

THE CITI BIKE

- Offers great flexibility to leave or take a bike depending on change of plans or weather
- Main use in city centres, and downtown for short distances to school/work

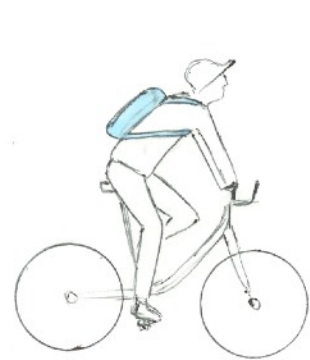
No rear rack for pannier attachment

Partial basket at front, does not secure bags or items well



citi bike

PROBLEM



FULL BACKPACK
NO EXTRA SPACE



HANGING OFF HANDLEBARS
UNBALANCED BIKE



TIED TO BASKET
NOT SECURE OR RELIABLE

Example: Getting groceries or running errands with a bike share

EXISTING SOLUTIONS



<https://www.arkel-od.com/en/arkel-randonneur-rack.html>

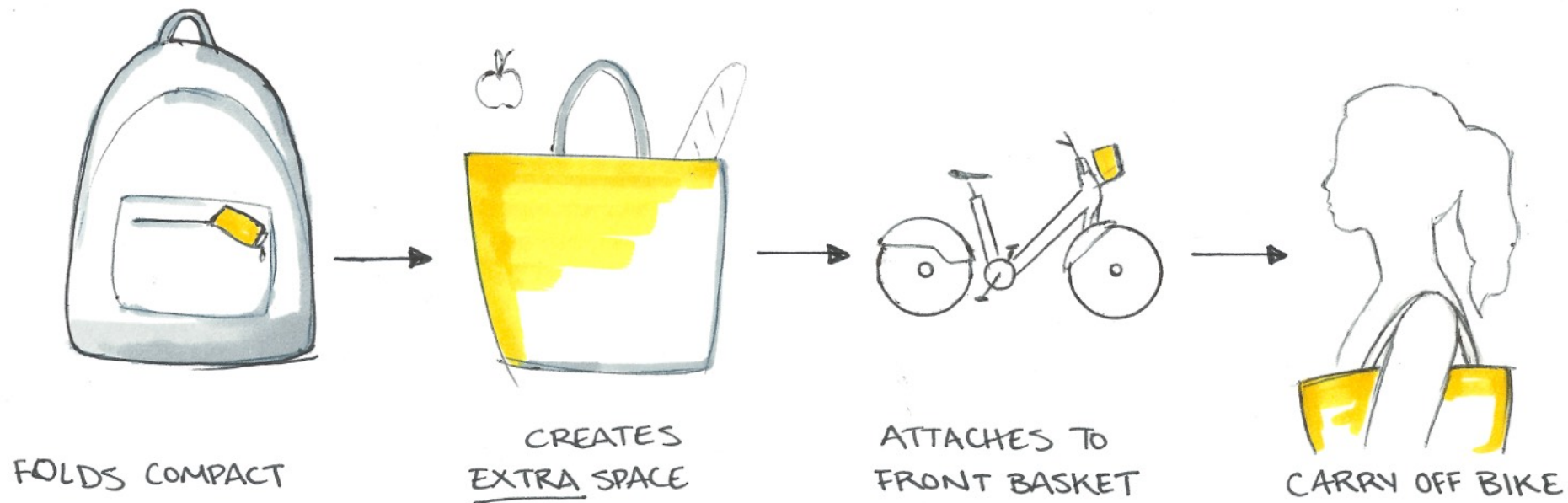
Under seat mounted back rack



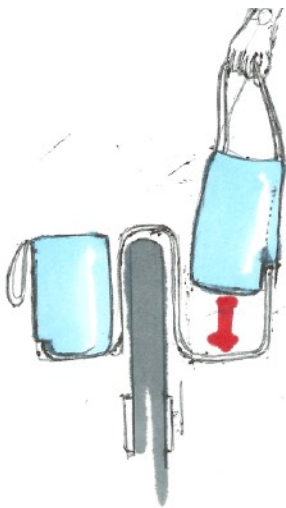
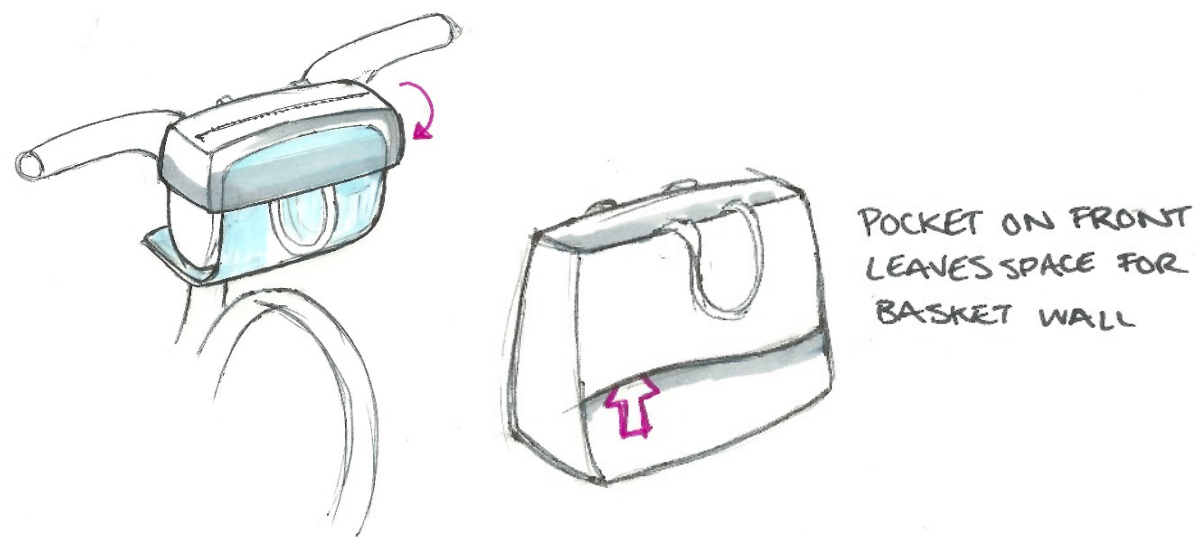
<https://www.kickstarter.com/projects/pocampo/ultimate-bike-share-bag>

PoCampo Bike share bag uses elastic bands to clip onto the front basket

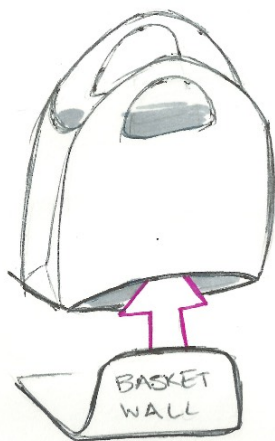
DESIGN IDEAS



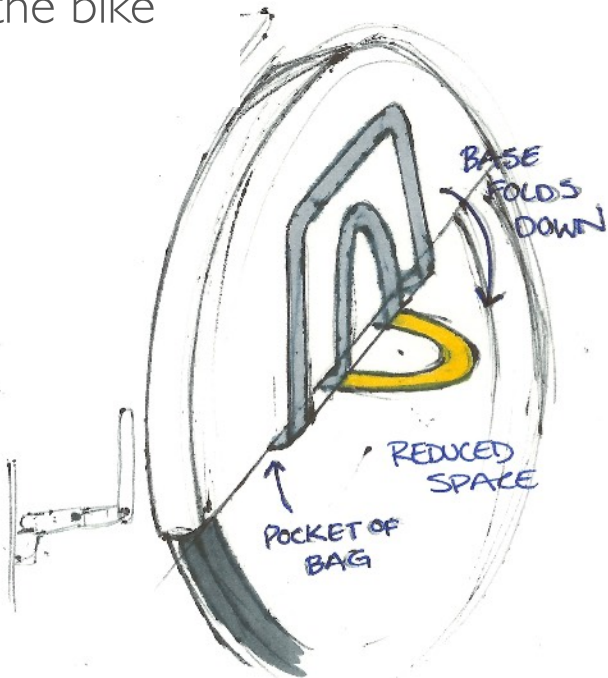
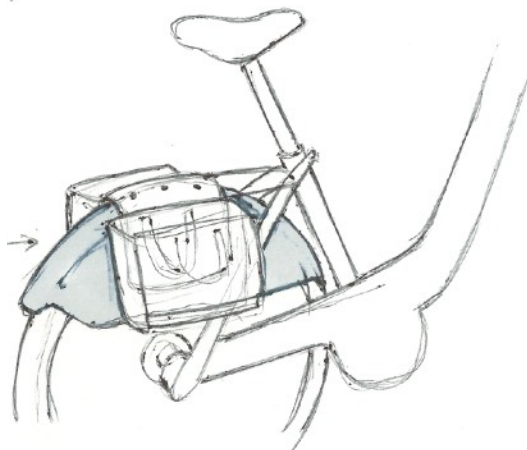
A collapsable bag to create extra space when needed that attaches to the shared bike system/



Additional rack on the rear wheel allows for 3X the available storage space with the use of the bike share bag

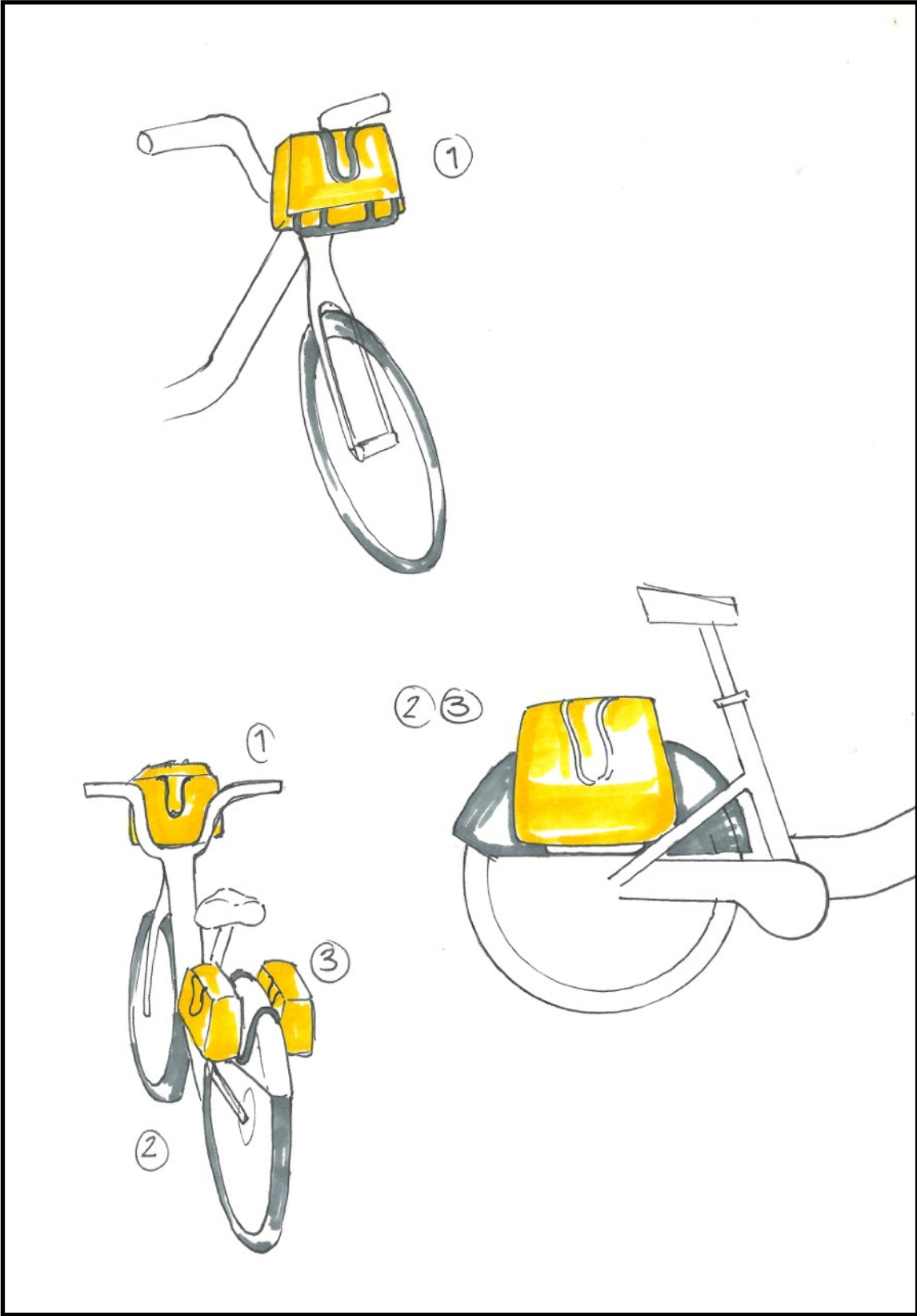
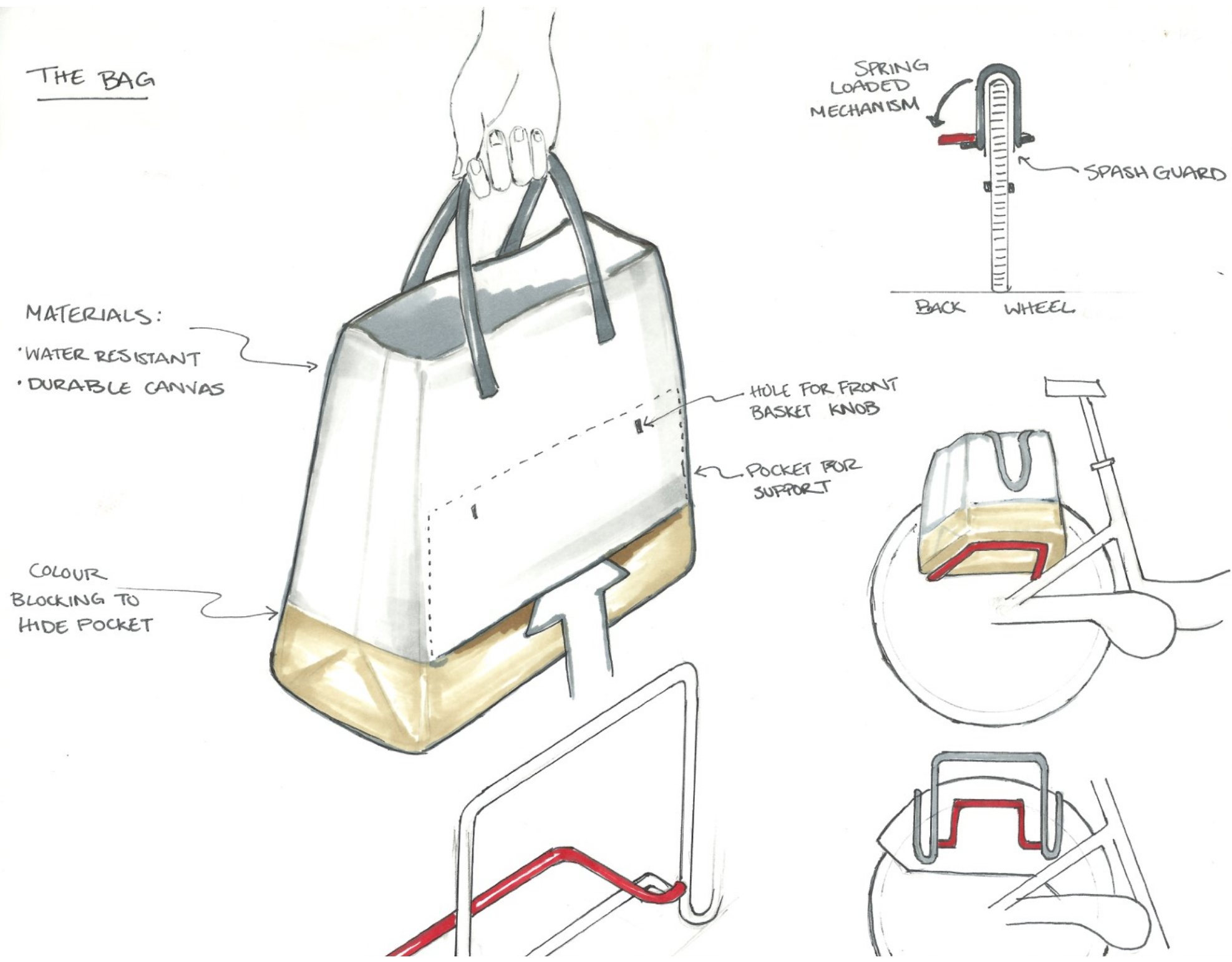


Bag that is compatible with the existing front basket on the citi bikes



Fold out base takes up minimal space on the bike

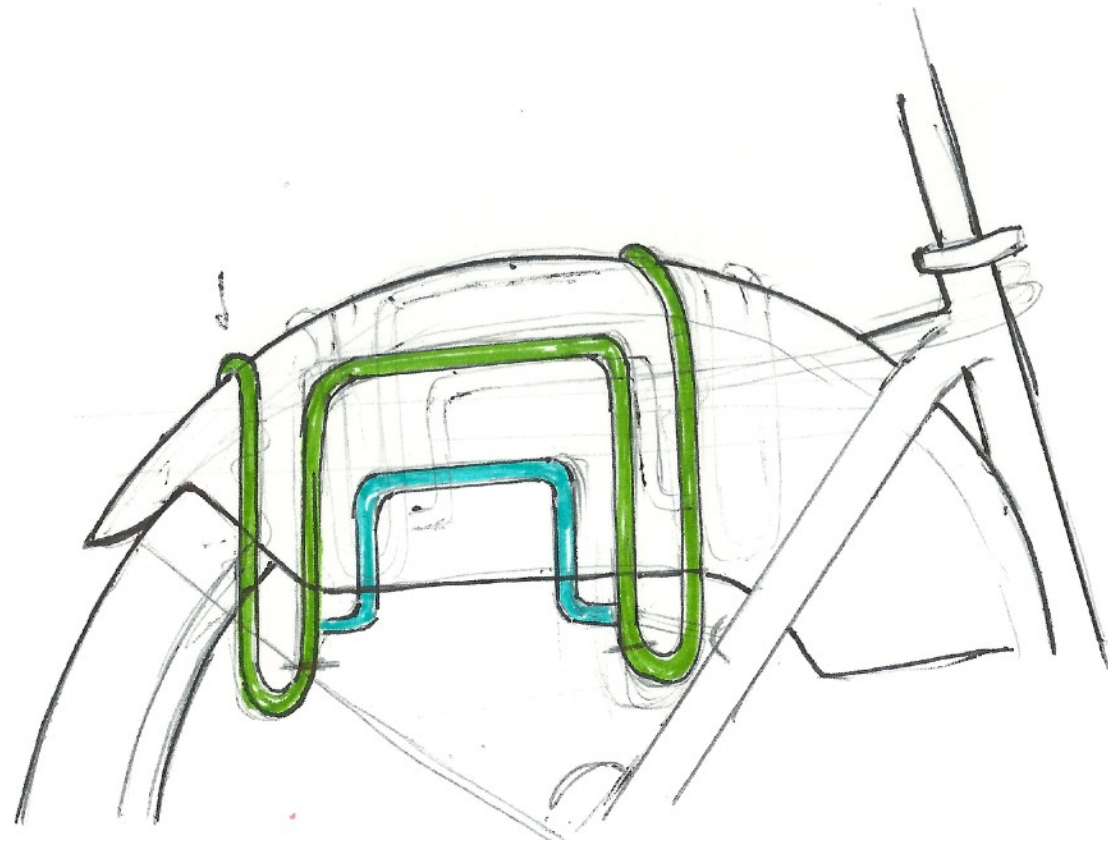
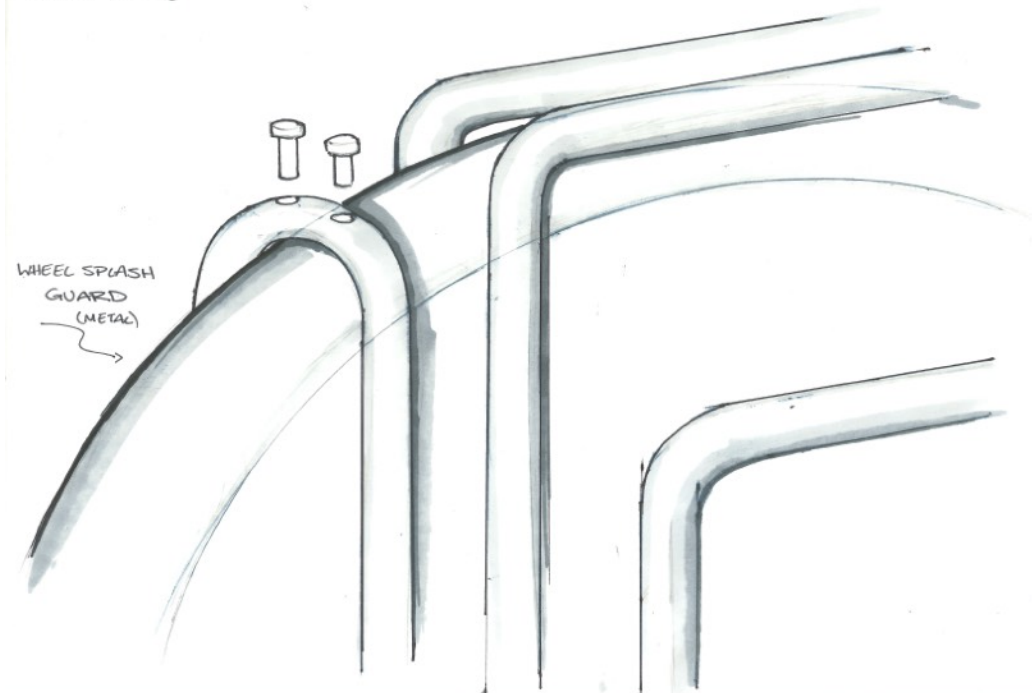
DESIGN CONCEPT



With the rear rack system, one bike share use will be able to carry THREE of the bike share bags at one time.

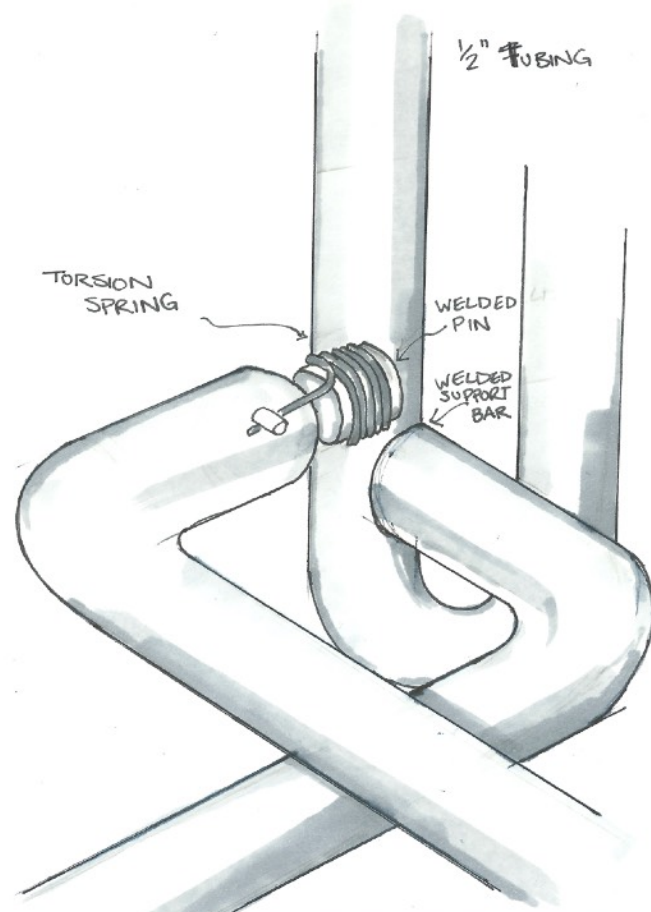
REAR WHEEL RACK

MOUNTING/INSTALL
TO BIKE FRAME



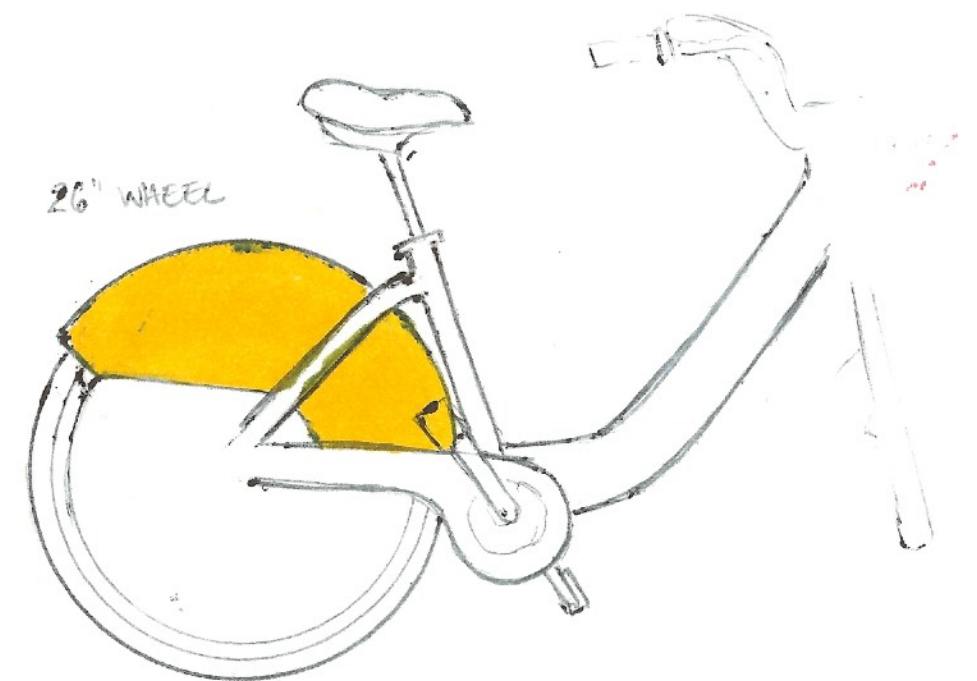
The rear wheel rack is installed by the bike share company, and can be used with individually purchased bike share bags.

SPRING MECHANISM

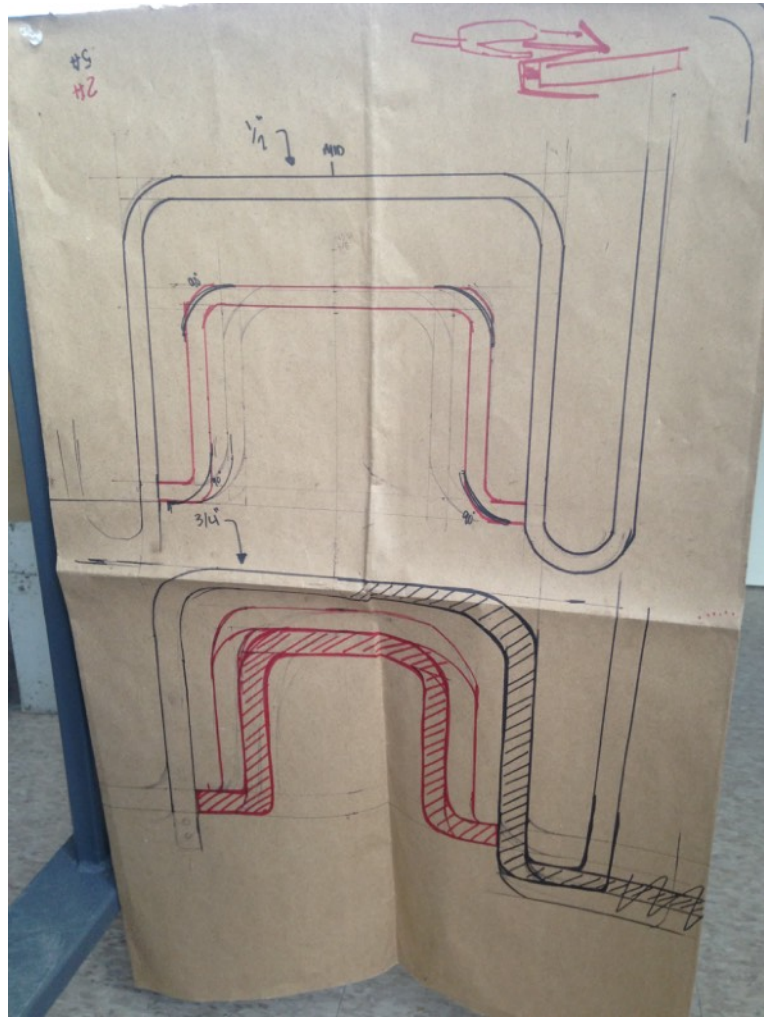


This allows the back rack to be collapsable and keep the back profile of the bike narrow.

The base folds down when in use, and springs back up when there is no bag on it.



REAR RACK MOCK-UPS



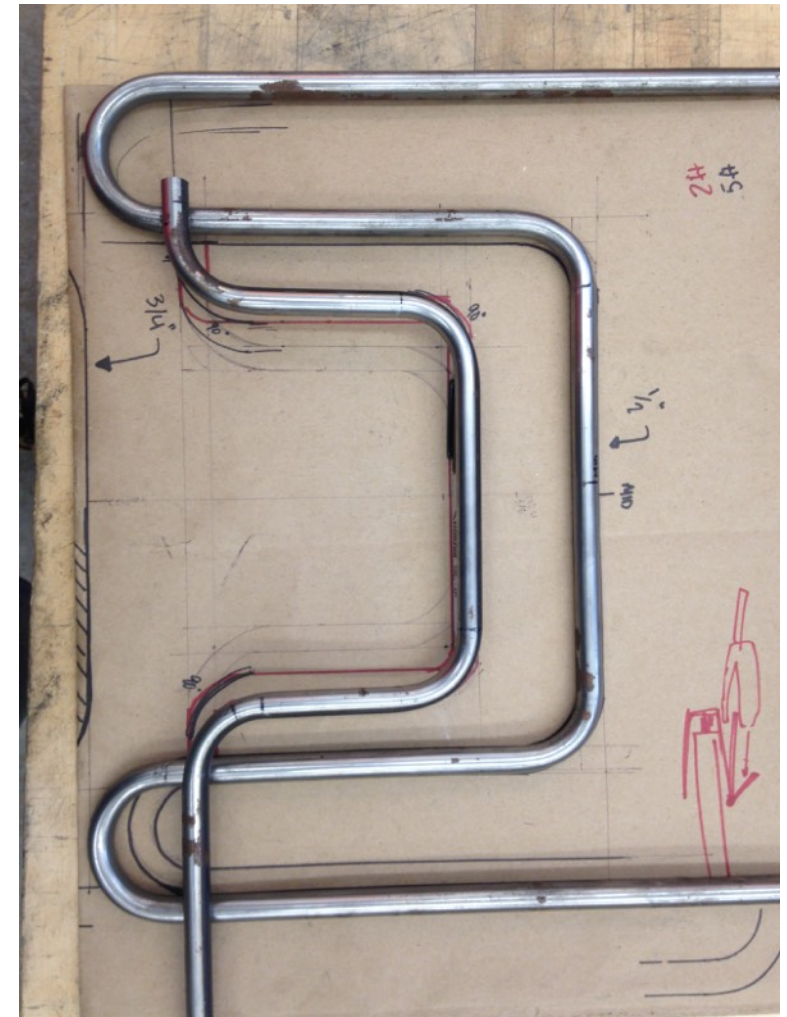
Top: design using 1/2 inch metal tubing
Bottom: design using 3/4 inch metal tubing



Scale model of bike share wheel with the splash guard



Created the frame using a metal rotary bending machine



TEST SPRING 1



The spring twisted out of shape when pressure was applied, and does not provide enough force to lift the base

TEST SPRING 2



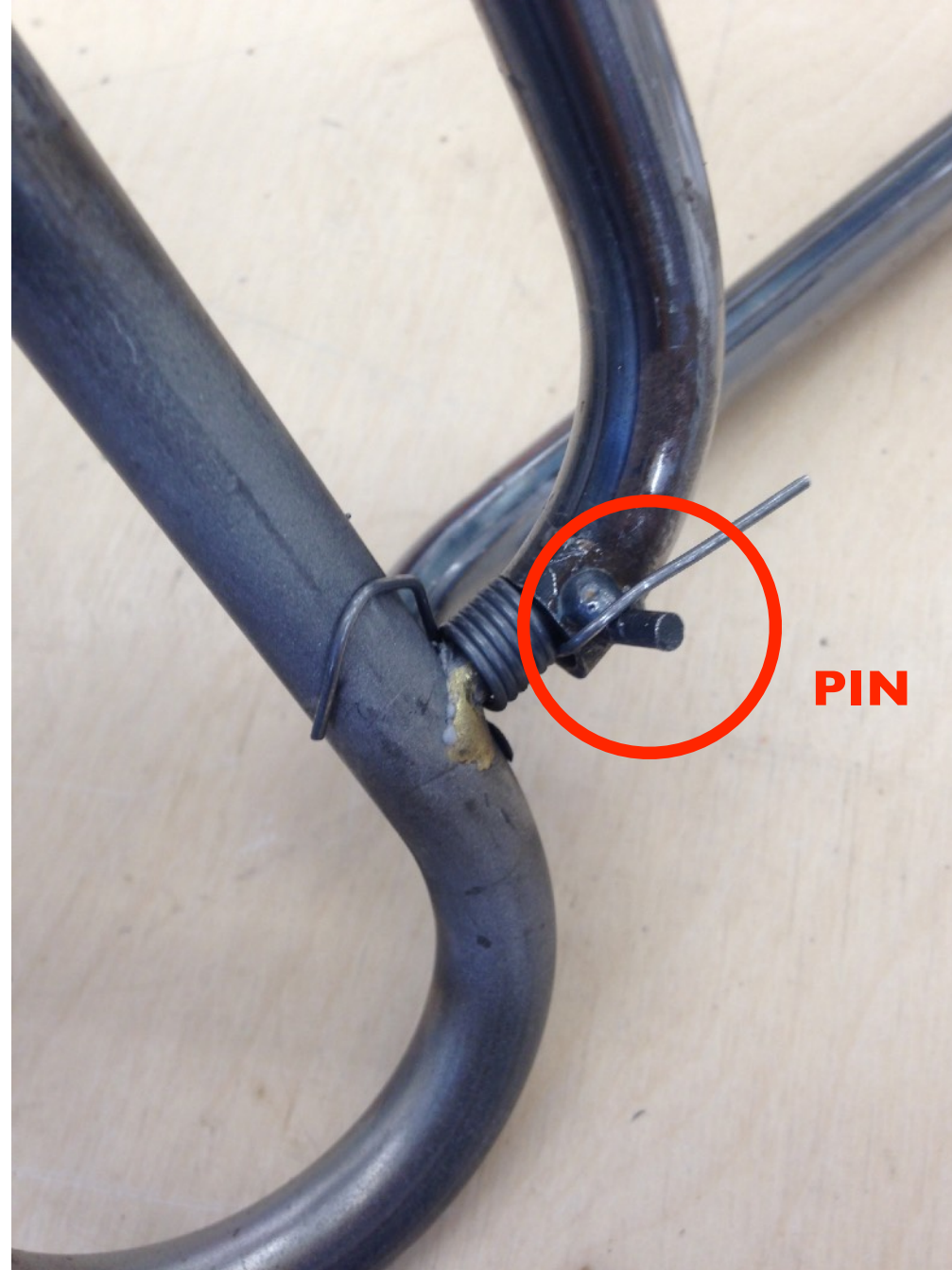
Compression spring is too weak to apply the force needed to raise the base

TEST SPRING 3



Torsion spring is correct strength and size
When the base of the rack is moved to the down position the spring is **twisted open**, producing a weak force

TEST SPRING 4



One end is bent to hook around the frame, while the other end catches the pin on the moving base, applying pressure to the spring when the base is moved.

When the base of the rack is moved to the down position the torsion spring is **twisted closed**, producing a strong force back.

Torsion Spring from McMaster Carr

FINAL REAR RACK



Placing rack on wheel size



Using a rod of steel inside the steel tubing to help line up the joint for brazing. This also helps to strengthen the brazed area



Two halves are brazed together to create the final rack

RACK KEY FEATURES



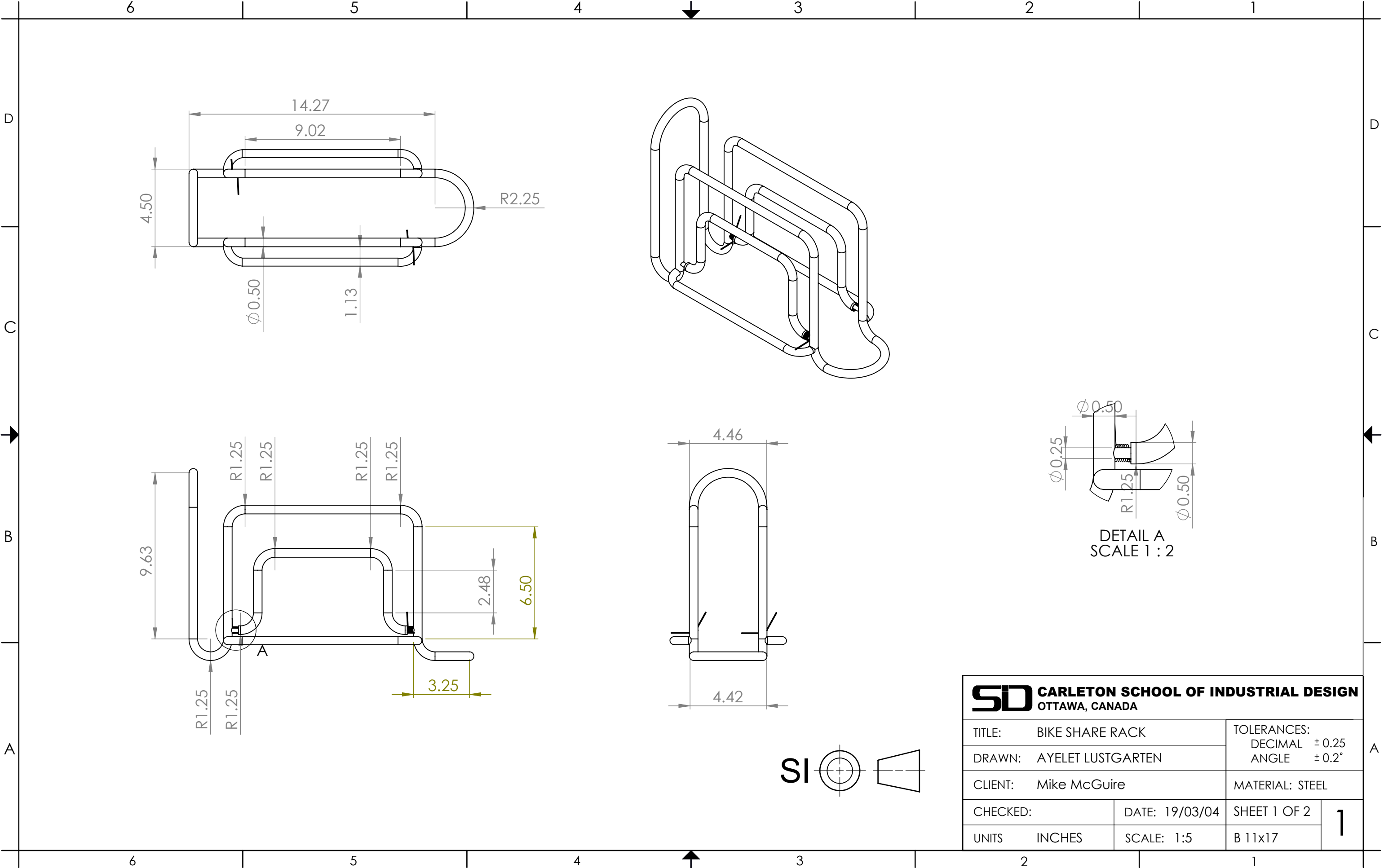
Rack is compact and folds out of the way when not in use.



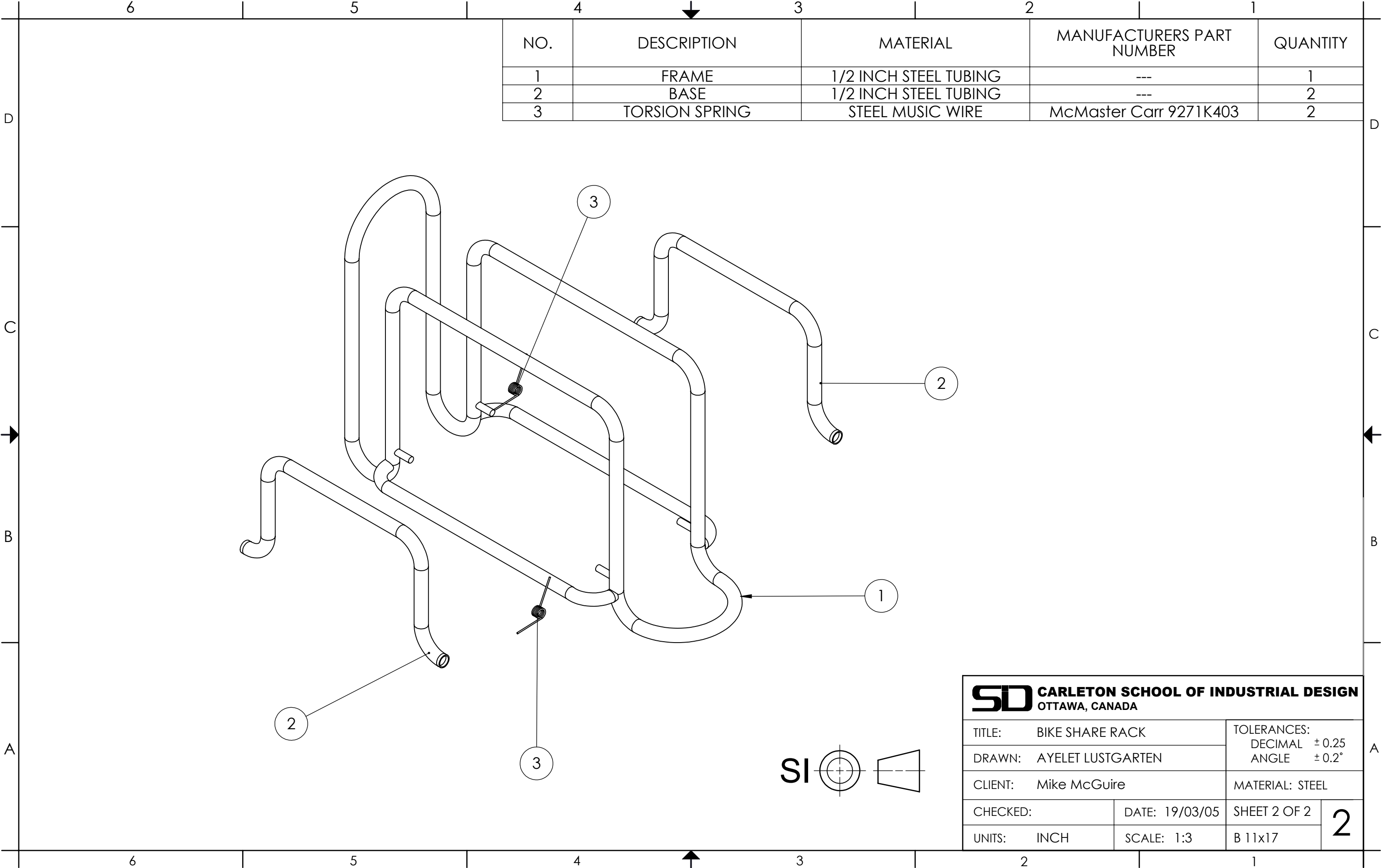
Spring mechanism makes it easy for the user to pull down the base. When no bag is on it, the spring loaded systems returns the base to the upright position.



The stop guard rail prevents the base from falling further than 90 degrees.



SD CARLETON SCHOOL OF INDUSTRIAL DESIGN OTTAWA, CANADA			
TITLE:	BIKE SHARE RACK	TOLERANCES: DECIMAL ± 0.25 ANGLE $\pm 0.2^\circ$	
DRAWN:	AYELET LUSTGARTEN		
CLIENT:	Mike McGuire	MATERIAL: STEEL	
CHECKED:	DATE: 19/03/04	SHEET 1 OF 2	1
UNITS: INCHES	SCALE: 1:5	B 11x17	



NO.	DESCRIPTION	MATERIAL	MANUFACTURERS PART NUMBER	QUANTITY
1	FRAME	1/2 INCH STEEL TUBING	---	1
2	BASE	1/2 INCH STEEL TUBING	---	2
3	TORSION SPRING	STEEL MUSIC WIRE	McMaster Carr 9271K403	2

SD CARLETON SCHOOL OF INDUSTRIAL DESIGN OTTAWA, CANADA				
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UNITS: INCH	SCALE: 1:3	B 11x17		

BAG TEST 1



Paper pocket attached to a bag to test the pocket system on the metal frame

BAG TEST 2



Seam to create a base at the bottom of the bag

No side panels used



Pocket for the rack is too small

CLIP CLOSING SYSTEM



Closing mechanism using a roll down top and buckle together both sides.

This method does not squish the contents of the bag.

STRAP CLOSING SYSTEM



With a thin fabric, this method of closing does not work

BAG SEWING PROCESS



Sewing pocket pieces before side seams.

Measured side seams on metal rack to ensure the pocket fit the frame.



Sew straps into a support strap to hid raw edges and provide additional support



Pocket for frame is left open

BAG KEY FEATURES



Large, comfortable handles

Durable material for everyday outdoor use



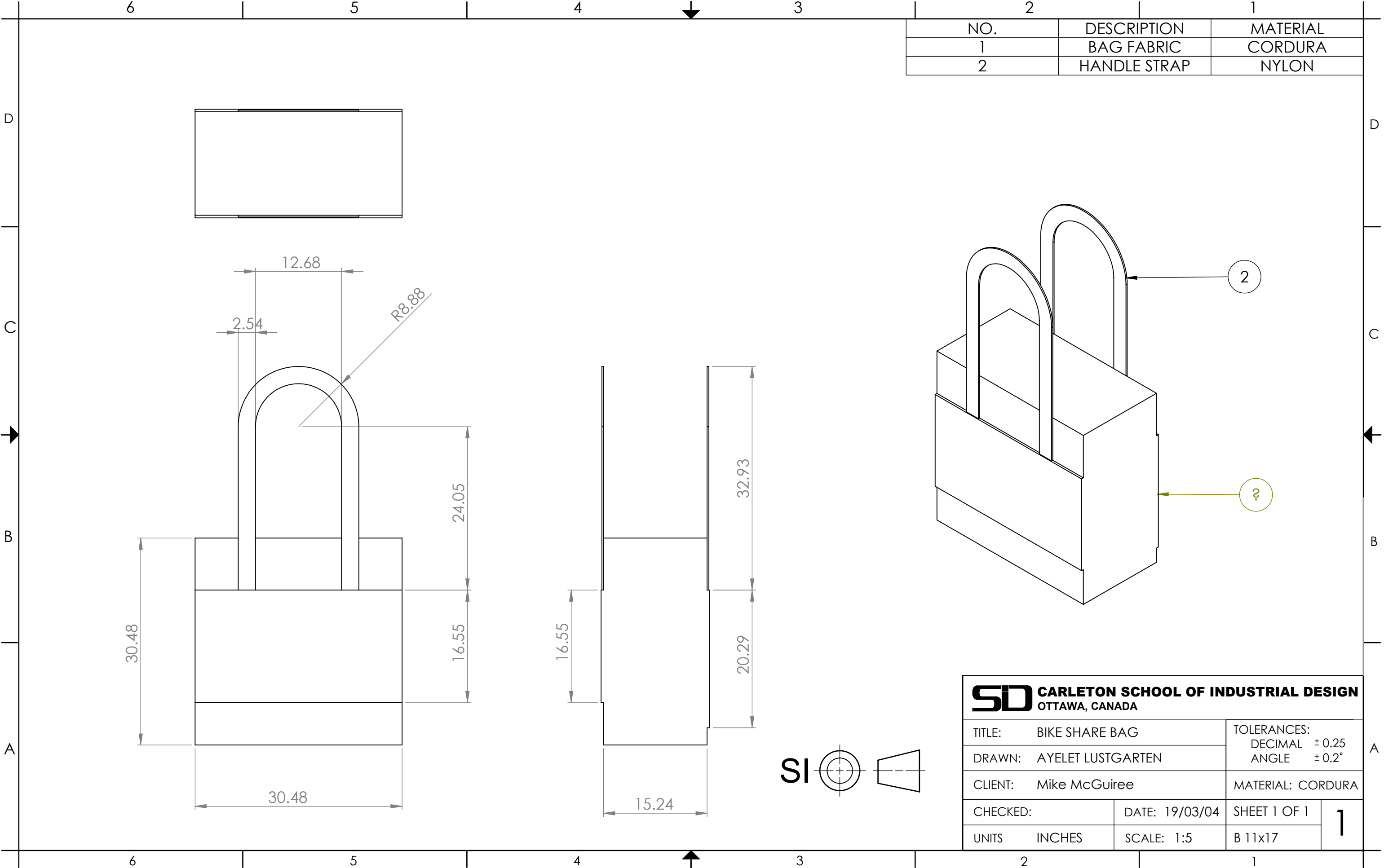
Waterproof roll top

Roll top allows for adjustability of the bag size, ensuring it does not sag away from the bike



Front pocket for small items

Strap and clip to adjust the size of the bag and secure contents



BAG AND RACK SYSTEM



Back rests on the folded down base of the rack



Back pocket slides onto the frame





The Citi Bike logo is located in the bottom left corner. It features the word "citi" in a dark blue font with a red arc above the "i", followed by the word "bike" in a light blue font. A small registered trademark symbol (®) is at the end.

