

# **GT-Race R6 Kite Buggy Backpack**

Philip Chase

2/24/23

# Table of contents

<b>Preface</b>	<b>3</b>
<b>1 Introduction</b>	<b>5</b>
<b>2 Description</b>	<b>8</b>
2.1 Supporting the backpack . . . . .	8
2.2 Phone pouch . . . . .	16
2.3 Resizing . . . . .	16
2.4 Option B . . . . .	16
<b>3 Phone Pouch</b>	<b>18</b>
3.1 Assembly . . . . .	18
3.1.1 Both panels . . . . .	18
3.1.2 Bottom panel . . . . .	21
3.1.3 Top panel . . . . .	21
3.1.4 Assemble the panels . . . . .	21
<b>4 Parts</b>	<b>27</b>
4.1 Hose exits . . . . .	27
4.2 Fittings . . . . .	27
<b>5 Assembly</b>	<b>33</b>
5.1 Front panel . . . . .	37
5.2 Panel assembly . . . . .	41
5.3 Accessories . . . . .	45
5.3.1 Flap Closure Anchor . . . . .	45
5.3.2 Strapped-on Bite Valve Anchors . . . . .	45
5.3.3 Sticky Bite Valve Anchors . . . . .	46
<b>6 Installation and Maintenance</b>	<b>48</b>
6.1 Installing the bladder . . . . .	48
6.2 Removing the bladder . . . . .	52
6.3 Cleaning the backpack . . . . .	52

# Preface

I had my first ride in a kite buggy July 4, 1992. My ride was a Peter Lynn buggy. That was so early in buggy history I don't even think it had a model. Later I bought a Peter Lynn Comp buggy, then another of the same. In maybe 2009, I bought a Peter Lynn XR+ and then a Flexifoil buggy. I never had a great way to carry tools, water, or any other gear. In 2014 I purchased a hydration backpack, but it was too small to carry anything but water. I would tie tools to the buggy frame just so I could tighten a loose bolt if my buggy came undone away from camp. Sometimes I would lose a wrench or a ground stake while riding and never find it again. After each session I had to hose and dry my wrenches to keep them from seizing up with sand and corrosion.

In the Summer of 2021, I finally purchased a decent hydration backpack that could carry my water and just enough gear. It had room for a few wrenches, a multi-tool, a line set, a fid, spar pocket repair supplies, repair tape, my car keys and a phone. The backpack held everything and it could keep everything dry. I finally had enough tools and parts on me I could break down miles from camp and probably fly home. It was a model from Osprey and I loved it. I used it every time I went buggying and it served very well. I was thrilled to have finally solved my gear management problem.

Yet a year later I upset that happy world when I placed an order for a really nice buggy. I wanted a buggy with a broader wheel base, larger wheel diameter, hip-lock, and better frame geometry. So I ordered a GT-Race R6 from Martin Faber. While I was waiting for Martin to build it, I realized my fancy Osprey backpack would never work on this modern, high-backed buggy. I began searching for a solution and decided the best option was to build a custom backpack tailored to the buggy and to center the design around a really big water bladder.

Version 1 was nothing but a fabric grocery bag tied to behind the buggy seat with a 3 liter Osprey water bladder inside. That was for the shakedown cruise of the new GT buggy in September 2022. Version 2 was a part of seat rebuild when the seat on my daughter's Peter Lynn Comp buggy failed. Version 3, the proper prototype for the GT buggy, is what you see pictured in this book.

I might never have made the book, but mine wasn't the only GT-Race buggy to cross the Atlantic last Fall. Errol Hartbarger got the bug to buy a new GT buggy the same time I did. We ordered them the same week and Martin shipped the pair to the US together a few months later. I promised Errol I'd make him a backpack, too. I wrote 23 pages of notes in designing my backpack, but they were so poorly sequenced and error-filled I wasn't sure I could execute a second one without goofing it up a few times on the way.

This book is my effort to turn those notes and the photographs I took during and after the build into a complete document describing how to build a backpack for a GT-Race R6 buggy like mine. I have included everything I did and learned in constructing the Version 3 backpack. My hope it that Errol's backpack can be a little better design with fewer mistakes in the construction. I hope others find the book useful as well.

*Philip Chase, March 2023*

# 1 Introduction

This is a book a guide for building a backpack for the GT-Race R6 kite buggy designed and built by Martin Faber (see <http://www.gt-race.nl/>). While Martin designs and builds the buggy, the backpack was designed by Philip Chase, Errol Hartbarger, and Susan Chase.



Figure 1.1: Right rear view of the backpack loaded with gear

The backpack is designed to provide both gear storage and accommodations for a three liter water bladder. It incorporates simple folded flap closures to provide easy access while mini-

mizing dirt and water intrusion. It also provides a dirt-out feature on each of its two pouches to allow sand to fall away from the stored gear and be easily removed. A large pouch the full width of buggy's back plate holds the water bladder while providing ample additional room for gear. A smaller pouch attached to the back of the main pouch is large enough to hold a large mobile phone.



Figure 1.2: Hose and bite valve magnetically affixed to the buggy frame

## 2 Description

The body of the backpack is a long tube open on both ends. The bottom of this tube has a full with hook-and-loop closure. Above that is a false floor made of mesh. The mesh floor and the full-width hook-and-loop closure allow sand and other debris to fall away from the compartment and be easily removed. The dirt out includes a nylon flap that can be pulled out of the opening to prevent the hook-and-loop closure from re-closing while cleaning.

Above the mesh floor is the main storage area of the backpack. This area holds a 3 L water bladder. The backpack is designed specifically around the [3 Liter Hydraulics® Reservoir](#) from [Osprey](#). This bladder is designed to be hung from the upper clip, so the backpack is designed accordingly. The water bladder is hung in the center of the main storage area. It occupies about 1/2 the width of this compartment allowing for additional storage left and right of the bladder as well as on top of the bladder.

The upper portion of the tube is folded down to form a flap closure for the backpack. The flap is tri-folded, then folded down and clip to an adjustable strap attached to the rear axle.

The backpack provides routes out the top of the backpack for the water bladder's hose. The routes are at the top of the backpack left and right of the center line. The two routes support the bladder's option to route the hose up the left or right side of the bladder. Each route has a draw string to seal the opening tightly around the hose to reduce the risk of water and sand intrusion.

The free end of the hose needs to be readily available to the pilot. Osprey's bladder hoses include a magnet that can be used to tether the bit-valve end of the hose with a second magnet. To coordinate with this, the buggy can be equipped with one or more magnets along the frame on the pilot's preferred side for the hose.

### 2.1 Supporting the backpack

The backpack is hung from via a single strap at the top center of the buggy's back-plate. This strap pierces the top seam of the backpack and directly supports the weight of the water bladder. A loop of webbing passes through slide opening of the bladder. The loop is pinned in place by a dogbone.



Figure 2.1: False floor and dirt-out of the main compartment. The yellow fabric can be pulled out of the opening during cleaning to keep the hook-and-loop closure open.

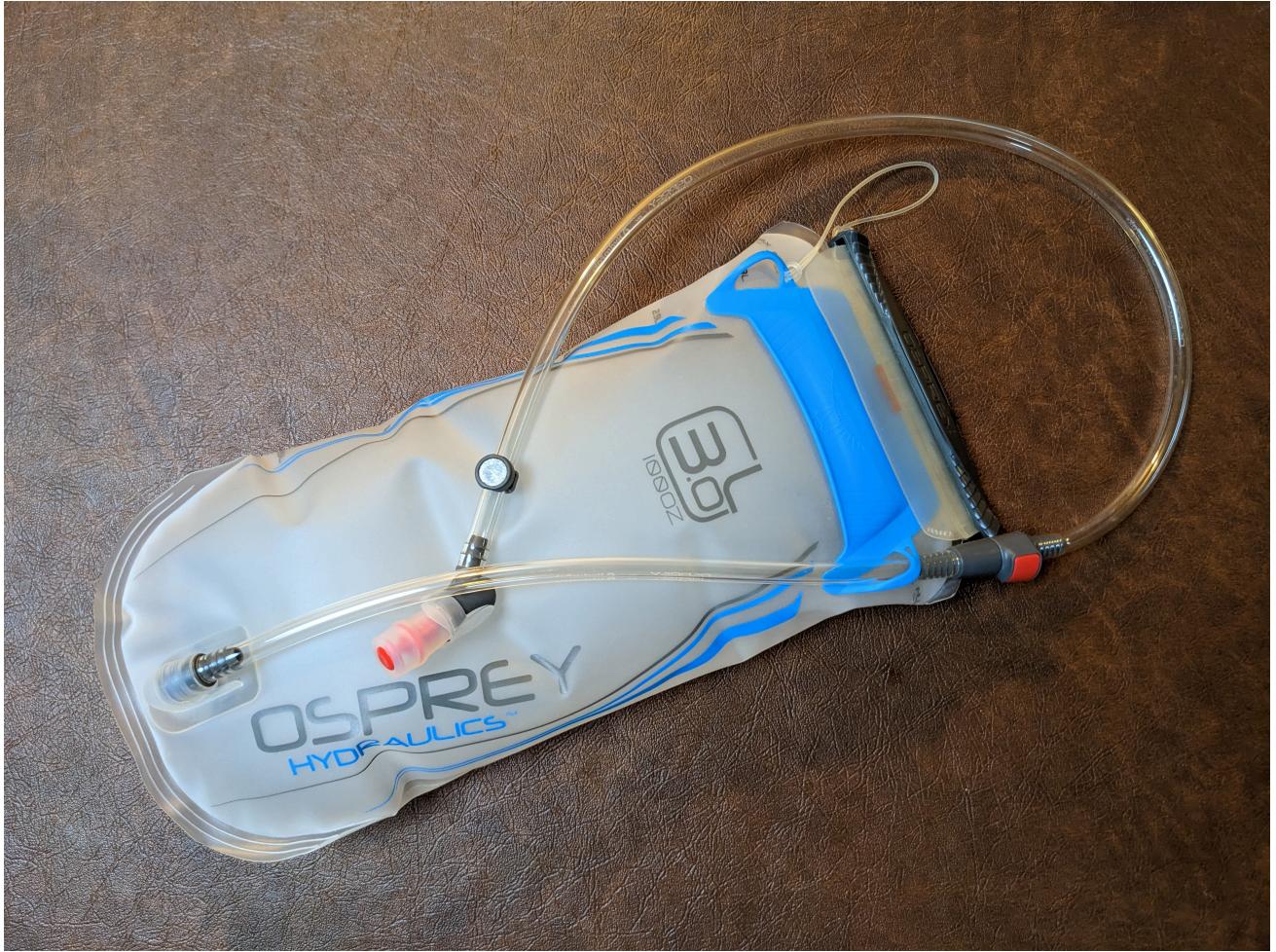


Figure 2.2: Osprey 3 Liter Hydraulics Reservoir



Figure 2.3: Water bladder installed in the backpack. The flap closure has been rolled down in this photo to allow a clearer view of the interior.



Figure 2.4: Flap closure of the backpack



Figure 2.5: Route of the bladder's hose out of the backpack

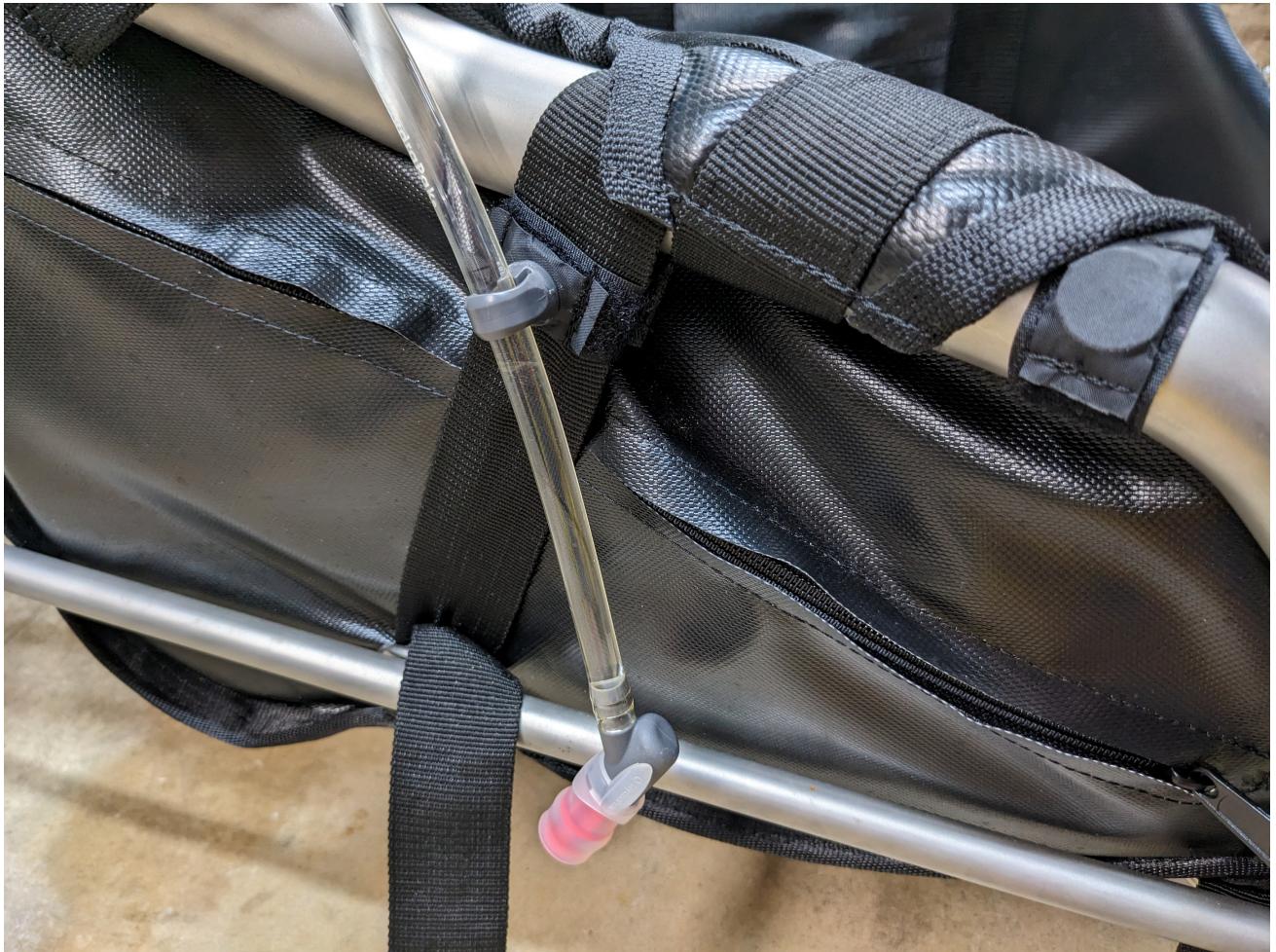


Figure 2.6: Magnets on the buggy frame help hold the hose and bite-valve in place



Figure 2.7: A dogbone holds a loop of webbing in place to support the bladder

The body of the backpack is held down and stabilized laterally by a pair of straps sewn to the underside that girth the buggy backplate and are cinched down tight to it. One strap is high on the backplate while the other is very low.

## 2.2 Phone pouch

The backpack has a much smaller pouch suitable for a phone affixed to the back of the backpack. The pouch has the same structure as main pouch with the tubular body, the full width hook-and-loop closure, the mesh false floor and the flap closure. The phone pouch is affixed just below the fold of the main pouch. It is largely covered by the flap of the main pouch as shown in Figure 2.4

## 2.3 Resizing

The GT-Race R6 buggy is available in 3 sizes: small, medium, and large. The variation between the sizes is the width of the back plate and the dressing plate mounted on top of it. Each backplate can also be configured to a narrow or wide setting. The published dimension for each buggy is width between side rails surrounding the back plate when the back plate is set in the narrow position. Those widths are 40 cm, 43 cm, and 46 cm, respectively for the small, medium, and large buggies. The prototype backpack was designed to match the 40 cm width of the narrow setting of a small back plate. All of the diagrams and text assume this width. Where it is needed to resize the backpack for a larger buggy, those diagrams will be followed by a note like this:

Resizing note: The width dimension above should be tailored to the buggy size. S:42, M:45, L:48

## 2.4 Option B

The flap closure of the prototype might not be the best way to keep everything dry. To experiment, version 4, Errol's backpack will use a longer flap that extends the full length of the bag. We'll preserve the original closure option on the longer flap, but we'll include buckles at the left and right corners of the end of the flap to allow the opening to be stretched flat across the bottom of the backpack. We'll refer to the original closure as *Option A*. The longer flap with the added side buckles will be termed *Option B*. Look for notes like this for Option B instructions:

Option B note: The height dimension should be adjusted for the closure. A:42, B:45



Figure 2.8: Girth straps on the underside of the backpack

# 3 Phone Pouch

The phone pouch needs to be big enough to hold a large phone, but it also needs to be wide enough to accommodate a man's hand to allow the phone to be extracted from the back. This pouch is designed for a phone 18 x 10 x 2 cm. A 30 cm circumference should accommodate most male hands.

Build the body of the water proof canvas. The prototype version of the phone pouch and backpack are made from **Ottertex® Waterproof Canvas**. Ottertex® is easy to mark with pencil on the back side. It is about impossible to mark on the face. I general affix blue tape to the face to when I need a mark.

Cut two panels of canvas as shown in Figure 3.1 The astute reader will note that the details of the height on the left don't match the dimensions on the right. Whatever! Until proven otherwise, cut the fabric 37 cm high, mark the seam of for the mesh 11 cm above the unfinished bottom, and mark the folder line 13 cm below the unfinished top.

Also cut these small parts from sewable 2.5 cm-wide hook-and-loop closure strips

- Dirt-out closure: a matched pair of strips 15 cm long
- Tri-fold closure: a matched pair of strips 3 cm long
- Flap closure: one fuzzy strip 9 cm long, one hooked strip 14 cm long

Also cut these parts

- Dirt-out flap: cut a single 8 x 15 cm panel from ripstop nylon
- Mesh floor: cut 2 panels 11 x 14 cm from any durable mesh fabric

## 3.1 Assembly

### 3.1.1 Both panels

1. Mark a stitch line on the backside of each pouch panel 11 cm up from the bottom of the unfinished edge.
2. From a 1 cm square from each corner of each pouch panel.
3. Fold and stitch a 1 cm hem on all four edges of the each pouch panel.



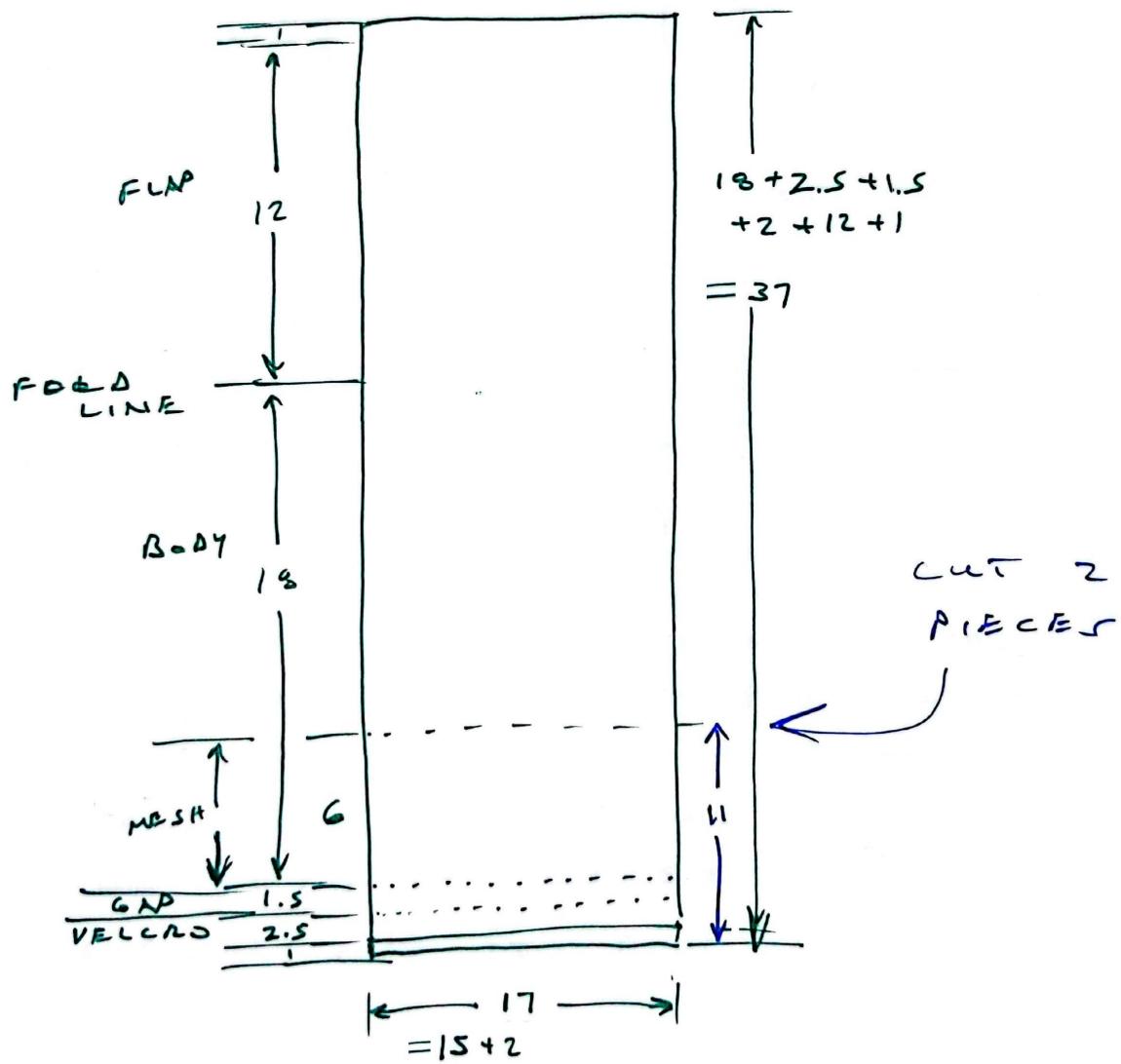


Figure 3.1: Phone pouch main panel - cut 2 pieces from canvas

4. Sew a mesh panel to the backside of each pouch panel along the aforementioned stitch line. Trim the excess mesh from the left and right edges.

### **3.1.2 Bottom panel**

1. Align the 8 x 15 cm nylon dirt-out panel to one long edge of a 15cm strip of hook-and-loop. Overlap the panels about 5mm. Lightly tack the pieces together.
2. Align to the other edge of the hook-and-loop with the lower hem, centering the hook-and-loop on the pouch panel. Stitch all edges of the hook-and-loop.
3. At the center of the top edge, on the face, overlap about 2 cm of the 14 cm long hook strip on top of the face. Orient the hook strip hook-side down. Stitch all four edges of the 2 cm over overlap. See Figure [3.2](#)
4. Orient the bottom panel face up, and top edge up. On the top left corner, orient a 3cm loop strip vertically, fuzzy side out. Stitch all four edges to the loop strip. See Figure [3.2](#)

### **3.1.3 Top panel**

1. Align a 15 cm piece of hook-and-loop closure with the lower hem, centering the hook-and-loop on the pouch panel. Stitch all edges of the hook-and-loop.
2. Orient the top panel face up, top up. At the top left corner of the panel, orient the 3 cm hook strip, hook side up as shown in Figure [3.3](#) Stitch all four edges of the loop strip.
3. Orient the top panel face up, top up. At the bottom center of the panel, orient the 9 cm loop strip vertically, fuzzy side up, with one end aligned with the bottom edge. Stitch all four edges of the loop strip.

### **3.1.4 Assemble the panels**

1. Align the backsides of the pouch panels
2. On the left and right edges, stitch from the top edge the mesh seam line.
3. Fold the pouch panels back to expose the two mesh panels.
4. If needed, apply a 6cm strip of blue tape the mesh to stabilize its shape.
5. Mark a curving line on the mesh/blue tape as shown in Figure [3.5](#) the bottom of the line should be about 6 cm below the stitch line that joins the mesh to the pouch panel.
6. Stitch along the marked line.
7. Peel away the blue tape from both side of the stitch line.
8. Trim off the excess mesh beyond the stitch line.
9. Triple-zig-zag stitch the remaining hem of mesh.
10. Fold the front and back pouch panels together again.
11. Stitch each side from the top of the mesh to the bottom to fully close the sides.



Figure 3.2: Bottom panel detail at top



Figure 3.3: Top panel detail at top

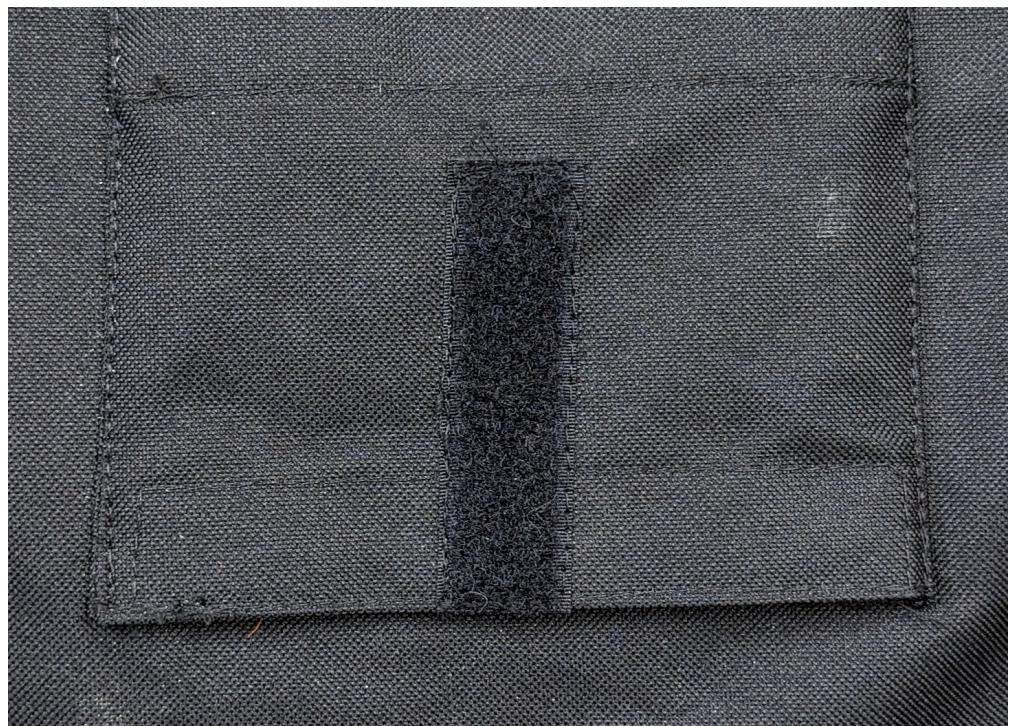


Figure 3.4: Top panel detail at bottom

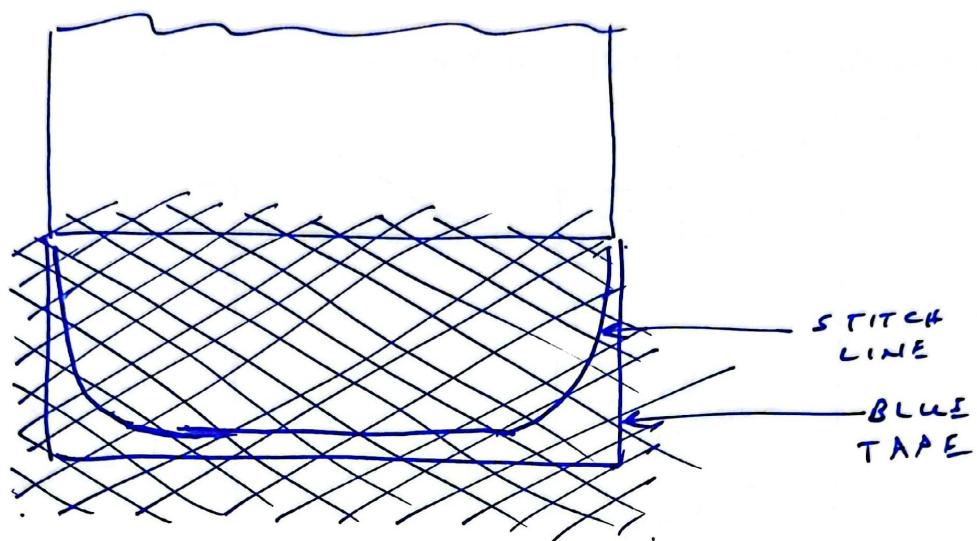


Figure 3.5: Joining the mesh panels

Most of the details of the construction are visible in the completed phone pouch shown in Figure 3.6

Mark the flap closure's fold line 12 cm below the upper finished edge of the pouch. Crease this line with a warm iron. Fold each corner of the flap closure and crease it with a warm iron as shown in Figure 3.6 The hook-and-loop tabs should align when the corners are folded.



Figure 3.6: Fully opened phone pouch

## 4 Parts

The main pouch covers the width of the buggy's backplate and the height from the top of the plastic plate nearly to the rear axle. The body is constructed 3 panels of **Ottertex® Waterproof Canvas**. The panels need to fit a small GT-Race R6 buggy are shown in Figure 4.1. Cut one of each of these panels.

Resizing note: The width dimension of the panels above should be tailored to the buggy size. S:42, M:45, L:48

Option B note: The height dimensions should be adjusted for the closure option used.

- Upper back panel height - A:35, B:44
- Front panel height - A:77, B:86.

The backpack requires two 44 x 14 cm mesh panels as shown in Figure 4.2 to form the mesh floor of the main pouch.

Resizing note: The width dimension of the mesh panelshould be tailored to the buggy size. S:44, M:47, L:50

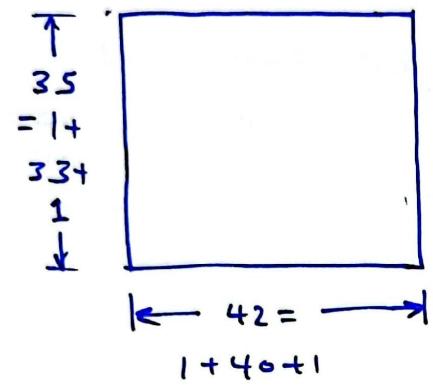
### 4.1 Hose exits

The hose exits require four 7 cm x 8 cm panels of ripstop nylon, two pieces of 1mm cord 26 cm long, and two cord locks as shown in Figure 4.3

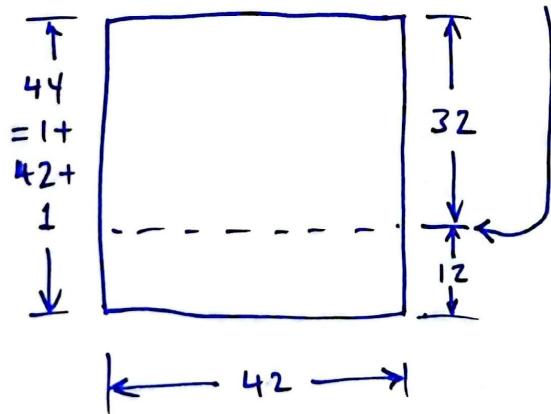
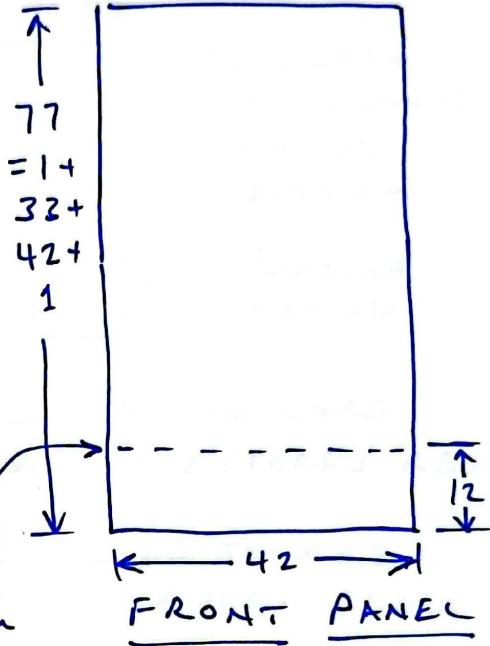
### 4.2 Fittings

Cut these parts from 340 cm of 5/8" (15mm) Bluewater climb-spec tubular webbing

- (1) 25 cm for connecting a plastic side-release buckle to the flap closure
- (1) 35 cm for the center hanger
- (1) 120 cm for upper girth strap

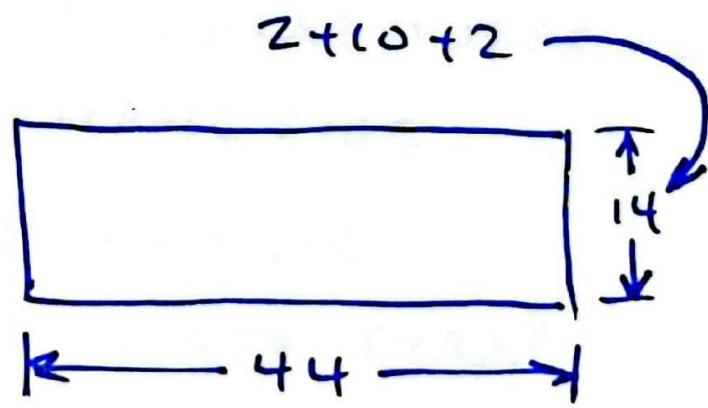


UPPER BACK PANEL



LOWER BACK PANEL

Figure 4.1: Backpack main panels



MESH PANELS  
2 REQUIRED

Figure 4.2: Backpack mesh panels - two pieces are required

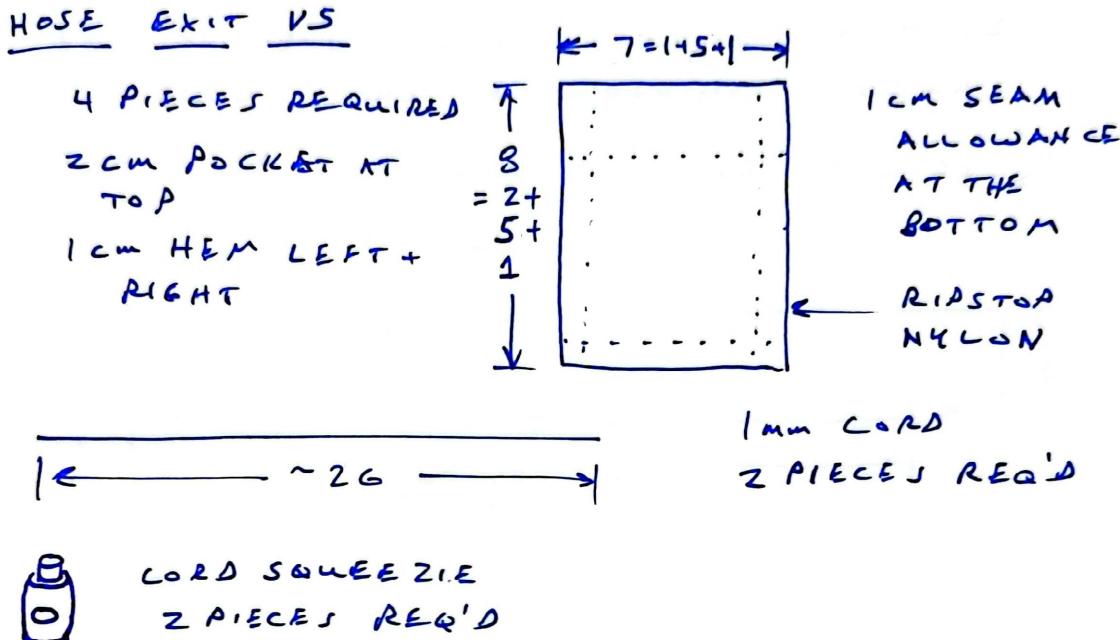


Figure 4.3: Hose exit components

Resizing note: The upper girth strap should be tailored to the buggy size. S:120, M:126, L:132

- (1) 105 cm for lower girth strap

Resizing note: The lower girth strap should be tailored to the buggy size. S:105, M:111, L:117

- (1) 65 cm to connect the lower clip of the plastic side-release buckle to the rear axle

Option B note: cut (2) 10cm for connecting two plastic side-release buckles to the corners of the flap closure. Cut and additional 65 cm strap to connect the lower clip of the plastic side-release buckle to the rear axle

Also cut these small parts from sewable 2.5 cm-wide hook-and-loop closure strips

- Dirt-out closure: a matched pair of strips 38 cm long

Resizing note: The dirt-out closure should be tailored to the buggy size. S:38, M:41, L:44

- Tri-fold closure: a matched pair of strips 5 cm long
- Long bite valve anchor A: 15 cm of loop strip and 3 cm of hook strip

- Short bite valve anchor A: 12 cm of loop strip and 39 mm of hook strip

Cut these small parts from insignia cloth:

- Wrapped bite valve anchor: (2) 5 x 5 cm squares of black cloth (one for each bite valve anchor)
- Sticky bite valve anchor: (1) 2 cm diameter circle and of white or black cloth
- Sticky bite valve anchor: (1) 5 cm diameter circle and of white or black cloth

Purchase six 3 mm x 15 mm marine grade welded stainless-steel rings: Two for each girth strap and two for the center hanger.

Purchase one plastic side-release buckle for 2 cm strap.

Option B note: A:1 buckle, B: 3 buckles

Purchase 2 or more of 18 mm x 3 mm nickel-plated neodymium magnets.

Cut 20 cm of 1mm line to thread the center hanger into the top of the bladder.

Cut a dirt-out flap of 38 x 8 cm panel from brightly-colored ripstop nylon.

Resizing note: The dirt-out flap should be tailored to the buggy size. S:38, M:41, L:44

Make a custom dogbone to connect the bladder to the loop of the center hanger. Turn the wood according to Figure 4.4 Sand the whole piece but pay special attention to the tapered end and the cylindrical 8mm diameter section. That will assure the dogbone can slide in and back out with ease.

## DOG BONE

MAKE FROM ANY  
CLOSE-GRAINED  
HARD WOOD

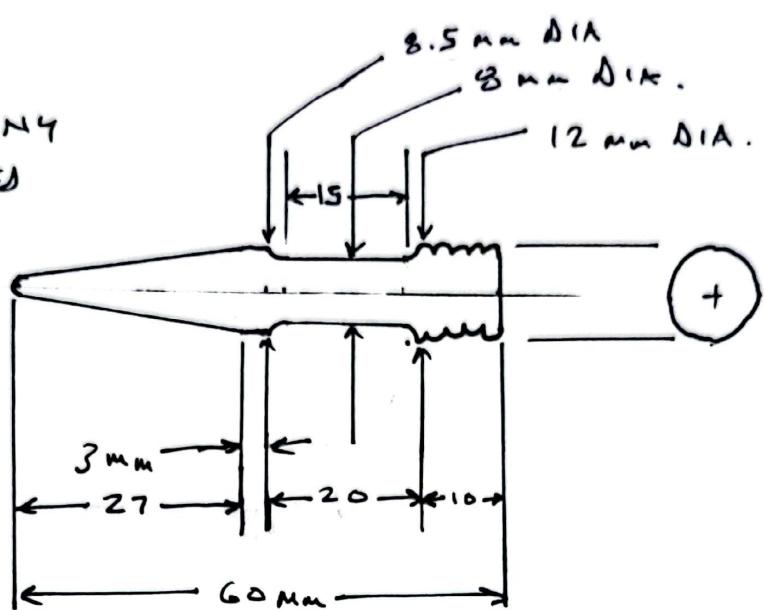


Figure 4.4: Diagram of dogbone

## 5 Assembly

To assemble the back panel of the backpack start by sewing the center hanger assembly. Use the 35 cm segment of 15mm webbing and two 15m stainless welded rings. Assemble them as shown in Figure 5.1.

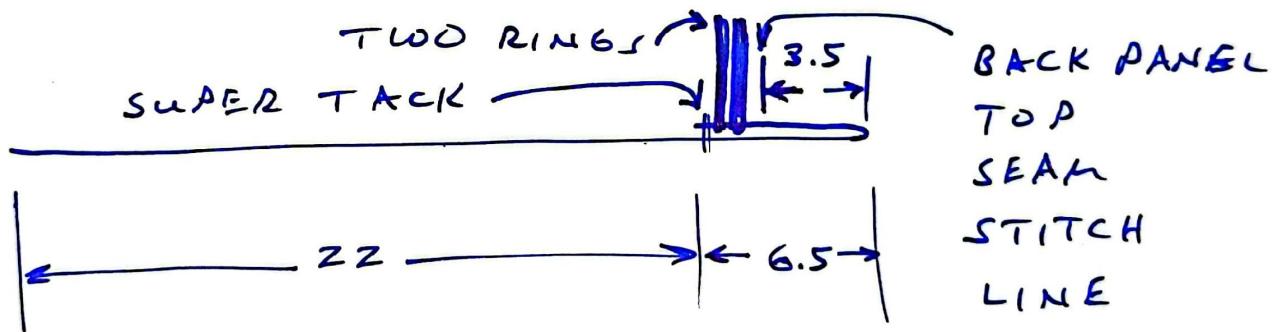


Figure 5.1: Center hanger assembly

Thread the 20 cm of 1mm line through the loop in the 15mm webbing. fold the 1mm line in half. Zig-zag stitch the halves of the 1mm line together from about 3 cm below the webbing the tip of the folder line. While not shown in Figure 5.1, this line is visible in Figure 5.4

Then prepare the hose exits for assembly by putting a 1 cm hem in the left and right edges of each of the four hose exit panels as shown in Figure 5.2.

On the top of the lower back panel and the bottom of the upper back panel, mark the vertical center line of each panel. Also mark 12.5 cm left and right of each panel. The 12.5cm mark will be the outer edge of each the tube exit. It's easiest to mark the backside of the fabric, but you'll need to see the 12.cm mark on the face of the fabric.

With one of the back panels face up, align a hose exit panel with the outer edge mark as shown in Figure 5.3. Stitch the hose exit panel to the back panel with a 1 cm straight-stitch hem. Be sure to be sure top back-stitch this seam. Stitch the hemmed edge with a zig-zag stitch. Repeat this these steps with the other hose exit on this back panel. Repeat the process with the other back panel.

With the lower back panel face up, align the center hanger along the center line of the lower back panel. 2.5 cm of looped end of the center hanger should protrude beyond the edge the

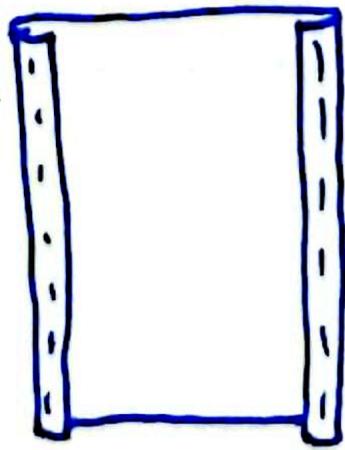


Figure 5.2: Hemmed hose exit panel

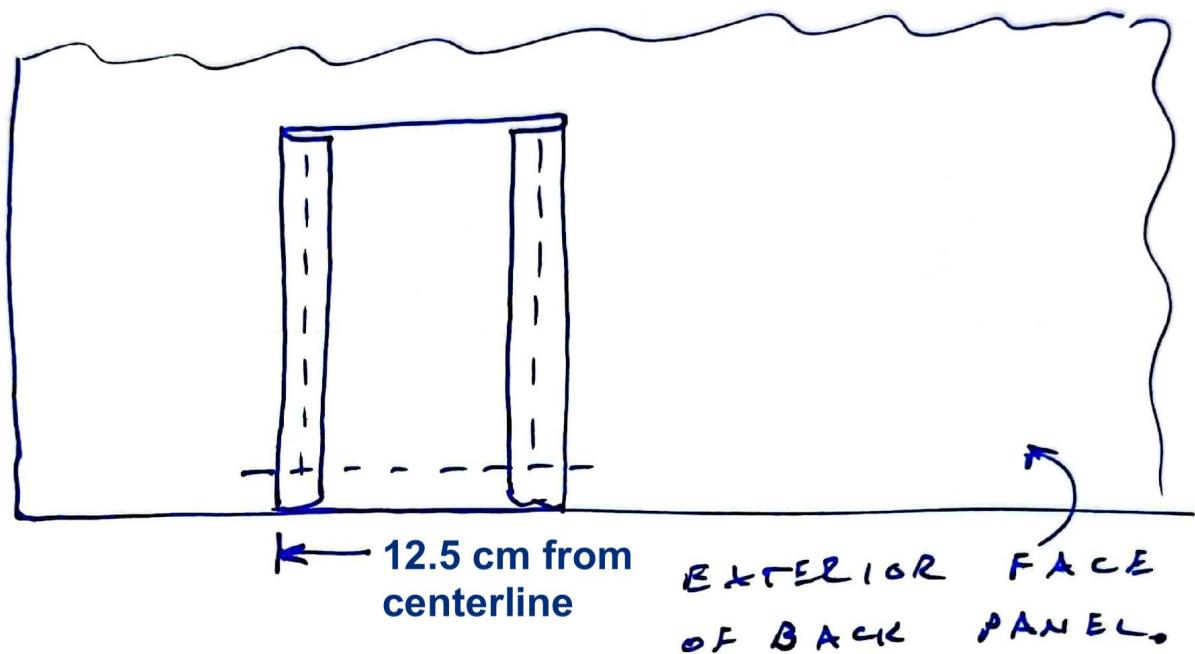


Figure 5.3: Hose exit assembly to back panel

back panel. See Figure 5.4 for more detail. Sew the center hanger to the back panel 1 cm inboard of the back panel edge.

Align the two back panels, face-to-face along the edge where the hose exist are attached. The hose exit panels should be hidden and aligned in two pairs. Sew a 1 cm straight-stitch hem to join the panels, but *do not* stitch across the hose exits. It's OK to put one stitch on the hose exits, but stitching more than 3mm will narrow the opening. Also be sure to back-stitch left and right of the hose exits.

Now fold the back panels together to expose the tube panels. Fold 2 cm of top one one hose exit panel towards its mate. Sew a straight-stitch hem at the bottom of the fold. Repeat this step with each of the other 3 hose exit panels. Make sure to stitch them *separately*, not to each other. These will form a pocket for a draw string.

Mark the middle of a 20 cm long 1mm cord. Thread the ends through the pockets you just made in the hose exit panels. Thread towards the middle of the back panel. Align the mid-line mark of the cord with the outer edge of the hose exit panels. Sew the outer edge of the hose exit panel from the joined back panels all the way to the top of the hose exit panels joining the panels and pinning the 1mm cord in one stitch line.

Stitch the in-board side of the hose exit panels from the joined back panels, but the lift the cord high in the pockets and stop just shy of the cord. Do *not* stitch the cord on this side. Each cord should function like a draw string to close the tube exit tightly.

With the sewing of the hose exists complete, thread each pair of cord ends through a cord lock. Tie the end of each pair with an over-hand knot to retain the cord lock.

Trim a 1 cm square from each corner of the back panel assembly. Fold and hem all of the back panel edges.

Align the long hook strip to the bottom edge of the back panel, center it and sew all four edges to the back panel.

Mark the backside of the back panel 11 cm above the bottom edge. Attach one of the mesh panels to the along that marked line with a 1 cm hem above the marked line.

To attach the girth straps to the back panel, mark the face of the back panel at 6 cm and 32 cm below the upper seam. Still on the face, mark the vertical center line of the back panel. Also measure about 10 cm from the vertical center line. Mark the center line on the upper girth strap. Align the center line of the upper girth strap with center line of the back panel along the 6 cm mark. Stitch the central 20 cm of the strap to the back panel with a zig-zag stitch. Repeat this process for lower girth strap along the 32 cm mark. See Figure 5.7 for more detail.

Resizing note: stitched length on the girth straps varies with buggy size. S:20, M:22, L:24

Attach a pair of 15mm welded stainless steel rings to one end of each girth strip. Pass 2 cm of strap through the pair of rings and stitch the end to the strap with a 6 straight stitch passes.

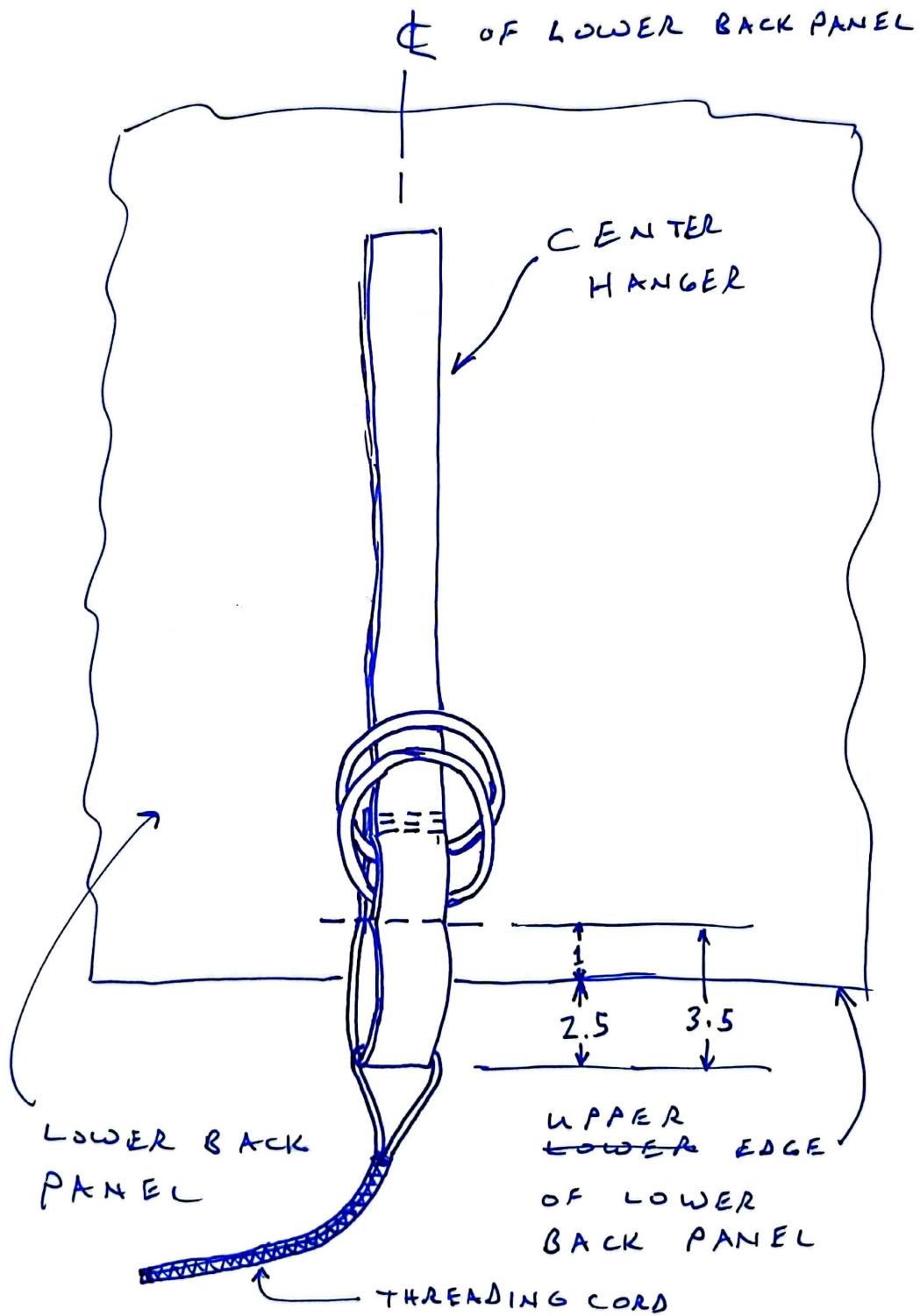


Figure 5.4: Attach the center hanger to the face of the lower back panel

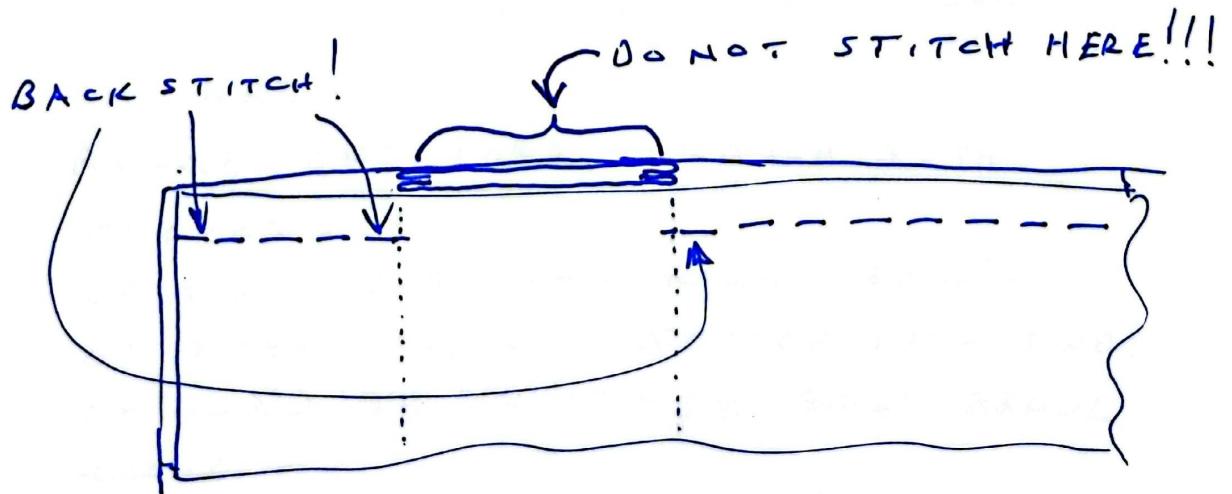


Figure 5.5: Back panel upper seam assembly

The back panel's flap closure requires two more pieces that require tricky alignment. Spread out the back panel face up placing the flap closure closest to you. Mark the diagonal construction lines shown in Figure 5.8. Thread one half of the plastic side-release buckle onto the 25cm piece of webbing. Use the diagonal construction lines to position the webbing on the panel. Stitch the webbing to the panel with a zig-zag stitch. Use the construction lines to position the 5cm hook strip. Stitch all four edges of the 5cm hook strip.

Option B note: The position of the closure fittings is not yet known for Option B.

## 5.1 Front panel

To construct the front panel, start by trimming a 1 cm square from each corner of the front panel and adding a 1 cm hem to each edge.

Sew a 5cm loop strip to the top left corner of front panel. Orient the strip horizontally as shown in Figure 5.9

Option B note: The position of the closure fittings is not yet known for Option B.

Align the long loop strip with the long edge of the dirt-out panel of ripstop nylon. Overlap the ripstop with 1 cm of the loop strip. Sew them together with a straight stitch.

Align the edge of the long loop strip to the bottom edge of the front panel, center it and sew all four edges of the loop strip to the back panel.

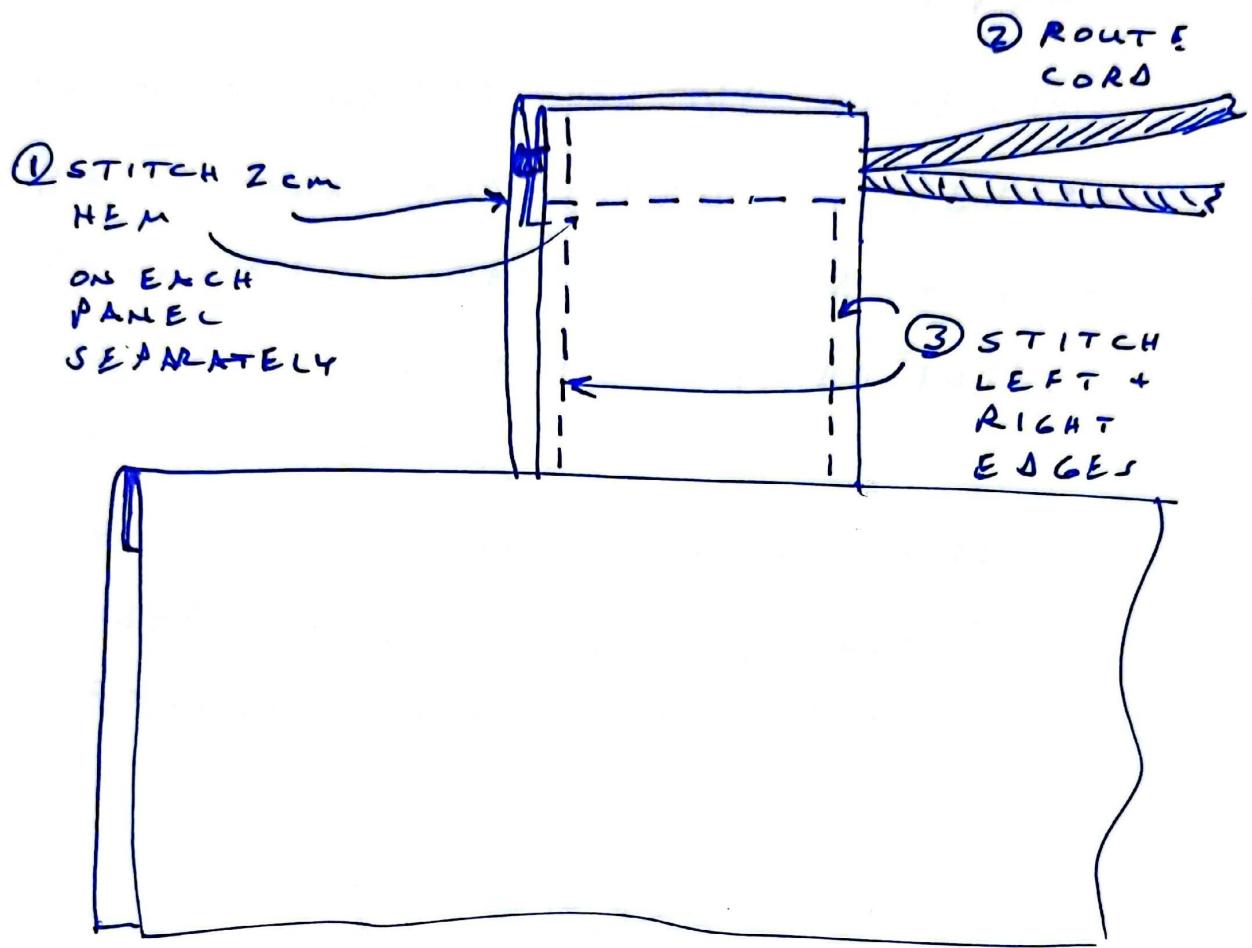


Figure 5.6: Finish hose exits

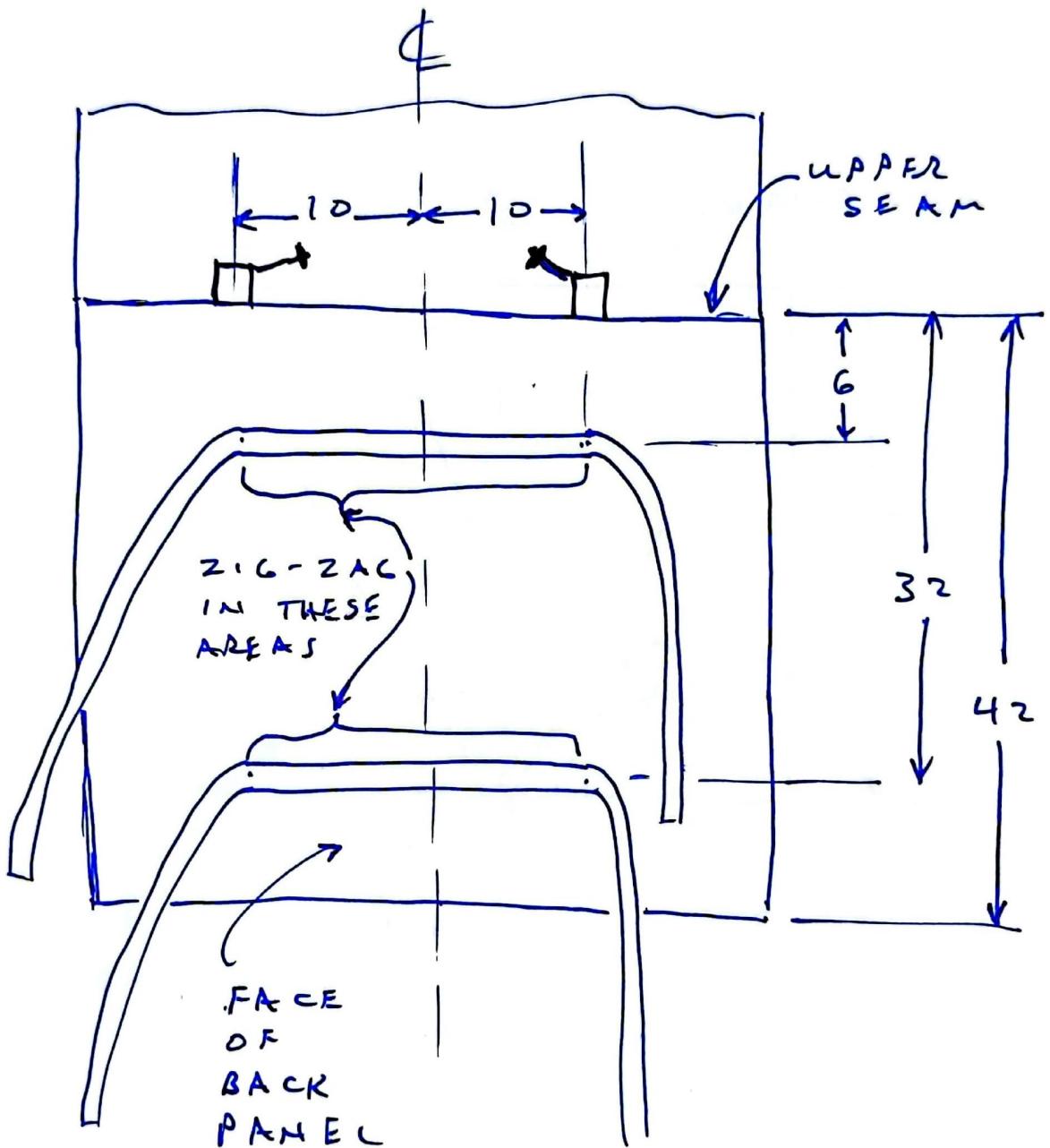


Figure 5.7: Attach the girth straps to the lower back panel face

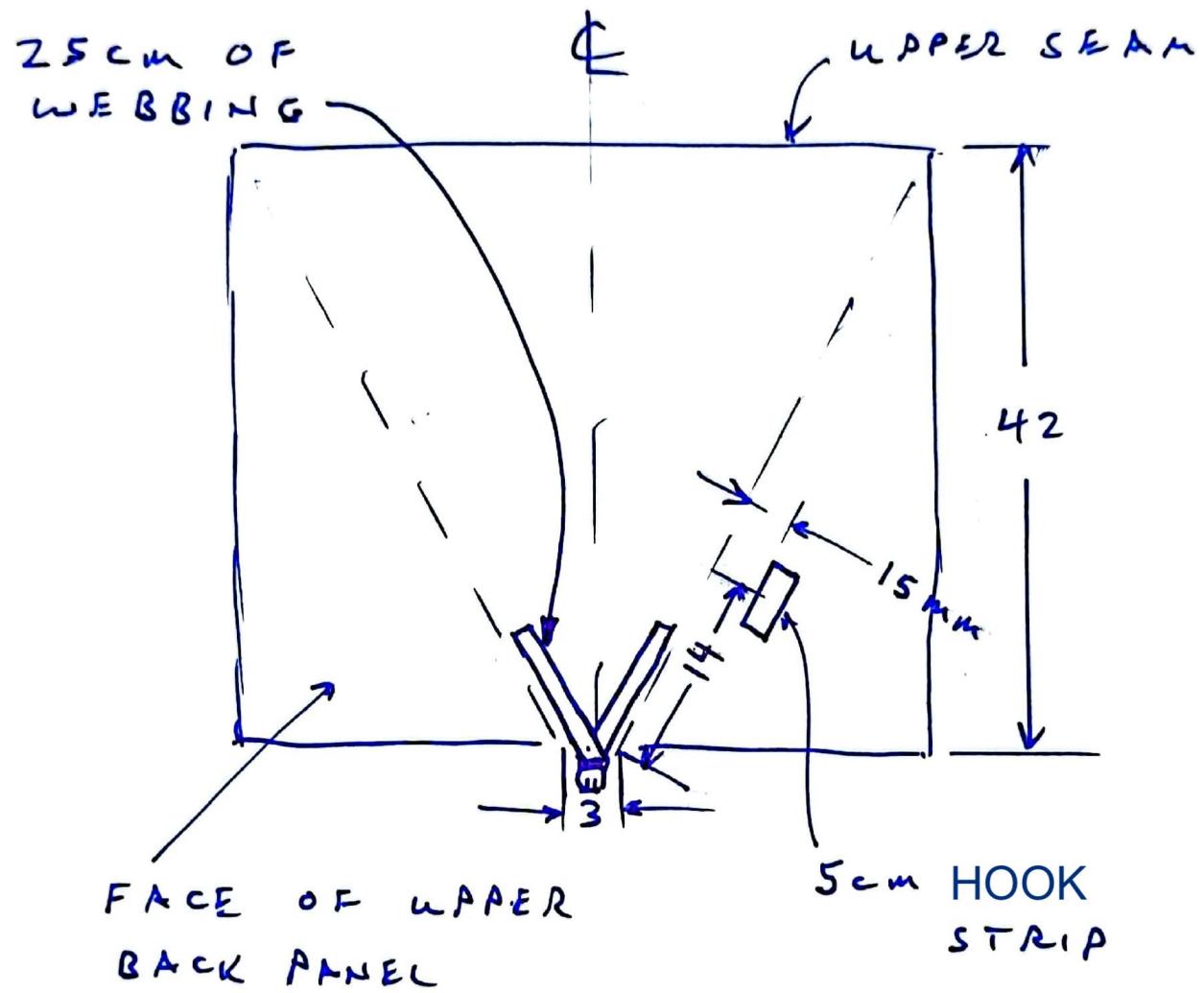


Figure 5.8: Align the flap closure fittings



Figure 5.9: Loop strip on the top left of the front panel

Mark the backside of the front panel 11 cm above the bottom edge. Attach one of the mesh panels along that marked line with a 1 cm hem above the marked line.

Mark the face of the front panel 31 cm below the upper finished edge to denote where the main pouch will be folded. Mark the vertical center line of the face of the front panel. Align the top of the closed phone pouch with 31 cm mark centering it on the face of the front panel. As shown in Sew the left and right edges of the phone pouch to the face of the main pouch front panel. Tack the seam at the upper left and right corners.

Option B note: The height below the top panel depends on the closure option: A:31, B:40

## 5.2 Panel assembly

Align the backsides of the front and back panels. Sew down the left and right edges from the top to the mesh seam line.

Fold the lower section of the front and back panels up to expose the mesh panels. Pin the mesh panels together along a curving path like a smile. Sew a straight stitch along the curving line. Trim 1 cm beyond the seam. Triple zig-zag stitch the seam allowance.

Note: It might be useful to stabilize the mesh with a wide strip of blue painters tape to sew it. If you're alignment is good as you back stitch the seam, it is easy to peel the tape off with



Figure 5.10: Backpack lower interior detail. The back panel of the prototype is shown here. The design has since evolved moving the dirt-out flap to the front panel, but the position of the mesh and hook strip are correct.



Figure 5.11: Phone pouch attached to the backpack

the seam forming a perforation in the tape. Just make sure you peel the tape off before you apply the zip-zag stitching as that makes tape removal extremely difficult.

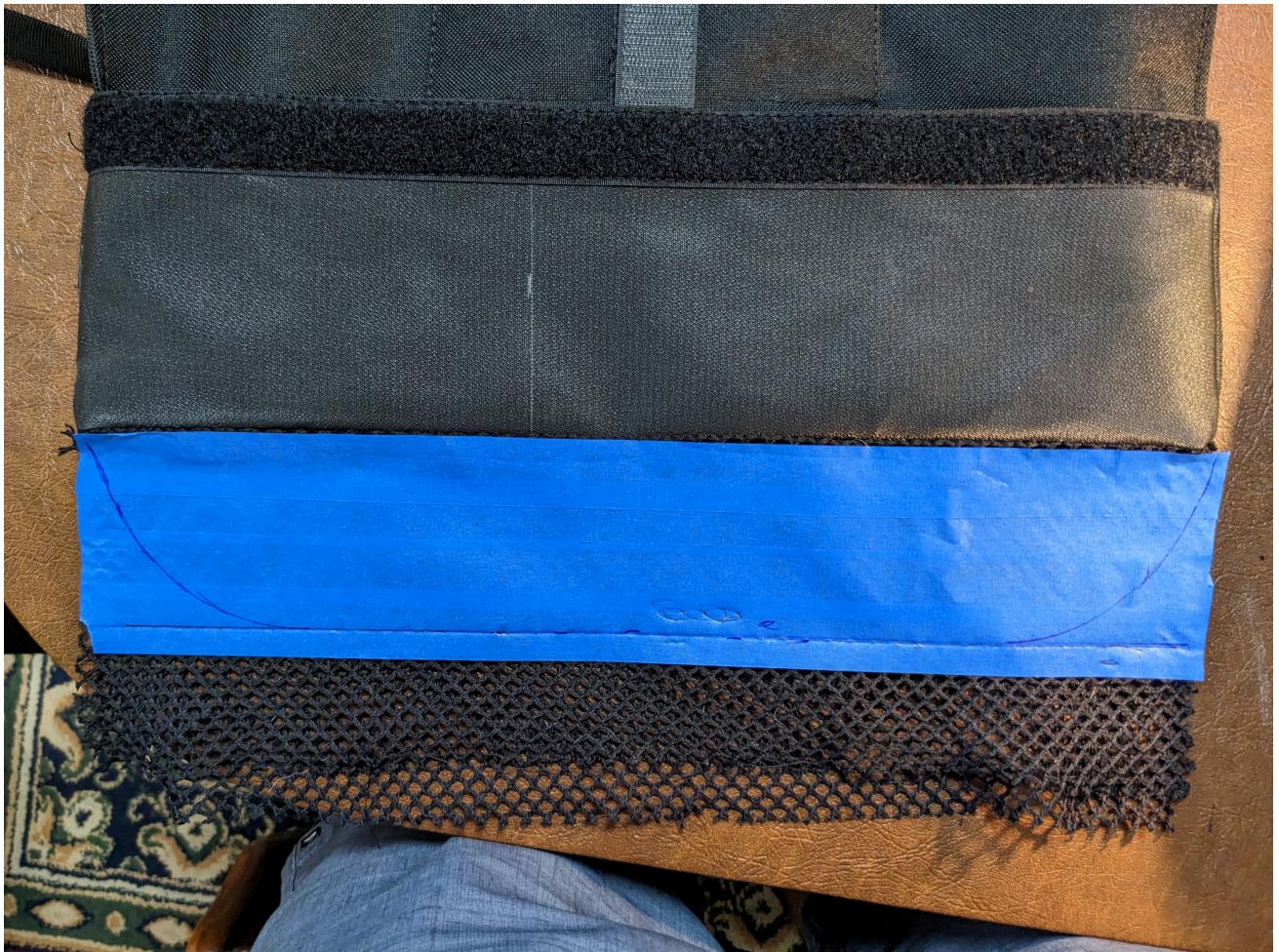


Figure 5.12: Sewing the mesh panels together. This photo of the prototype backpack already has the side seams sewn all the way to the bottom. That's OK, but it probably makes the job harder. Note that the exact shape of the curve doesn't matter.

Sew the remaining portion of the left and right edges of the main pouch.

## 5.3 Accessories

### 5.3.1 Flap Closure Anchor

To make a anchor for the backpack's folder flap, fold back 7 cm of the 65 cm piece of 15 mm webbing onto itself and stitch the end for form a 7 cm loop. Thread the free end of the webbing into the lower clip of the plastic side-release buckle. See Figure 2.4



Figure 5.13: Flap closure anchor

Option B note: make two for Option B

### 5.3.2 Strapped-on Bite Valve Anchors

The bite valve anchors are magnets captured in fabric sewn to a strip of hook-and-loop. When installed, the hook-and-loop strip is wrapped around a portion of the buggy to hold the magnet in place. The large anchor is sized for the seat tube. It can be affixed to the left or right side of any buggy. The small anchor is sized for the seat straps. They can also be affixed om the left or right sides of the buggy, but those straps are only exposed if the buggy is undressed.

Stitch 39 mm of the hook strip to the backside of the 12 cm loop strip to make the short anchor.

Stitch 3 cm of the hook strip to the backside of the 15 cm loop strip to make the short anchor.

Wrap the 18 mm magnet in a 5 x 5 cm piece of insignia cloth. Test the magnet's polarity against the bite valve anchor that came attached to the water bladder hose. Note which side of the wrapped magnet adheres to the magnet on the hose and mark this side as up. Place the wrapped magnet on the loop side of the strap, right side up, and centered between the ends of the strap. Stitch the ends of the wrapped magnet to the strap. Trim the excess length off the ends of the wrapped magnet leaving 5mm at beyond the seam.

Note: If the magnet's attraction to the sewing machine deck causes issues, slide a few layers of thin cardboard under the strap.



Figure 5.14: Bite valve anchors

### 5.3.3 Sticky Bite Valve Anchors

Dressed buggies might need additional anchor points on side dressing. These can be affixed with peel-and-stick insignia cloth. Check the polarity of an 18mm magnet against hose's magnet. Mark the up and down sides. Cover the down-side of the magnet with a 2 cm circle of insignia cloth. This should reduce abrasion and galvanic corrosion. Affix the magnet to the center of a 5 cm circle of insignia cloth with the upside against the adhesive. Affix the circle of insignia cloth to the side plates.

Note: The galvanic corrosion risks arises because the aluminum of the Dibond plate and the nickel-plating of the magnet have different electric potentials. Seawater vastly accelerates this

reaction. These magnets should be well-rinsed after any beach trip and checked for corrosion every other year. It's unclear if rinsing can prevent damage to the Dibond plates.

# 6 Installation and Maintenance

To install the backpack, the rear panel of the buggy's "dressing" must already be installed. The panel supports the weight of the backback and its contents. The upper girth strap cinches to the panel.

Place the empty backpack on the rear panel. Route the free end of the center hanger down between the crack in the backplate and the flange just about backplate size indicator. Go below the flange, up between the flange and the pad and back to the double rings. Route the free end of the webbing through the rings and pull it tight while aligning the upper seam of the back pack with the upper edge of the rear panel. All of these details can be seen in Figure 6.1

Route each girth strap between the rear plate and the side tubes. Connect the free ends of each strap below the rear plate and cinch them tight.

## 6.1 Installing the bladder

Disconnect the hose from the bladder at the top of the bladder. Route into the hose exit on the side you prefer. Cinch the hose exit tight around the hose. Cinch the other hose exit to prevent intrusion of dirt or water. If needed, reconfigure the water bladder to match your preferred hose side.

*Note: Fill the water bladder before installing it in the backpack.*

Locate the dogbone, removing it from the webbing loop if needed. Lower the water bladder into the backpack. Thread the threading loop through the top center of the slide opening of the bladder. Pull the webbing loop through the center of the slide opening. Push the dogbone into the webbing loop to secure the bladder.

Locate the end of the hose inside the backpack. Insert it into the connector on the bladder.

The finished product looks like Figure 6.2 and Figure 6.1



Figure 6.1: Hanging the backpack



Figure 6.2: The dogbone in place



Figure 6.3: Water bladder installed in the backpack. The flap closure has been rolled down in this photo to allow a clearer view of the interior.

## **6.2 Removing the bladder**

To remove the bladder, disconnect the hose at the top of the bladder. Pull the dogbone out of the loop and lift the bladder out. Don't lose the dogbone!

## **6.3 Cleaning the backpack**

To remove dirt from the backpack or the phone pouch, open the dirt-out at the bottom. Most of the sand should fall out freely. If it doesn't, compressed air or a leaf blower applied at the upper end should clear the remaining sand.

If sea water intruded into the backpack, it should be rinsed with a fresh water. Leave the backpack empty and open to dry if it is wet. It is made of waterproof fabric and will not dry if it is not left open and well-ventilated for several hours.