPYLENE |



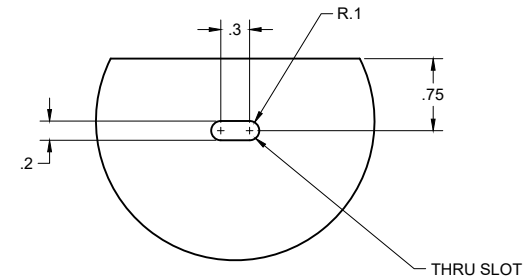
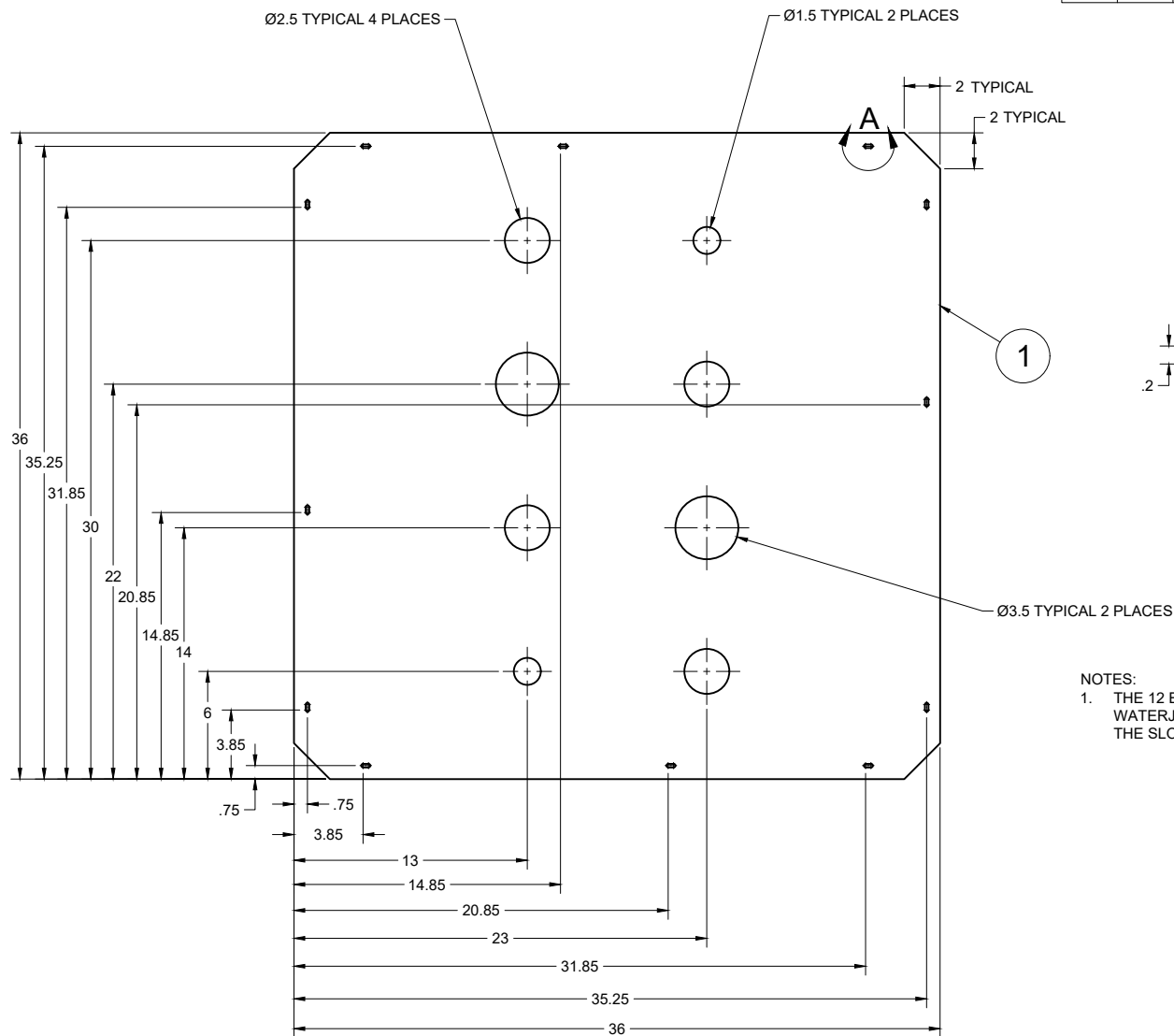
**DETAIL A**  
**SCALE 1:1**  
**(TYP 12 PLACES)**

**NOTES:**

- THE 12 ELONGATED SLOTS ARE FOR CABLE TIES AND ARE SPECIFIED FOR WATERJET CUTTING. IF THE PLATE IS BEING MADE MANUALLY, SIMPLY PUNCH THE SLOTS USING A LARGE FLAT BLADE SCREWDRIVER.

|                                                                                                                                                                                                                                                                                                                                       |              |                                                           |     |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------|-----|--|
|  <p>OTHERWISE SPECIFIED:<br/>1. ALL DIMENSIONS ARE IN INCHES<br/>2. TOLERANCES<br/>DEC: <math>X \pm .05</math><br/>XX: <math>.01</math><br/>XXX: <math>\pm .005</math><br/>FRAC: <math>\frac{1}{32}</math><br/>ANG: <math>\pm 1^\circ</math></p> |              | PROJECT<br><b>International SeaPerch Challenge</b>        |     |  |
|                                                                                                                                                                                                                                                                                                                                       |              | TITLE<br><b>Mission Course<br/>Platform Plate (Solid)</b> |     |  |
| SIZE<br><b>C</b>                                                                                                                                                                                                                                                                                                                      |              | DWG NO<br>SPCXX-U-Mission-PlatformPlate-01                | REV |  |
| DATE<br>8/22/19                                                                                                                                                                                                                                                                                                                       | SCALE<br>1:5 | SHEET 1/1                                                 |     |  |

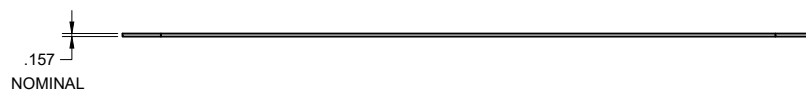
| PARTS LIST |     |             |                                             |               |
|------------|-----|-------------|---------------------------------------------|---------------|
| ITEM       | QTY | PART NUMBER | DESCRIPTION                                 | MATERIAL      |
| 1          | 1   | F36X36      | POLYPROPYLENE SHEET, .157" THICK, 36" X 36" | POLYPROPYLENE |



**DETAIL A**  
SCALE 1:1  
(TYP 12 PLACES)

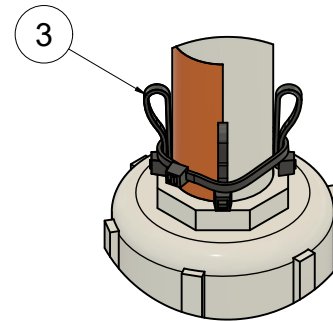
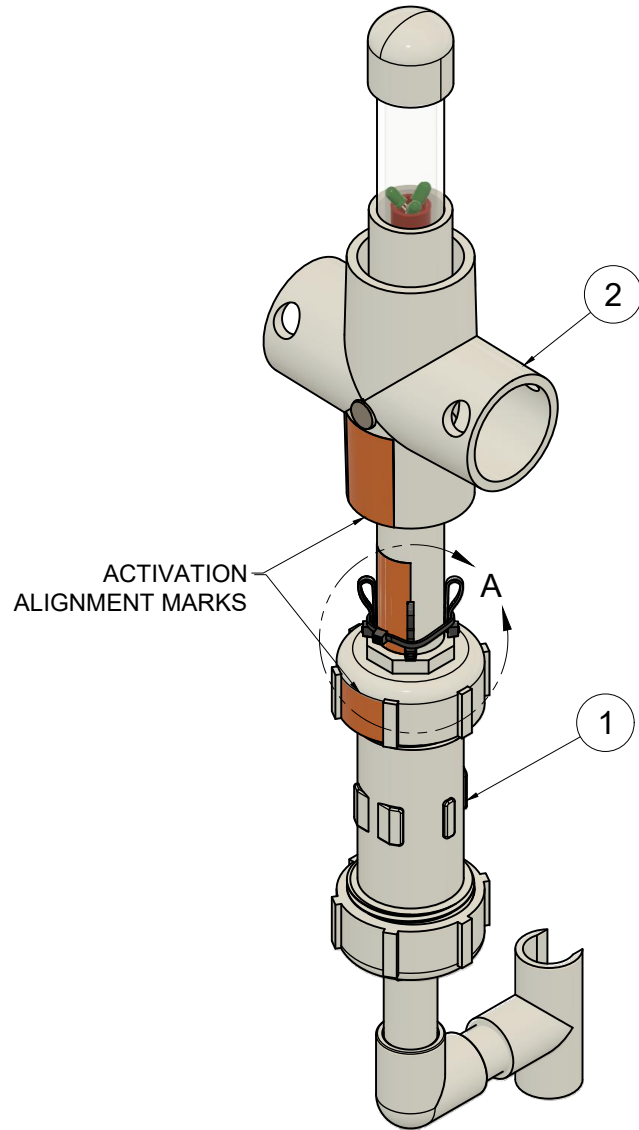
**NOTES:**

- THE 12 ELONGATED SLOTS ARE FOR CABLE TIES AND ARE SPECIFIED FOR WATERJET CUTTING. IF THE PLATE IS BEING MADE MANUALLY, SIMPLY PUNCH THE SLOTS USING A LARGE FLAT BLADE SCREWDRIVER.



|                                                                                                                                                         |        |                                             |                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------------------------------------|----------------------------------|
|                                                                    |        | PROJECT                                     |                                  |
|                                                                                                                                                         |        | International SeaPerch Challenge            |                                  |
| OTHERWISE SPECIFIED:<br>1. ALL DIMENSIONS ARE IN INCHES<br>2. TOLERANCES<br>DEC: X ± .05<br>XX ± .01<br>XXX ± .005<br>FRAC: $\frac{1}{16}$<br>ANG: ± 1° |        | TITLE                                       |                                  |
|                                                                                                                                                         |        | Mission Course<br>Platform Plate (w/ Holes) |                                  |
| SIZE                                                                                                                                                    | C      | DWG NO                                      | SPCXX-U-Mission-PlatformPlate-02 |
| DATE                                                                                                                                                    | 9/2/19 | SCALE                                       | 1:5                              |
|                                                                                                                                                         |        | SHEET                                       | 1/1                              |

| PARTS LIST     |      |     |             |                           |          |
|----------------|------|-----|-------------|---------------------------|----------|
| REFERENCE PAGE | ITEM | QTY | PART NUMBER | DESCRIPTION               | MATERIAL |
| Page 28        | 1    | 1   |             | BEACON                    |          |
| Page 27        | 2    | 1   |             | ACTIVE MINE ARMING DEVICE |          |
|                | 3    | 5   | C6          | 6" CABLE TIE              | NYLON 6  |



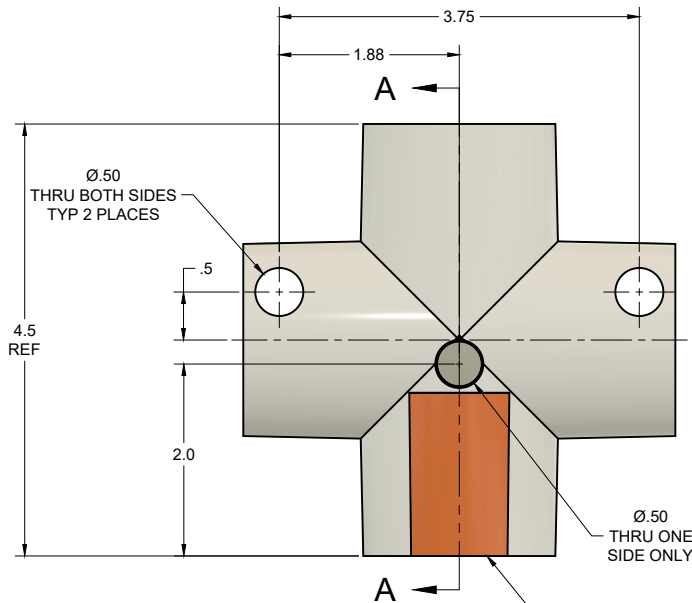
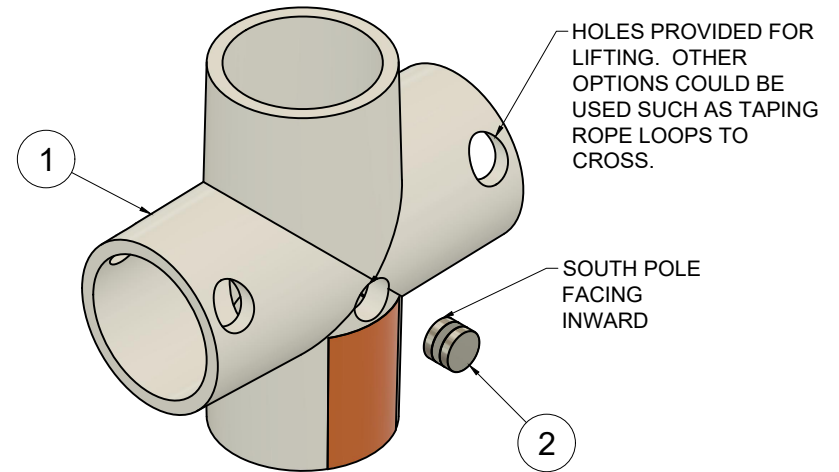
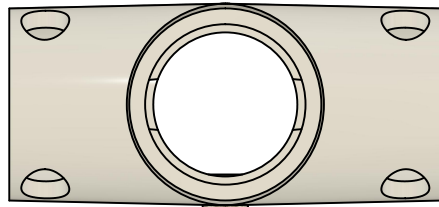
DETAIL A  
SCALE 1:1



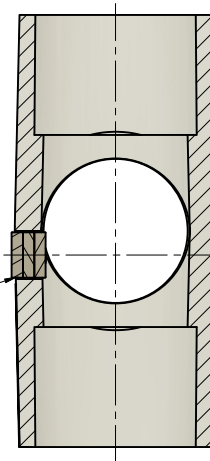
PRE-FORM 4 CABLE TIES AND SECURE TO THE BEACON MAIN PIPE USING A CABLE TIE AS SHOWN. ADJUST CABLE TIE LOOPS TO ALLOW ARMING DEVICE TO SLIDE FULLY TO COMPRESSION FITTING WHILE STILL PROVIDING RESTRICTION TO HORIZONTAL MOVEMENT OF ARMING DEVICE.

|                                                                                                                                                                                  |              |                                                               |                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------------------------------------------------------|------------------------------------------|
|                                                                                             |              | PROJECT<br>International SeaPerch Challenge                   |                                          |
|                                                                                                                                                                                  |              | TITLE<br>Mission Course - Task 1<br>Active Mine Main Assembly |                                          |
| OTHERWISE SPECIFIED:<br>1. ALL DIMENSIONS ARE IN INCHES<br>2. TOLERANCES<br>DEC: $X \pm .05$<br>.XX: $.01$<br>.XXX: $\pm .005$<br>FRAC: $\pm \frac{1}{32}$<br>ANG: $\pm 1^\circ$ |              | SIZE<br>C                                                     | DWG NO<br>SPCX20-U-Mission-ActiveMine-01 |
| DATE<br>9/10/19                                                                                                                                                                  | SCALE<br>1:2 | SHEET 1/2                                                     |                                          |

| PARTS LIST |     |             |                                       |            |
|------------|-----|-------------|---------------------------------------|------------|
| ITEM       | QTY | PART NUMBER | DESCRIPTION                           | MATERIAL   |
| 1          | 1   | BC4         | 1-1/4" SCH 40 PVC CROSS (DURA)        | PVC-PIPING |
| 2          | 3   | M12         | 12MM DIA X 3.0MM THK NEODYMIUM MAGNET | NEODYMIUM  |



EPOXY MAGNETS  
IN PLACE  
SEE NOTE 2

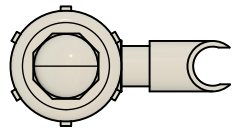


SECTION A-A  
SCALE 1:1

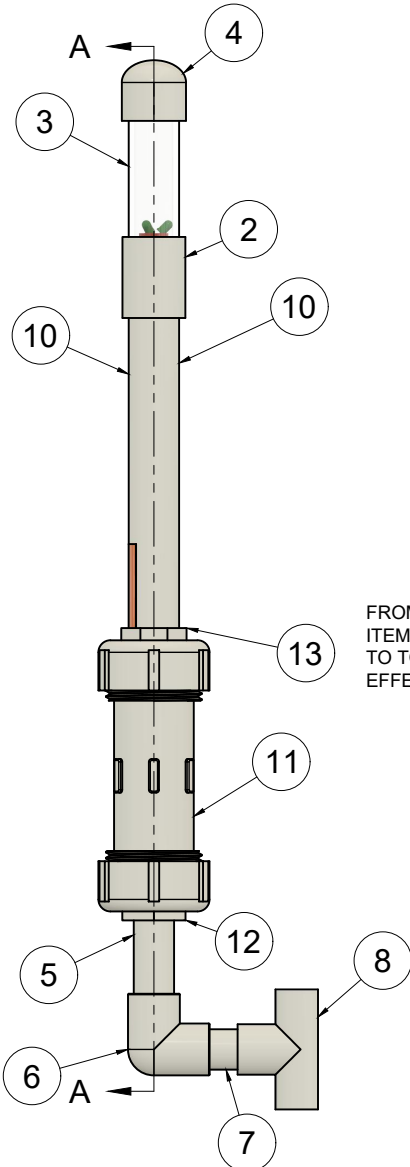
#### NOTES:

1. SIZES OF FITTING MAY DIFFERENT BETWEEN MANUFACTURERS. ADJUST LOCATION OF MAGNETS ACCORDINGLY.
2. MAGNETS ONLY NEEDED IF USING BEACON WITH ELECTRONIC CIRCUIT.
3. OTHER MAGNETS SUCH AS STRIP MAGNETS COULD OPTIONALLY BE TAPED INSIDE CROSS IF DRILLING AND EPOXYING ARE NOT DESIRABLE.
4. EPOXY OR SEAL MAGNETS IN PLACE WITH SOUTH POLE FACING INWARD AND INNER FACE FLUSH WITH INSIDE OF FITTING. USE MARINE EPOXY, MARINE ADHESIVE SEALANT, OR OTHER SUITABLE MEANS TO SECURE MAGNET TO FITTING.
5. APPROXIMATE WEIGHTS: 170 GRAMS IN AIR, 56 GRAMS IN WATER (MEASURED IN POOL WATER).

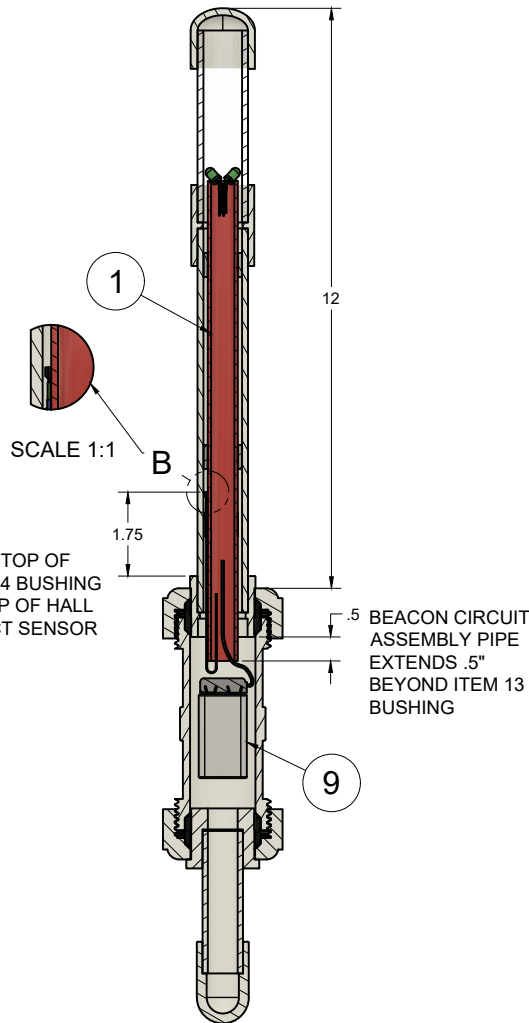
|                                                                                                                                                                                |              |                                                                       |                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------------|-----------------------------------------|
|                                                                                                                                                                                |              | PROJECT<br>International SeaPerch Challenge                           |                                         |
|                                                                                                                                                                                |              | TITLE<br>Mission Course - Task 1<br>Active Mine Arming Device Details |                                         |
| OTHERWISE SPECIFIED:<br>1. ALL DIMENSIONS ARE IN INCHES<br>2. TOLERANCES<br>DEC: $X \pm .05$<br>$.XX \pm .01$<br>$.XXX \pm .005$<br>FRAC: $\frac{1}{16}$<br>ANG: $\pm 1^\circ$ |              | SIZE<br>C                                                             | DWG NO<br>SPC20-U-Mission-ActiveMine-01 |
| DATE<br>9/9/19                                                                                                                                                                 | SCALE<br>1:1 | REV<br>SHEET 2/2                                                      |                                         |



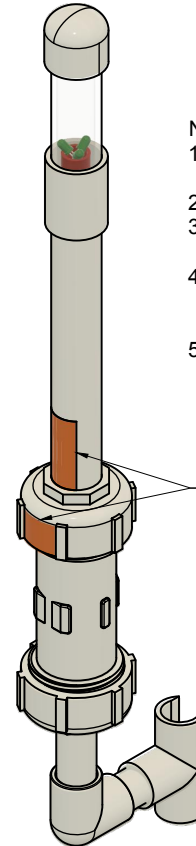
TOP VIEW



FRONT VIEW



SECTION A-A  
SCALE 1:2



| PARTS LIST |     |             |                                                    |            |
|------------|-----|-------------|----------------------------------------------------|------------|
| ITEM       | QTY | PART NUMBER | DESCRIPTION                                        | MATERIAL   |
| 1          | 1   |             | BEACON CIRCUIT ASSEMBLY                            |            |
| 2          | 1   | BE2         | 3/4" SCH 40 PVC COUPLER                            | PVC-PIPING |
| 3          | 1   | AB4C        | 3/4" SCH 40 CLEAR PVC PIPE 4" LG                   | PVC-PIPING |
| 4          | 1   | PF0.75-CP   | 3/4" SCH 40 PVC CAP                                | PVC-PIPING |
| 5          | 1   | AA3         | 1/2" SCH 40 PVC PIPE X 3" LG                       | PVC-PIPING |
| 6          | 1   | BA1         | 1/2" SCH 40 PVC ELBOW                              | PVC-PIPING |
| 7          | 1   | AA2         | 1/2" SCH 40 PVC PIPE X 2" LG                       | PVC-PIPING |
| 8          | 1   | BF1         | 1/2" PVC SCH 40 SNAP-ON SADDLE                     | PVC-PIPING |
| 9          | 1   |             | 9V BATTERY                                         |            |
| 10         | 1   | AB8         | 3/4" SCH 40 PVC PIPE X 8" LG                       | PVC-PIPING |
| 11         | 1   | BK3         | 1" PVC COMPRESSION FITTING (SPEARS S110-10)        |            |
| 12         | 1   | BD2         | 1" X 1/2" SCH 40 PVC REDUCING BUSHING              | PVC-PIPING |
| 13         | 1   | BD1         | 1" X 3/4" SCH 40 PVC REDUCING BUSHING (WITH FLATS) | PVC-PIPING |

NOTES:

1. GLUE ALL SOCKET FITTINGS USING SUITABLE PVC SOLVENT CEMENT FOR WATER TIGHT SEAL.
2. DO NOT LUBRICATE COMPRESSION FITTING GASKET.
3. ITEM 8 SNAP-ON-SADDLE TEE MUST BE SEALED TYPE WITH NO OUTLET HOLE.
4. SPEARS BRAND COMPRESSION FITTINGS (ITEM 11) HAVE BEEN TESTED AND ARE LEAK PROOF. SOME OTHER BRANDS HAVE LEAKED WITH LOW EXTERNAL PRESSURE.
5. SEE BEACON CIRCUIT BUILD GUIDE AT [WWW.SEAPERCH.ORG/BEACONBUILD](http://WWW.SEAPERCH.ORG/BEACONBUILD) FOR DETAILED INSTRUCTIONS FOR BUILDING THE BEACON CIRCUIT.

TAPE, PAINT, OR MARK 1" WIDE X 1.75" TALL TO INDICATE TOP OF HALL EFFECT SENSOR AND AREA BETWEEN TWO RAISED RIBS. ALIGN MARKS DURING ASSEMBLY.

ATTACHES TO TASK STAND. SECURE USING CABLE TIES OR SCREWS AS APPROPRIATE



OTHERWISE SPECIFIED:  
1. ALL DIMENSIONS ARE IN INCHES  
2. TOLERANCES  
DEC: X ± .05  
XX: .01  
XXX: ± .005  
FRAC: 1/16  
ANG: ± 1°

PROJECT  
International SeaPerch Challenge

TITLE  
Mission Course - Task 1  
Beacon Assembly

|                  |                                     |              |
|------------------|-------------------------------------|--------------|
| SIZE<br>C        | DWG NO<br>SPCXX-U-Mission-Beacon-01 | REV          |
| DATE<br>11/14/18 | SCALE<br>1/2 (From parent)          | SHEET<br>1/3 |



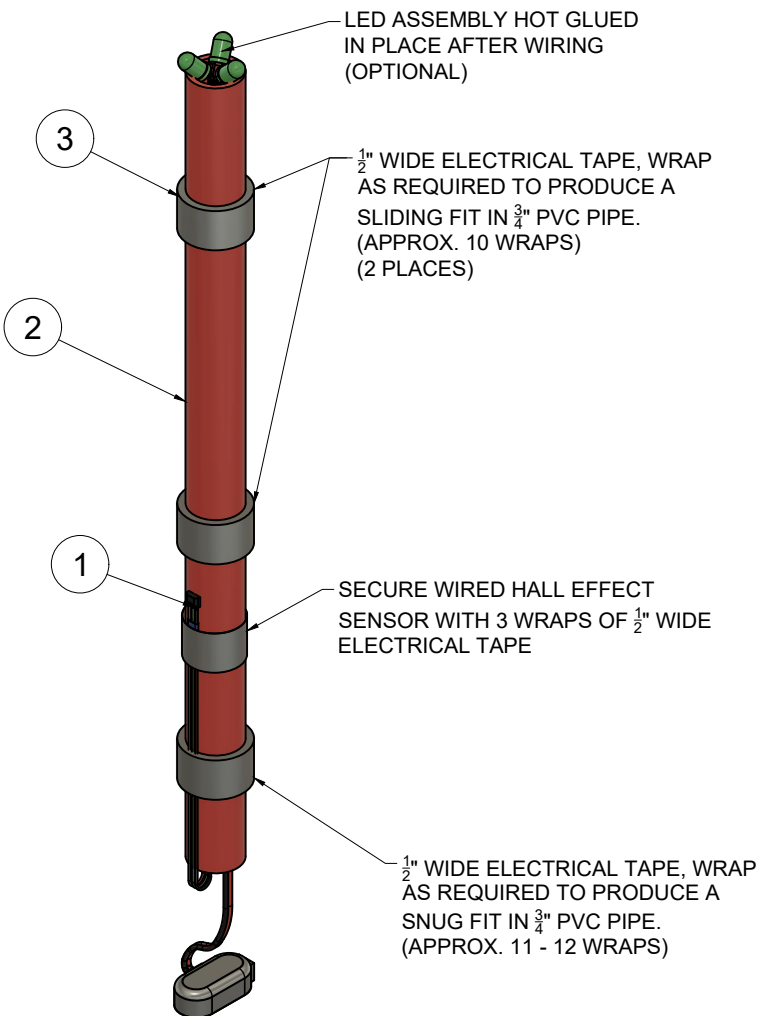
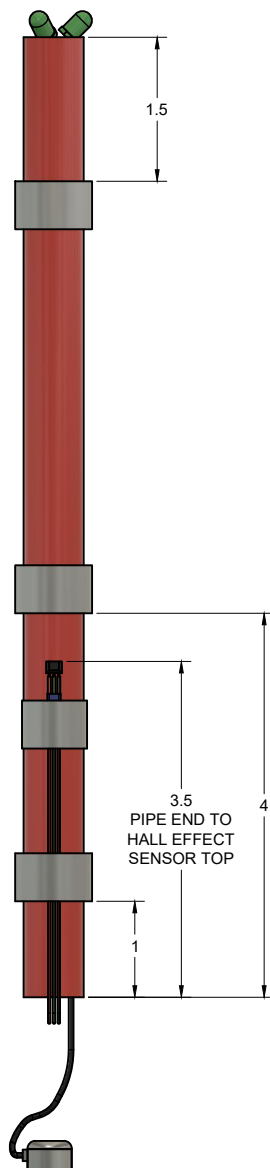
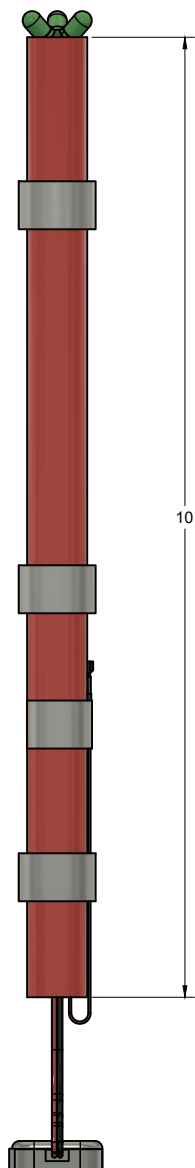
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1

| PARTS LIST |     |             |                                                |                            |
|------------|-----|-------------|------------------------------------------------|----------------------------|
| ITEM       | QTY | PART NUMBER | DESCRIPTION                                    | MATERIAL                   |
| 1          | 1   |             | BEACON CIRCUIT                                 |                            |
| 2          | 1   | AAP10       | 1/2" PEX PIPE X 10" LG                         | POLYETHYLENE, HIGH DENSITY |
| 3          | 1   |             | ELECTRICAL TAPE, 1/2" WIDE, LENGTH AS REQUIRED | STEEL                      |



OTHERWISE SPECIFIED:  
 1. ALL DIMENSIONS ARE IN INCHES  
 2. TOLERANCES  
 DEC:  $X \pm .05$   
 $.XX \pm .01$   
 $.XXX \pm .005$   
 FRAC:  $\frac{1}{16}$   
 ANG:  $\pm 1^\circ$

PROJECT  
 International SeaPerch Challenge

TITLE  
 Mission Course - Task 1  
 Beacon Sensor Assembly

SIZE  
 C

DWG NO  
 SPCXX-U-Mission-Beacon-01

REV

DATE 11/13/18

SCALE 1:1

SHEET 2/3

4

3

2

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D

D

C

C

B

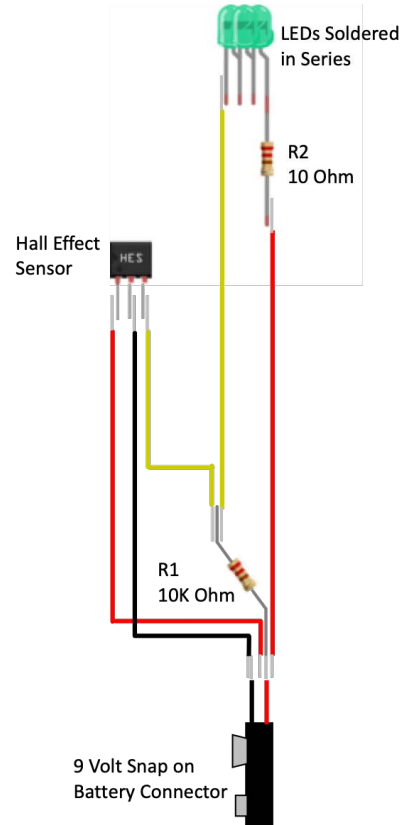
B

B

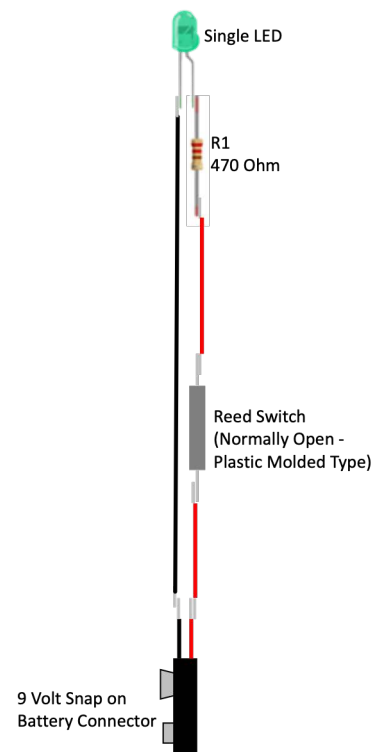
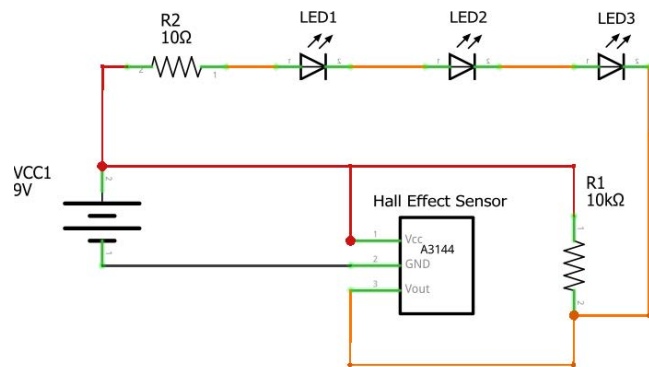
B

A

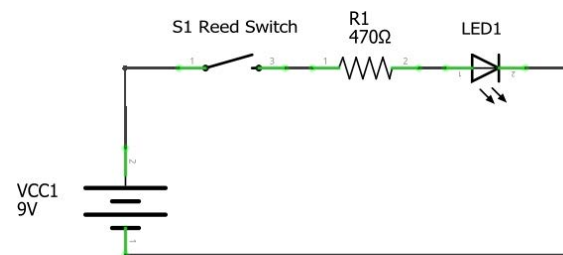
A



2019 Beacon Circuit



Simplified Beacon Circuit



The 2019 Beacon circuit will work for the 2020 SeaPerch Challenge, however if you are building a new beacon circuit you may want to consider the simplified circuit.



OTHERWISE SPECIFIED:  
1. ALL DIMENSIONS ARE IN INCHES  
2. TOLERANCES  
DEC:  $X \pm .05$   
XXX:  $.01$   
XXX:  $\pm .005$   
FRAC:  $\frac{1}{16}$   
ANG:  $\pm 1^\circ$

DATE 11/15/18

PROJECT  
International SeaPerch Challenge

TITLE  
Mission Course - Task 1  
Beacon Schematic Options

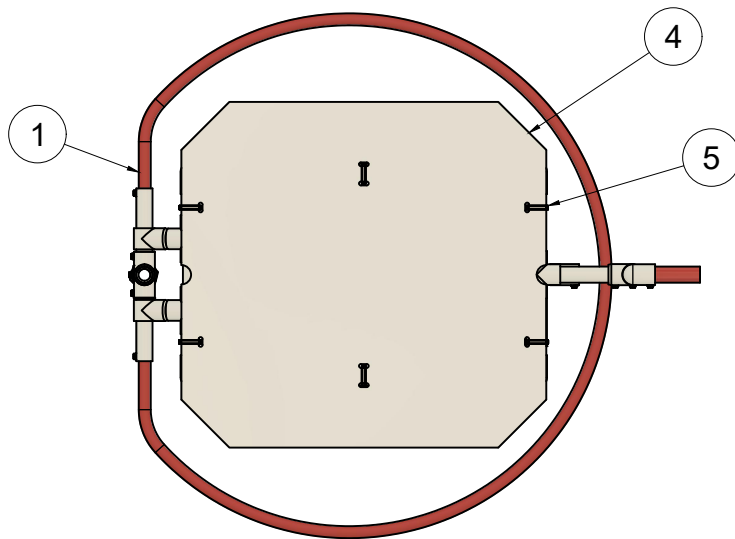
SIZE  
C

DWG NO  
SPCXX-U-Mission-Beacon-01

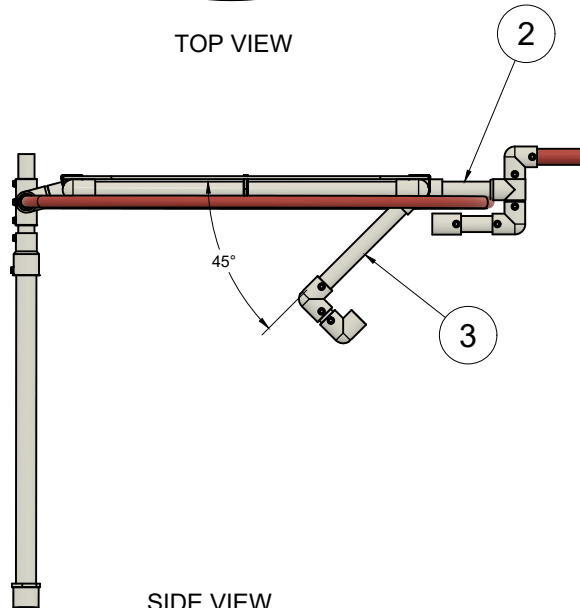
REV

SCALE

SHEET 3/3

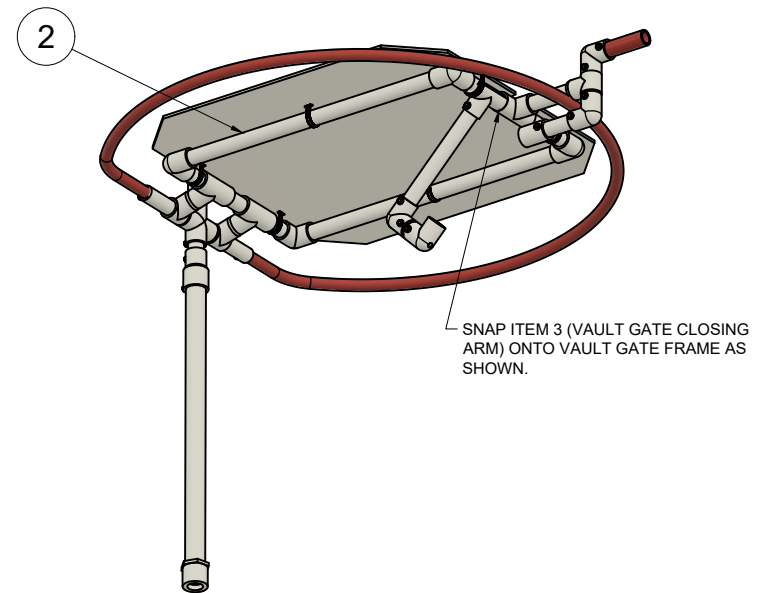


TOP VIEW

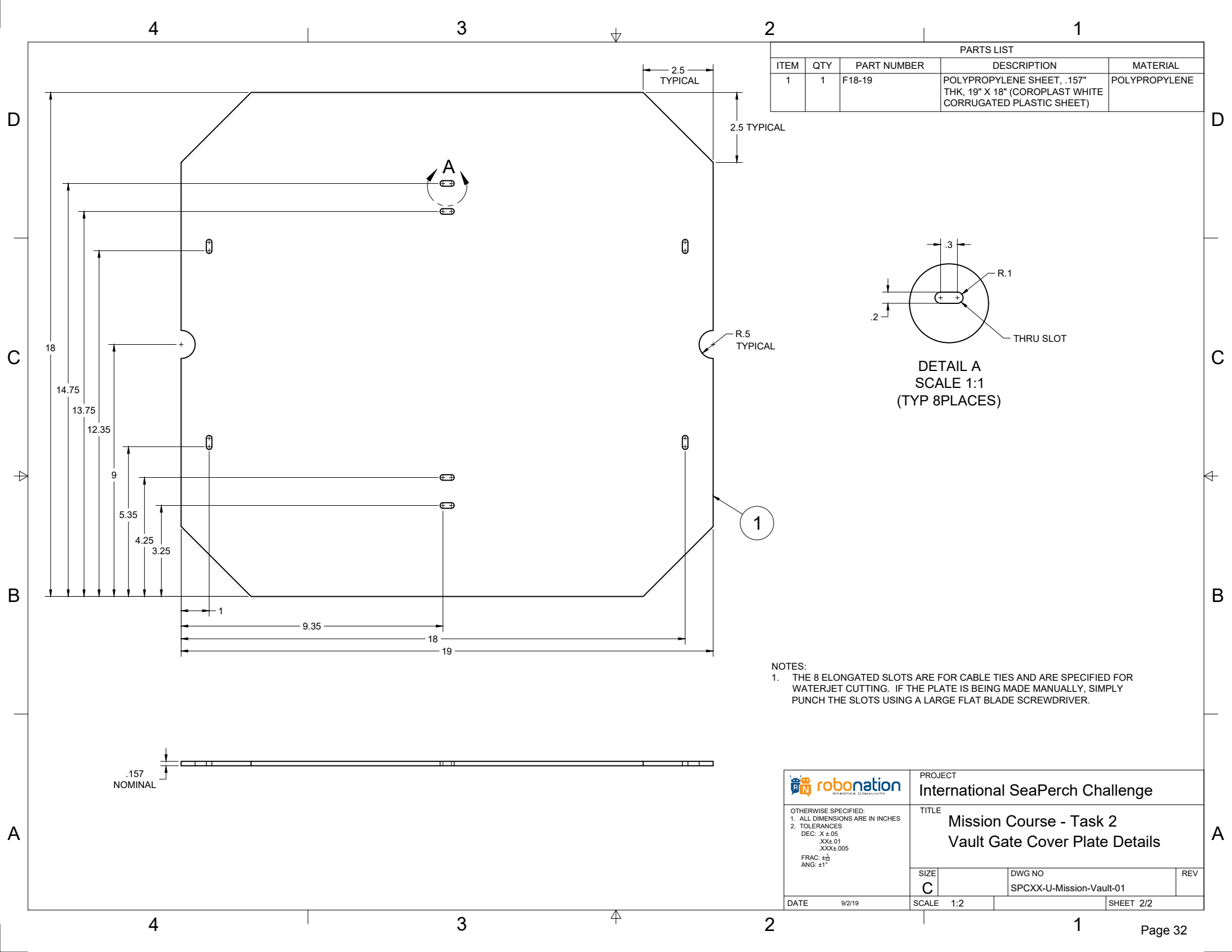


SIDE VIEW

| PARTS LIST     |      |     |             |                                                                                      |               |
|----------------|------|-----|-------------|--------------------------------------------------------------------------------------|---------------|
| PAGE REFERENCE | ITEM | QTY | PART NUMBER | DESCRIPTION                                                                          | MATERIAL      |
| Page 33        | 1    | 1   |             | VAULT HOOP ASSEMBLY                                                                  |               |
| Page 34        | 2    | 1   |             | VAULT GATE FRAME ASSEMBLY                                                            |               |
| Page 35        | 3    | 1   |             | VAULT GATE CLOSING ARM ASSEMBLY                                                      |               |
| Page 32        | 4    | 1   | F18X19      | POLYPROPYLENE SHEET, .157" THK, 19" X 18" (COROPLAST WHITE CORRUGATED PLASTIC SHEET) | POLYPROPYLENE |
|                | 5    | 6   | C8          | 8" CABLE TIE                                                                         |               |



|                                                                                                                                                                                                                                                                      |              |                                                    |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------------------------------------------------|-----|
|  <p>OTHERWISE SPECIFIED:<br/>1. ALL DIMENSIONS ARE IN INCHES<br/>2. TOLERANCES<br/>DEC: X ± .05<br/>XX: .01<br/>XXX: .005<br/>FRAC: <math>\frac{1}{16}</math><br/>ANG: ± 1°</p> |              | PROJECT<br>International SeaPerch Challenge        |     |
|                                                                                                                                                                                                                                                                      |              | TITLE<br>Mission Course - Task 2<br>Vault Assembly |     |
| DATE<br>9/2/19                                                                                                                                                                                                                                                       | SCALE<br>1:4 | DWG NO<br>SPCXX-U-Mission-Vault-01                 | REV |
|                                                                                                                                                                                                                                                                      |              | SHEET 1/2                                          |     |



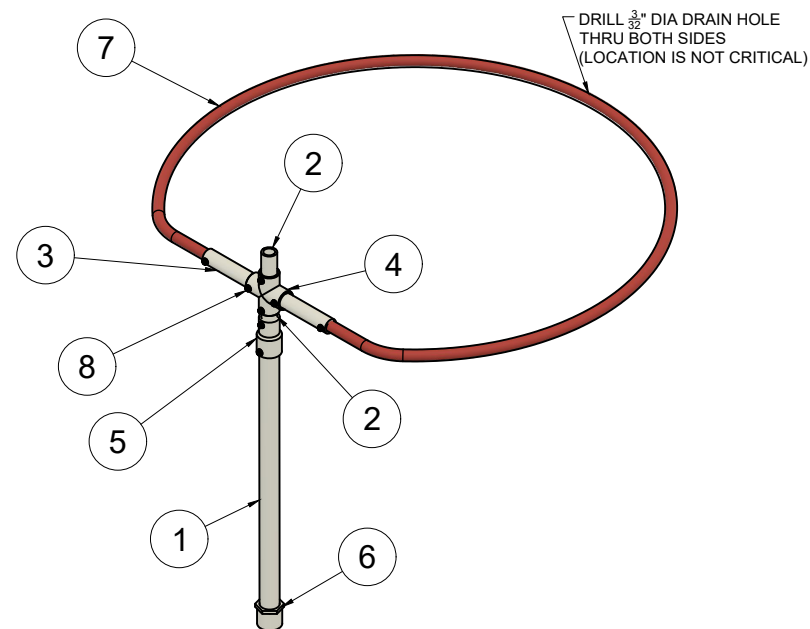
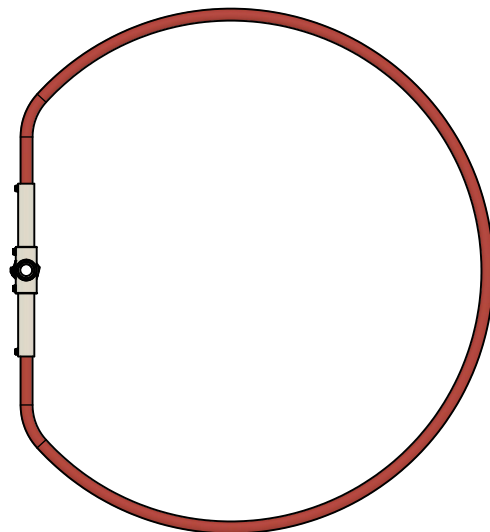
4

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1

| PARTS LIST |     |             |                                                            |                            |
|------------|-----|-------------|------------------------------------------------------------|----------------------------|
| ITEM       | QTY | PART NUMBER | DESCRIPTION                                                | MATERIAL                   |
| 1          | 1   | AB18        | 3/4" SCH 40 PVC PIPE X 18" LG                              | PVC-PIPING                 |
| 2          | 2   | AA2         | 1/2" SCH 40 PVC PIPE X 2" LG                               | PVC-PIPING                 |
| 3          | 2   | AA4         | 1/2" SCH 40 PVC PIPE X 4" LG                               | PVC-PIPING                 |
| 4          | 1   | BC1         | 1/2" SCH 40 PVC CROSS                                      | PVC-PIPING                 |
| 5          | 1   | BL1         | 3/4" X 1/2" SCH 40 PVC REDUCING COUPLER                    | PVC-PIPING                 |
| 6          | 1   | BD2         | 1" X 3/4" PVC REDUCING BUSHING                             | PVC-PIPING                 |
| 7          | 1   | AAP72       | PEX TUBING (RED), 1/2" X 72" LG                            | POLYETHYLENE, HIGH DENSITY |
| 8          | 8   | DA2         | #8 X 5/8" STAINLESS STEEL FLANGED HEAD SELF-DRILLING SCREW | STAINLESS STEEL            |



#### NOTES:

1. THE PEX PIPE MAY NOT SLIDE EASILY INTO THE PVC PIPE. DRILL THE PIPE OUT 0.625" DIA. X 1.0" DEEP AS NECESSARY.



OTHERWISE SPECIFIED:  
 1. ALL DIMENSIONS ARE IN INCHES  
 2. TOLERANCES  
 DEC: X ± .05  
 .XX ± .01  
 .XXX ± .005  
 FRAC:  $\frac{1}{16}$   
 ANG: ± 1°

DATE 9/2/19

PROJECT  
 International SeaPerch Challenge

TITLE  
 Mission Course - Task 2  
 Vault Hoop Assembly

SIZE  
 C

DWG NO  
 SPCXX-U-Mission-Vault-02

REV

SCALE 1:5

SHEET 1/1

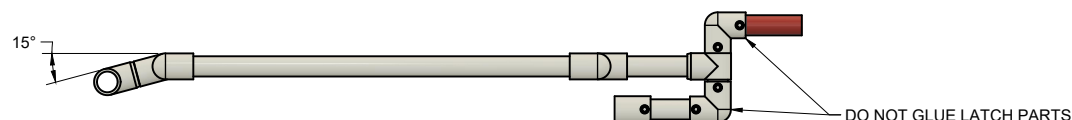
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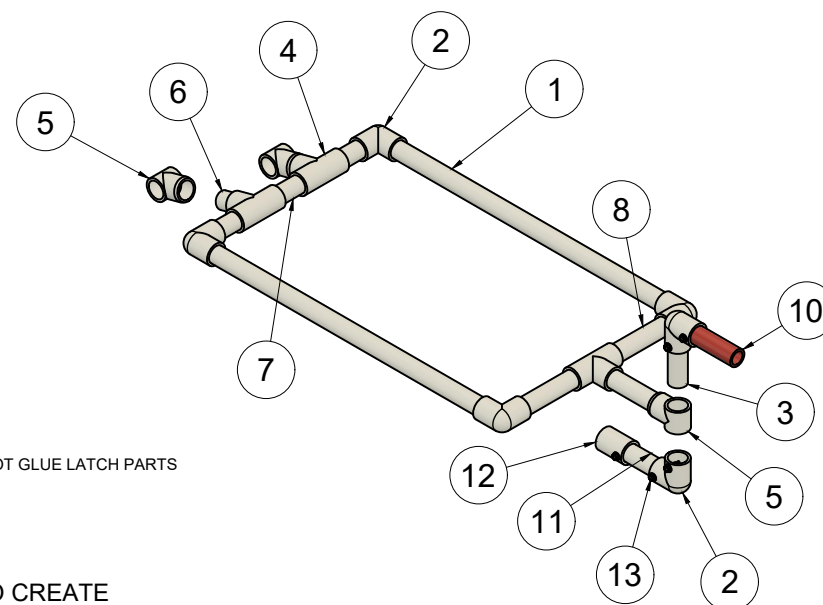
1

| PARTS LIST |     |             |                                                            |                 |
|------------|-----|-------------|------------------------------------------------------------|-----------------|
| ITEM       | QTY | PART NUMBER | DESCRIPTION                                                | MATERIAL        |
| 1          | 2   | AA17        | 1/2" SCH 40 PVC PIPE X 17" LG                              | PVC-PIPING      |
| 2          | 6   | BA1         | 1/2" SCH 40 PVC ELBOW                                      | PVC-PIPING      |
| 3          | 3   | AA2.5       | 1/2" SCH 40 PVC PIPE X 2.5" LG                             | PVC-PIPING      |
| 4          | 3   | BB1         | 1/2" SCH 40 PVC TEE                                        | PVC-PIPING      |
| 5          | 3   | BG1         | 1/2" PVC FURNITURE GRADE SLING TEE                         | PVC-PIPING      |
| 6          | 2   | AA1.5       | 1/2" SCH 40 PVC PIPE X 1.5" LG                             | PVC-PIPING      |
| 7          | 1   | AA2.75      | 1/2" SCH 40 PVC PIPE X 2.75" LG                            | PVC-PIPING      |
| 8          | 2   | AA4.25      | 1/2" SCH 40 PVC PIPE X 4.25" LG                            | PVC-PIPING      |
| 9          | 1   | AA4         | 1/2" SCH 40 PVC PIPE X 4" LG                               | PVC-PIPING      |
| 10         | 1   | AA3R        | 1/2" SCH 40 PVC PIPE X 3" LG (RED)                         | PVC-PIPING      |
| 11         | 1   | AA3         | 1/2" SCH 40 PVC PIPE X 3" LG                               | PVC-PIPING      |
| 12         | 1   | BE1         | 1/2" SCH 40 PVC COUPLER                                    | PVC-PIPING      |
| 13         | 5   | DA2         | #8 X 5/8" STAINLESS STEEL FLANGED HEAD SELF-DRILLING SCREW | STAINLESS STEEL |



#### NOTES:

1. GLUE ALL JOINTS OF FRAME (EXCEPT AS NOTED) USING PVC CEMENT TO CREATE AIR-TIGHT SEALS. FOLLOWING THIS PROCEDURE NEGATES THE NECESSITY FOR ADDITIONAL FLOATATION FOR THE GATE.
2. PIPE FITTINGS MAY VARY BETWEEN DIFFERENT MANUFACTURERS. ITEMS 4, 7, & 8 MAY HAVE TO BE ADJUSTED TO ASSURE SPACING BETWEEN SLING TEES IS ADEQUATE TO ACCOMMODATE THE PVC CROSS ON THE VAULT HOOP AND TO KEEP ITEM 1 PIPES PARALLEL.
3. ASSURE SLING TEES HAVE ADEQUATE CLEARANCE SO PIPES ROTATE FREELY.
4. OPTIONALLY PAINT OR TAPE ITEM 10 INSTEAD OF PURCHASING RED PVC PIPE.



  
 OTHERWISE SPECIFIED:  
 1. ALL DIMENSIONS ARE IN INCHES  
 2. TOLERANCES  
 DEC: X ± .05  
 .XX ± .01  
 .XXX ± .005  
 FRAC:  $\frac{1}{16}$   
 ANG: ± 1°

PROJECT  
 International SeaPerch Challenge

TITLE  
 Mission Course - Task 2  
 Vault Gate Frame Assembly

SIZE  
 C

DWG NO  
 SPCXX-U-Mission-Vault-03

REV

DATE 9/2/19

SCALE 1:4

SHEET 1/1

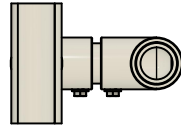
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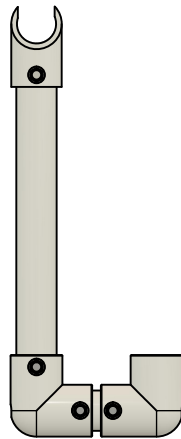
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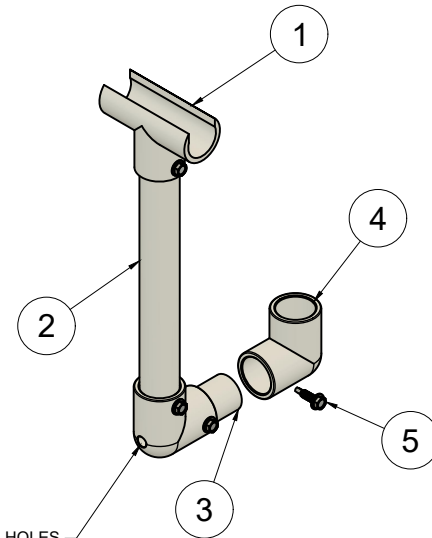
| PARTS LIST |     |             |                                                            |                 |
|------------|-----|-------------|------------------------------------------------------------|-----------------|
| ITEM       | QTY | PART NUMBER | DESCRIPTION                                                | MATERIAL        |
| 1          | 1   | BF1         | 1/2" PVC SCH 40 SNAP-ON SADDLE TEE                         | PVC-PIPING      |
| 2          | 1   | AA7         | 1/2" SCH 40 PVC PIPE X 7" LG                               | PVC-PIPING      |
| 3          | 1   | AA1.5       | 1/2" SCH 40 PVC PIPE X 1.5" LG                             | PVC-PIPING      |
| 4          | 2   | BA1         | 1/2" SCH 40 PVC ELBOW                                      | PVC-PIPING      |
| 5          | 4   | DA2         | #8 X 5/8" STAINLESS STEEL FLANGED HEAD SELF-DRILLING SCREW | STAINLESS STEEL |



TOP VIEW



SIDE VIEW



DRILL .25 DIA. DRAIN HOLES  
IN BOTH ELBOWS  
(LOCATION IS NOT CRITICAL)

PARTIALLY EXPLODED VIEW



OTHERWISE SPECIFIED:  
1. ALL DIMENSIONS ARE IN INCHES  
2. TOLERANCES  
DEC:  $X \pm .05$   
XX:  $.01$   
XXX:  $\pm .005$   
FRAC:  $\frac{1}{16}$   
ANG:  $\pm 1^\circ$

PROJECT

International SeaPerch Challenge

TITLE

Mission Course - Task 2  
Vault Gate Closing Arm Assembly Details

SIZE

C

DWG NO

SPCXX-U-Mission-Vault-04

REV

DATE 9/1/19

SCALE 1:2

SHEET 1/1

4

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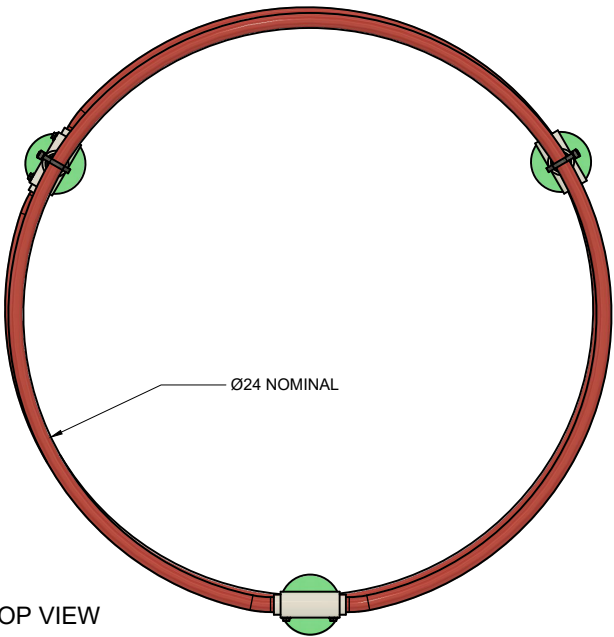
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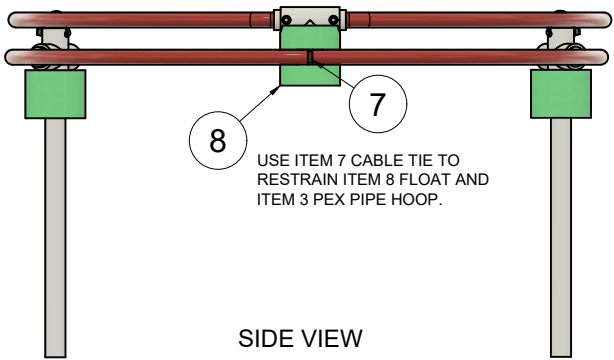
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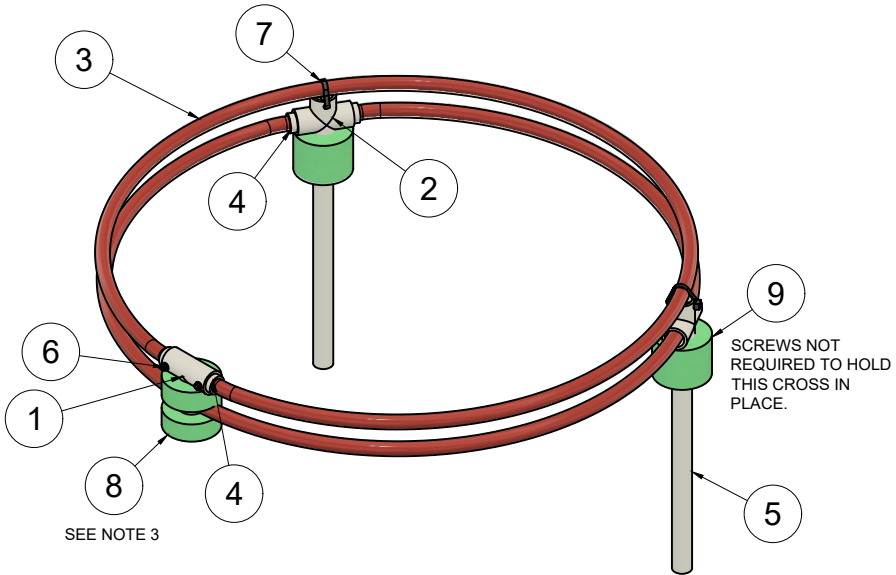
| PARTS LIST |     |             |                                                            |                            |
|------------|-----|-------------|------------------------------------------------------------|----------------------------|
| ITEM       | QTY | PART NUMBER | DESCRIPTION                                                | MATERIAL                   |
| 1          | 2   | BB1         | 1/2" SCH 40 PVC TEE                                        | PVC-PIPING                 |
| 2          | 3   | BC1         | 1/2" SCH 40 PVC CROSS                                      | PVC-PIPING                 |
| 3          | 2   | AAP76       | 1/2" PEX PIPE X 76" LG                                     | POLYETHYLENE, HIGH DENSITY |
| 4          | 4   | AA1         | 1/2" SCH 40 PVC PIPE X 1" LG                               | PVC-PIPING                 |
| 5          | 2   | AA12        | 1/2" PVC SCH 40 PIPE X 12" LG                              | PVC-PIPING                 |
| 6          | 6   | DA2         | #8 X 5/8" STAINLESS STEEL FLANGED HEAD SELF-DRILLING SCREW | STAINLESS STEEL            |
| 7          | 3   | C8          | 8" CABLE TIE                                               | NYLON                      |
| 8          | 1   | N2.5        | FLOAT 2.5" DIA X 2.5" LG (POOL NOODLE)                     | POLYETHYLENE FOAM          |
| 9          | 2   | N2          | FLOAT 2.5" DIA X 2" LG (POOL NOODLE)                       | POLYETHYLENE FOAM          |



TOP VIEW

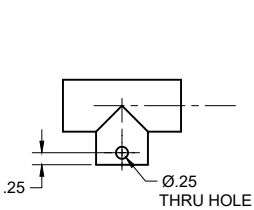


SIDE VIEW

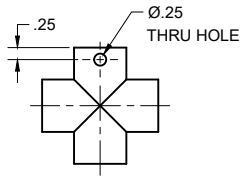


SEE NOTE 3

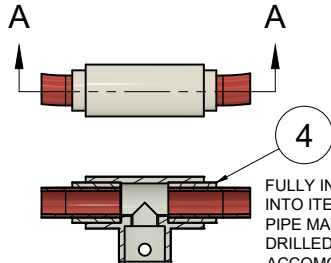
- NOTES:
1. ADJUST FLOAT LENGTHS AS NEEDED TO ACHIEVE DESIRED FLOATION.
  2. SECURE PIPE JOINTS USING ITEM 6 SCREWS AS NECESSARY.
  3. CUT ITEM 8 FLOAT AS NECESSARY.



ITEM 1 DETAIL  
SCALE: 1:2



ITEM 2 DETAIL  
SCALE: 1:2



SECTION A-A  
SCALE 1:2

FULLY INSERT PEX PIPE INTO ITEM 4 PIPE. ITEM 4 PIPE MAY NEED TO BE DRILLED OUT TO ACCOMODATE PEX PIPE.

|                                                                                                                                                                                                                                        |              |                                                                 |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------|-----|
| <br>OTHERWISE SPECIFIED:<br>1. ALL DIMENSIONS ARE IN INCHES<br>2. TOLERANCES<br>DEC: X ± .05<br>XXX: .03<br>XXX ± .005<br>FRAC: 1/16<br>ANG: ± 1° |              | PROJECT<br>International SeaPercH Challenge                     |     |
|                                                                                                                                                                                                                                        |              | TITLE<br>Mission Course - Task 3<br>Garbage Patch Ring Assembly |     |
| DATE<br>8/28/19                                                                                                                                                                                                                        | SCALE<br>1:4 | DWG NO<br>SPC20-U-Mission-GarbagePatch-01                       | REV |



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| PARTS LIST |     |             |                                                        |                          |
|------------|-----|-------------|--------------------------------------------------------|--------------------------|
| ITEM       | QTY | PART NUMBER | DESCRIPTION                                            | MATERIAL                 |
| 1          | 1   | W2.86       | 2.86" DIA. WIFFLE BALL                                 | POLYPROPYLENE            |
| 2          | 1   | W3.86       | 3.86" DIA. WIFFLE BALL                                 | POLYPROPYLENE            |
| 3          | 12  | P1          | 1/4" X 1.5" X .055" THK. STAINLESS STEEL FENDER WASHER | STAINLESS STEEL AISI 304 |
| 4          | 2   | H2          | 1/4" DIA. POLYPROPYLENE ROPE X 14" LG                  | POLYPROPYLENE            |
| 5          | 10  | C8          | 8" CABLE TIE                                           | NYLON 6                  |

| APPROXIMATE WEIGHTS (FULLY ASSEMBLED) |               |                          |
|---------------------------------------|---------------|--------------------------|
| BALL DIAMETER                         | WEIGHT IN AIR | APPARENT WEIGHT IN WATER |
| 2.86                                  | 100 GRAMS     | 61 GRAMS                 |
| 3.86                                  | 126 GRAMS     | 61 GRAMS                 |

## NOTES:

1. SECURE ROPE ENDS TOGETHER USING CABLE TIES (NOT SHOWN ON DRAWING).
2. CUT SLIT BETWEEN HOLES IN WIFFLE BALLS TO INSERT WASHERS.
3. SECURE WASHERS IN BALLS USING CABLE TIES (NOT SHOWN ON DRAWING).
4. BALLS WEIGHED IN POOL WATER. WATER TEMPERATURE, WATER DENSITY, AND OTHER FACTORS WILL EFFECT APPARENT WEIGHT.
5. SEE CANISTER BUILD GUIDE FOR DETAILED INSTRUCTIONS FOR BUILDING WEIGHTED WIFFLE BALLS, [WWW.SEAPERCH.ORG/CANISTERBUILD](http://WWW.SEAPERCH.ORG/CANISTERBUILD)

|                                                                                                                                                                                                                                                 |                                            |                                                                            |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|----------------------------------------------------------------------------|--|
|  <p>OTHERWISE SPECIFIED:<br/>1. ALL DIMENSIONS ARE IN INCHES<br/>2. TOLERANCES<br/>DEC: X ± .05<br/>XX: .01<br/>XXX: .005<br/>FRAC: 1/16<br/>ANG: ± 1°</p> |                                            | PROJECT<br>International SeaPerch Challenge                                |  |
|                                                                                                                                                                                                                                                 |                                            | TITLE<br>Mission Course - Task 4<br>Weighted Wiffle Balls Assembly Details |  |
| SIZE<br>C                                                                                                                                                                                                                                       | DWG NO<br>SPCXX-U-Mission-WeightedBalls-01 | REV                                                                        |  |
| DATE<br>9/7/19                                                                                                                                                                                                                                  | SCALE<br>1:1                               | SHEET 1/1                                                                  |  |

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