SAN FRANCISCO GARMENT REPAIR

Pilot Project Results

SAN FRANCISCO ENVIRONMENT DEPARTMENT

CPSC California Product Stewardship Council SM

goodwill SF BAY

CBU PRODUCTIONS

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PREFACE

We recognize and respect the over two hundred tribes of Indigenous Peoples as traditional stewards of this land we call California. Long before the City and County of San Francisco existed, regional ecosystems for textile manufacturing played an integral role for Indigenous communities.

We recognize California plays a big role in the global system which disproportionately impacts our community's most vulnerable members, including an unfair cost-burden shift onto waste managers, secondhand clothing markets, and environment.

We ask that the SF Environment Department give consideration to the establishment of a textile recovery program that engages the industry to find solutions to complex problems in a manner that prioritizes repair and reuse over recycling and protects existing infrastructure. The sheer volume of landfill-bound textiles from commercial generators in the county poses to be an expensive program without industry engagement to address barriers identified in this report.

Figure 1. Pictures of textile and waste accumulating in the Global South which originated from overproduction and lack of producer accountability in the Global North.

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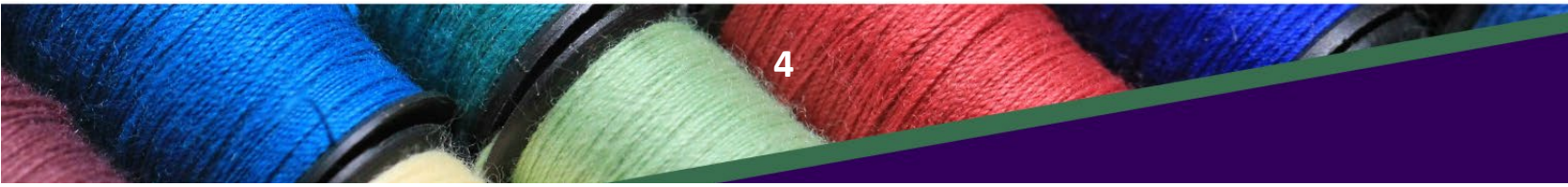


1. EXECUTIVE SUMMARY

This repair pilot project, funded by the San Francisco Environment Department, explored opportunities for repairing garments donated to Goodwill that were received in a damaged condition. The repaired garments for this project were presorted by Goodwill for sale on their e-commerce site because of an anticipated higher retail value. The partners established criteria for eligible garments for repair and a 5-step process for getting items to vendors and listed for e-tailing. A total of 876 garments were repaired by cleaning, mending, or redesigning for a total diversion of 815 lbs and a calculated GHG reduction of 8.61 MTCO2 using a textile calculator created by CPSC. The analyses conducted in this pilot showed sales trends exist for repaired garments and opportunities for partnerships to expand the reselling platforms. Long-term repair opportunities for Goodwill include selling damaged items as-is or in bulk, mending workshops to teach repair skills, or hiring in-house repair specialists to focus on minor repairs. Local and state policies on textile recovery can alleviate barriers to large-scale repair and resale for garments arriving at thrift stores in a damaged or unusable condition.

2. BACKGROUND INFORMATION

This project was awarded to the California Product Stewardship Council (CPSC), a 501c3 nonprofit with the mission of saving money for local government and garbage rate payers by engaging industry in complex end-of-life solutions for hard to manage products. Textiles are considered hard to manage because of the volume, material complexity, and lack of opportunities for innovative material recovery processes.

2.1. Textile Waste in California

California leads the nation in the number of sheep shorn for wool each year and produces almost all the country's long staple cotton. Developing more capacity for in-state fiber processing will create jobs and reduce the carbon footprint of our textile stream as most of the textile sorting and grading currently happens abroad. The large volume and fiber diversity of materials in the textile and clothing industry is immense, with additional complexities of equity and access. There is great potential for fibers sourced from California textile waste to maximize opportunities for textile circularity, economic development, and climate mitigation, while expanding existing infrastructure.

Table 1. CalRecycle disposal waste characterization study (2018), totals for textiles.

Overall Disposed Waste Stream	***Estimated Percent***	***Estimated Tons***
Textiles-Organic	1.10%	434,956
Textiles-Synthetic, Mixed, Unknown	1.60%	644,473
Textiles-shoes, purses, belts	0.30%	120,032
Totals	**3.00%**	**1,199,461**

CalRecycle identified textiles as the fifth most common material in California's single-family residential disposal waste stream, a top priority for landfill diversion and opportunity for innovative material management programs. The 2018 CalRecycle Waste Characterization study separated out textiles, which accounted for 3 percent of California's overall waste in 2018, into three sub-categories for the first time, separating them into organic textiles (1.1 percent), synthetic and mixed textiles (1.6 percent), and shoes, leather, and purses (0.3 percent), representing approximately 1.2M tons. It should be noted that textile identification is extremely challenging at the fiber level, especially given that labels are typically missing or inaccurate and often do not provide the level of detail needed for textile recovery processors. The textiles classified as organic in the CalRecycle study do not account for unlabeled synthetic fibers or chemical treatments added to the product, both of which can impact a processor, such as a composter looking for all natural, untreated materials.

CPSC launched a project in 2020 with Goodwill San Francisco Bay to sort and characterize post-consumer textile waste brought to the San Francisco Bay Goodwill locations. The project characterized 2,080 lbs. of material, representing 2,092 individual post-consumer garments. The garments were graded based on gender, adult/child, stains (% and intensity), rips, sellability, repairability, and repurposability. Of the 2,092 garments analyzed, 1,886 (90.15%) were deemed to be sellable. Similarly, 1,155 garments (55.2%) were deemed recyclable. A total of 899 unique brands were identified, with 44 unique fiber types and 275 unique fiber blends.

The volume of garments facing end-of-life increased significantly between 2020 and 2021 due to COVID-19 as more residents cleaned out their closets and updated home spaces, driving thrift stores to capacity for managing products their highest and best-use. And while they are not trained waste managers, thrift stores have become stewards for pre-sorting unwanted items without much support for repair and upcycling of damaged goods to ensure they are kept out of the landfill. Meanwhile, an entire infrastructure for garment repair exists that includes local dry-cleaners, tailors, designers, upholsterers, artists, and other innovators.

2.2. The importance of Repair for Textile GHG Reduction and Landfill Diversion

It has been documented that manufacturing of the fabric from which clothing is produced has the greatest negative environmental impact on the clothing lifecycle. When these clothing products are discarded and sent to landfill, GHGs are emitted. What is currently being researched is the benefits of recycling garments to make new yarns to fabrics to garments vs. the redesign or repair of these garments. Some stakeholders support the notion that reuse through repair, cleaning, and redesign are, when possible, the most relevant solutions. If garments that are stained or need repair are cleaned and repaired, there are no additional environmental impacts, and the garments can be worn again.

2.3. Textile Repair Pilot for San Francisco and Related Textile Projects

In 2021, SFE awarded the California Product Stewardship Council one of their coveted Zero Waste Grants to fund the Textile Repair Pilot (Repair Pilot), in partnership with Goodwill San Francisco Bay. The Repair Pilot connected local textile repair infrastructure with thrift stores to expand markets for textile products. The pilot showcased a local business and education network that can give damaged or unwanted garments a new life, thus diverting textiles from landfills, supporting local jobs, and contributing to a circular economy with the following:

1. **Redesigning and repurposing unusable garments**
2. **Sewing rips, tears, hems, and patches**
3. **Deep cleaning and textile surface repair**

Repair Pilot Project Partners

San Francisco Environment Department

The San Francisco Environment Department, or SFE, are the primary funders of the SFE Textile Repair Pilot. SFE focuses on advancing the environmental protection and enhancing the quality of life for all residents of San Francisco.

Goodwill San Francisco Bay

Goodwill San Francisco Bay was the primary collector and clothing partner. Goodwill is an established leader in sustainability by collecting and reusing not just textiles but electronics, furniture, and more. The Goodwill business model allows consumers to purchase secondhand items, thus reducing the demands for new items while creating and supporting jobs. In addition to the environmental contributions resulting in Goodwill's thrift operations, they also make every effort to be a leader in reducing operational impacts. Notably, Goodwill San Francisco Bay was the first to obtain a fleet of electric box trucks, which resulted in reducing more than 135 tons of greenhouse gasses per year and has since been adopted by other Goodwill locations across the country.

CBU Productions

Dr. Connie Ulasewicz, Emeritus Faculty of San Francisco State University (SFSU), founded CBU Productions to engage in collaborative projects to create awareness of the social and environmental impacts of our clothing and textile choices. Dr. Ulasewicz advocates for individuals to understand the true value of what they already have and focus on conscious purchasing decisions. In October of 2022, the 3rd edition of her co-authored book, *Sustainable Fashion: Take Action*, was published.

While at SFSU, Dr. Ulasewicz was a recipient of two SFE Zero Waste grants. One grant was that the Fabric & Clothing Exchange Project rebranded as the Wear Movement for the collection and distribution of clothing on campus and the second was Circular Cycle for PVC Banners, redesigning out-of-season promotional banners into usable bags.

Contributors and Vendors

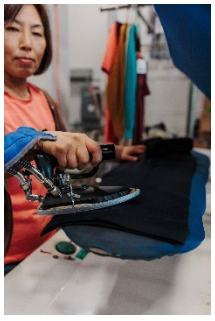
San Francisco State – Department of Apparel Design

This pilot collaborated with San Francisco State's Apparel Design and Merchandising (ADM) faculty members Nancy Martin, Kamal Ragbotra, and Danette Scheib. The clothing items were provided to students in their Apparel Design classes, where they were tasked to use their creativity to redesign the textile and clothing items.

Designing a Difference

Designing a Difference (DaD) was founded by Rebecca Cahua, an alumnae from ADM at SFSU, which provided repair and upcycling services for the pilot. The mission of DaD is to create job opportunities for people with employment barriers through its Workforce Training program. Rebecca created the DaD Sewing House with a mission to grow the creative and apparel industries in San Francisco to foster a network of local manufacturers and provide employment opportunities in the Bay Area.

Savvy Cleaners



Savvy Cleaners is a locally owned, family operated business that provided cleaning services for the garments in the pilot. Savvy Cleaners is a certified California Organic/Clean cleaner with a goal to provide the best quality services possible while using only toxic-free and eco-friendly cleaning methods.

Other textile projects led by CPSC

CPSC is leading six publicly funded textile recovery pilot projects in California: two with the City and County of San Francisco (2020 and 2021), two in the Los Angeles area (2020 and 2023), one in Alameda County (2021), and one in Castro Valley (2022). The six projects have concerted efforts to collect relevant and comparable data for comparative analyses and build the evidence needed to make impactful recommendations for state and local textile programs.

CPSC partnered with the City and County of San Francisco and Goodwill to test feasibility of and pilot a repair program for damaged garments. An initial sort was conducted in 2020 to characterize the unwanted textiles that arrived at the San Francisco Bay Goodwill locations. The second part of the partnership piloted a project to repair and repurpose unwanted textiles by connecting existing infrastructure with thrift stores to repair and upcycle these textiles.

Alameda County partnered with CPSC to expanded on StopWaste's Re:Source Database relating to the Textile Reuse/Repair, provide one page "primers" with information on why repair/reuse is important, how to conduct basic repair functions, and describe opportunities to divert textiles from the landfill.

The Castro Valley Sanitary District (CVSan) worked with CPSC to conduct an audit on a curbside textile collection project. This CVSan curbside textile program runs similarly to the small pilot (test-run) that San Francisco ran, except CVSan took an approach that partners with a local thrift store. The findings from the CVSan audit matched the results of San Francisco textile curbside test-run, where a high rejection of textile items occurred due to the high contamination rates from being mixed with other recyclable materials.

CPSC partnered with both the City and County of Los Angeles to characterize and divert commercially generated textile waste into the highest-and-best use. The City of Los Angeles pilot focused on creating a centralized hub (or multiple hubs) where material byproducts from businesses can be repurposed instead of going to landfills. This hub will create a local closed-loop market that promotes a circular economy by providing stable and consistent material streams for reuse. For the County of Los Angeles pilot, the volume of commercial textile waste in Los Angeles County supported the development to make Los Angeles a global market center for sustainable textiles.

2.4. Relevant State and Local Regulations for Textile Repair and Redesign

Two state regulations impacted the ability to find service providers eligible to provide repair work and affected the cost analysis of this repair: garment contractor's license and garment workers protection act. Designing a Difference, a registered contractor, was eligible and interested in the project. Because each garment is unique, there was no economy of scale, and each garment was analyzed as to how to repair or, in the process of repair, how to redesign. For the SFSU students, as this redesign was part of their course curriculum, students were given the materials, their hours were not documented, and they were not supported monetarily.

A. Labor Commissioner's Garment Manufacturer or Contractors License

According to California Labor Code Section 2675 and Section 13630 of Title 8 of the California Code of Regulations, every person engaged in the business of garment manufacturing must register with the Labor Commissioner. Every employee leasing company or temporary agency that leases or otherwise provides garment manufacturers or contractors with the services of employees must register with and obtain a valid registration certificate from the Labor Commissioner as a contractor. The activities requiring this registration certificate are for those engaged in sewing, cutting, making, processing, repairing, finishing, assembling, or otherwise preparing any garment or article of wearing apparel or accessories designed or intended to be worn by any individual is itself engaged in garment manufacturing.

California Department of Industrial Relations

> At the time of this report, there are 138 garment manufacturers and contractors in the City of San Francisco, but only 39 are approved by the California Department of Industrial Relations with active licenses.

If planning on contracting for garment manufacturers, please note that entries in the database of businesses created in this pilot, verify current license with the California Department of Industrial Relations. Please refer to the current statewide Department of Industrial Relations Verification Database **or** the Previous System - California Department of Industrial Relations Database to view active and expired licenses.

B. The Garment Worker Protection Act, also known as SB 62 (Durazo 2021), was signed into law by California Governor Gavin Newsom and will now prohibit the use of the piece-rate system, as the basis to pay to workers, who are now ensured fairer wages and guaranteed a minimum hourly wage. The passing of SB 62 impacted the costs associated with the SFE Textile Repair Pilot as not only were the vendors required to hold a garment manufacturer or contractor license, but the sewing professionals needed to be paid on a per hour basis instead of per piece. This proved to be a challenge in finding the vendors for the pilot as there are no economies of scale for mending and redesigning textiles like there are in traditional manufacturing. Mending and resigning garments that are already designed required extra planning to ensure the best use of the materials. Traditional manufacturing does not do unique designs for each garment, rather create many garments of the same design.

C. Non-Governmental Organizations

In addition to the government agencies and textile infrastructure, a large and an active network of Non-Governmental Organizations (NGOs) exists in San Francisco with missions related to textile industry reform, sustainable fashion, local manufacturing, and/or waste diversion. Some of these NGOs based on San Francisco include SCRAPSF, Fabmo, Salvage Studio SF, reThink Repair, and SFMade. They join other stakeholders involved in developing a circular economy for textiles and clothing. Many NGOs were included in this pilot project as they play an integral role in the development and oversight for a future textile recovery program. The Textile Exchange, an industry association, set voluntary goals to introduce more organic cotton and recycled polyester in member organizations' products, which is a good example of an NGO leading through voluntary action.

3. PILOTING TEXTILE REPAIR IN THE SAN FRANCISCO

3.1. Preview of Damaged Goods and Developing the Repair Criteria

In November 2021, CPSC and CBU Productions partnered with Goodwill to conduct a preliminary study of the textiles that came through the Goodwill pre-sort for sale through E-commerce, to help establish the repair criteria for the pilot project. During the one-day sort, 264 garments were categorized by their need for either wash/clean, minor damage, major damage, innovative redesign, or rejection.

Table 2. Frequency and categories of the preliminary damaged garment sort.

Category	Description	Total count	% of total
Wash/Clean	Wash or dry clean	40	15
Minor	Spot clean, repair needed on seams/hems, buttons	85	32
Major	Special stain (grease), difficult placement of damage, special fabric type, skills needed for repair	33	13
Innovative	Not repairable as is, recognizable/high-value brand, special or unique fabric, vintage	12	5
Rejection	detailed reasons below	94	35
Total Count	**Gaylord 1**	**264**	**100**

Table 3. Reasons for rejecting damaged garments from repair categories.

Reasons for Rejection	Count	% of total
Stain will not come out	36	38
Mold	2	2
Pill	28	30
Damaged/Hole not repairable	25	27
No value	3	3
Total	**94**	**100**

The team of project partners held several meetings with potential vendors to determine the scope of services and costs. The final sorting categories, based on the number of contracted vendors, were:

1. **Cleaning only**
2. **Repair**
3. **Redesign**

The sorting criteria for these three categories were built on the criteria already used by Goodwill in deciding which items to sell via E-commerce and address in the 5-step process for sorting, repairing, and selling the damaged garments.

3.2. Creating the 5-Step Process

1. **Identify damaged garments valued $45 or greater with recognizable brands**

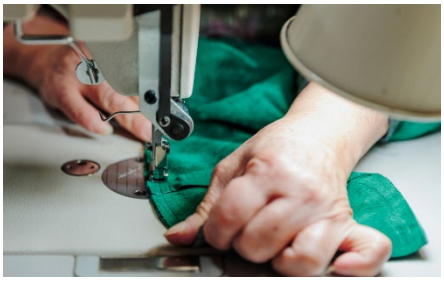
Garments arrived to the Goodwill e-commerce team already identified worth $45 or more. Then, the e-commerce teams identified of those garments, which garments could be sold as it, or needed to be diverted to be cleaned, repaired, and/or redesigned. Qualifying criteria for redesign included the intense repairs or cleaning required to make the garment sellable, outdated style, and recognizable brands.

2. Segregate damaged garments by sorting categories of cleaning, repair, redesign

Before leaving Goodwill, garments were marked with masking tape as to the location(s) of stain, dirt, or repair work. Garments for redesign were simply separated, not marked. A garment manifest listing the brand, type of garment, damage type, primary fiber type, potential sale price, and more was kept updated for all the garments sent from Goodwill for the pilot project.

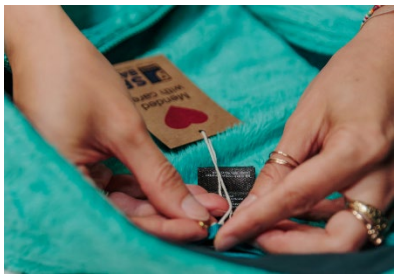
3. Send garments for cleaning, repair, and redesign

All drop-off and pick-up schedules were developed and documented for deliveries to and from Goodwill and Savvy Cleaners, Designing a Difference, and San Francisco State University. San Francisco Environments' Green Business program certifies businesses in San Francisco if they meet certain criteria. Of all the cleaners in San Francisco, only two are certified Green, meaning they only use non-toxic cleaning products and use processes that require less harsh chemicals. The chosen cleaner was Savvy Cleaner, one of the two certified green cleaners, as they excelled in overall cleaning, as well as spot cleaning, which was essential to this pilot.



As Goodwill was reselling the garments, the vendors who were repairing or redesigning the garments must have a garment manufacturer or contractor license under California law. This proved to be a challenge in San Francisco's small textile manufacturing hub, especially for individual garments over large bulk orders of garments.

4. Return garments to Goodwill for tagging and ecommerce listing



After being cleaned, repaired, and/or redesigned, garments were returned to Goodwill to be tagged and listed on either their eBay store or on their official website. Special hangtags included the quote "mended with care" and a QR code linking to the pilot's webpage and the Goodwill eBay store. This allowed partners to directly communicate the story of these garments to consumers without having to directly write out the story on the listing.

5. Cost benefit analysis of the project

Data on the textile garments repaired and upcycled during the SFE Textile Repair Pilot was tracked on a shared google sheet between project partners. A garment manifest listing the brand, type of garment, damage type, primary fiber, sale price, and more was kept updated for all the garments sent from Goodwill for the pilot project. A secondary manifest with separate tables to track an itemized list of the cost to clean, repair, or redesign each garment was utilized to gather data on the average cost to repair each textile garment compared to the selling price. CPSC completed an analysis on the garment manifest, including a GHG footprint calculator taking garment type and primary fiber type into consideration. The Results section below provides more detail on how the Goodwill project data shows the greater potential for repair to greatly impact textile waste and GHG.

4. RESULTS

Over the course of the project, 876 garments were diverted and repaired, including cleaning, mending, and redesigning, then returned to Goodwill for resale. Garment types ranged from blouses to pants to jackets, so weights of the individual garments varied. CPSC pulled references for average square feet per garment type and average weight per square foot per primary fiber type to get the closest estimate for total weight diverted from landfills. The project diverted 815 lbs. of garments during this pilot project.

Table 4. Total frequencies of garment types repaired in the pilot.

Garment Type	Frequency	Estimated square yards per garment*
Dress	207	4.25
Jacket/Coat/Blazer	261	2.25
Sweater/Cardigan	109	2.25
Pants/Jeans	30	3.25
Blouse/Top/Shirt	99	2.25
Suit	22	5.5
Jumpsuit	19	4.25
Skirt	19	2.25
Vest	11	2
Shorts	1	2.25
Robe	7	4.25
Rejects	51	N/A
N/A	40	N/A
Total	**876**	**Average: 3.16**

*Source: https://www.dummies.com/article/home-auto-hobbies/crafts/sewing/sewing-for-dummies-cheat-sheet-208978/

Table 5. Frequencies and estimated weight per primary fiber type.

Primary Fiber	Frequency	Est weight per square yard of primary fiber*
Polyester	162	0.56
Cotton	101	0.37
Wool/Cashmere/Mohair	113	0.75
Silk	50	0.18
Nylon	18	0.56
Viscose/Rayon/Tencel	31	0.5
Acrylic	19	0.31
Leather/Suede	9	1
Acetate & Triacetate	8	0.31
Linen	8	0.37
Fur	3	1
Polyurethane	1	0.75
MISC (Cupro, polyamide, vinyl)	4	0.56
n/a	320	-
Rejects	29	-
Total	**876**	**Average: 0.56 lbs per square yard**

Of the total garments diverted 539 were sent to Designing a Difference to be sewn or redesigned. The average cost for sewing was $34.50 per garment with multiple damages. The average cost for redesign was $30.59, including finding new uses for the excess Outside Lands Music Festival T-shirts (see more discussion regarding this issue later in this report). The garments designated for cleaning were sent to Savvy Cleaners to be wet cleaned. The average cost to clean each garment was $17.34.

Of the 60 garments given to the ADM students, 45 were completed for viewing at the Runway 2023: Kinetic event, held on May 11th. Of the remaining 15, as the redesign greatly changed the garment, it was decided that online sales were not the best means of sale. In-person discussions through a display at a retail store ensure the story of the redesign process that is not easily done on e-commerce.

Figure 2. Example of redesigned garments by the ADM students. (Left) Trench coat redesigned into two-piece by Cassandra Cueva. (Right) Dress redesigned into corset by Cameron Miller.

Of the total garments, 702 were sold on the Goodwill San Francisco Bay eBay account. While the average listing price for each garment was $20.37, the average selling price was $31.11. The lowest priced item sold was $9.99, while the highest priced item sold was $260. In general, the repaired items sold for more than they were listed, but not all the garments sold, so the grand total of sales was less than the total spent on repairs. Note there were additional costs external from the calculations below: Labor for sorting, tracking, and reporting, space and storage, and transportation to/from vendors

Table 6. Cost and sales analyses for repaired garments.

Total Sewing	$11,004.00
Total Cleaning	$12,396.85
Total Redesign	$6,210.00
Grand Total All Repairs	**$29,610.85**
Average cost for Sewing	$34.50
Average cost for Cleaning	$17.34
Average cost for Redesign	$21.41
Average cost for Repairs	$22.08
Grand Total from Listing Price	$11,729.22
Grand Total from Sale Price	**$12,750.56**
Average Listing Price	$20.37
Average Sale Price	$31.11

A last finding of the study was that Goodwill initiated selling garments on E-commerce that listed the damage or repair need, and where that is located on the garment. They are finding that with these disclaimers, the garments have sold and the buyer can repair or redesign as they desire.

5. ANALYZING PILOT RESULTS

5.1. Garment Manifest Data and Analyses

The data tracked on the garment manifest provided insight into the repaired garments. Tables 4, 5, and 6 outline the calculations most relevant to the Goodwill team in making decision for ongoing repair offerings. The garment types that sold in less than two weeks from listing, in order from fastest or slowest, include jumpsuits, robes, cardigans, and skirts. The items slowest to sell that took over three weeks included blazers, jeans, dresses, and vests. Analyses identified brands that sold for $45 or more shown in the list below, which are good targets for added repairs or selling with marked damages.

Table 7. Average Days from Listing to Sale by Garment Type

Garment Type	Average Days from Listing to Sale
Jumpsuit	10.4
Robe	11.6
Cardigan	12.0
Skirt	12.0
Suit	14.6
Pants	15.0
Top	15.3
Jacket	16.0
Blouse	16.2
Shirt	17.5
Coat	18.7
Sweater	19.3
Vest	20.4
Blazer	21.5
Jeans	22.3
Dress	29.8

Brands that sold for $45 or more in order of lowest to highest sale price

1. Alexander Wang
2. X Element
3. Theory
4. TSE Brand
5. Club Monaco
6. Dale of Norway
7. Emilio Pucci
8. Gispa Womens
9. Portfolio Perry Ellis
10. Carhartt
11. Chiara Boni
12. Lilli Ann
13. The North Face
14. Arc'teryx
15. Weatherproof Germany
16. Bugatchi Uomo
17. VTG Yves Saint Laurent
18. Mackage
19. Eileen Fisher
20. Brioni
21. Chalk Line Boys
22. Mackage
23. Isabel Marant Etoile
24. Patagonia
25. Hutch
26. Russeks Fifth
27. Kappa
28. Canali
29. Foxrun
30. Johnny Was
31. Coogi
32. Burberry
33. Nooworks
34. Carolina Herrera
35. St John
36. Christian Dior

Another key calculation for the project diversion included a GHG reduction estimate. In the textiles industry, there is no one proven GHG calculator. A previously used Higgs-Index was pulled from use as it incorporated unfounded calculations which resulted in synthetics having a lower GHG footprint compared to natural fibers. The complex nature of unknown fiber blends, chemical treatments, and unknown end-of-life processes have caused most GHG calculators to be irrelevant in textiles applications.

CPSC created a GHG calculator for this project, which has its own assumptions and limitations. One limitation is the calculator is based off a Woman's Medium Cotton Jacket to calculate a per pound GHG reduction (Cheng and Liang, 2021). To accommodate this limitation, the EPA WARM calculator was used to calculate the synthetics GHG reduction. Both GHG calculators were used on the total weight of the garments repaired for this project, presented as two totals using the entire garment weight and an average of the two.

- Total textiles diverted, based on garment type and primary fiber: 815 lbs.
- Total GHG (Natural): 0.93 MTCO2
- Total GHG (Synthetic): 16.30 MTCO2
- Average GHG: 8.61 MTCO2

Figure 3. Greenhouse Gas (GHG) footprint for textiles diverted in San Francisco Textile Repair Pilot.

5.2. Challenge: Telling the Sustainability Story

The repaired items didn't sell on their own on the e-tailing platforms as the story as to why they were repaired or redesigned was left out of the listing. For this reason, the pilot partners designed the special hangtag with a QR code. The QR code linked to a landing page where Goodwill described the project and their sustainability goals, including a link to view all the other repaired items listed on Goodwill's eBay store. Grouping all the repaired items into one sharable link allowed for easier promotion and storytelling.

To show off the redesigned garments from the students at SFSU, an exhibition was hosted on campus on September 27th, 2022, to showcase the initial redesigns from the students in the ADM program. Designs were also displayed at the Bridging of the Bay Merger Celebration on Treasure Island during the Week of Goodwill. The second round of redesigns from the ADM students was planned to go down the runway at the Spring 2023: Kinetic Fashion Show that was held on May 11th, 2023 at SF State.

A webinar was hosted on September 28, 2022, to broadcast the story of the collaborative SF Textile Repair Pilot. The webinar and its recording provided a detailed narration of the sustainability story viewed by over 170 people to date.

The power of storytelling proved impactful for this pilot as customers were able to engage in the story of how that garment had been deemed "unusable", then repaired back into reuse. Similarly, the storytelling is accompanied by the importance of including outreach budget to get the message out on the current and future opportunities.

Circular Language Barriers

One challenge that arose in several instances was the different uses of words and vocabularies between different stakeholders.

Examples from this project:

- ✓ **Call for sewing professionals campaign**: Unclear how to word the outreach campaign. Not all upcycling vendors identify as "designers".
- ✓ **Standardized data metrics**: Listing garment type, primary fiber, and other data categories consistently, using information available. A lot of N/A. See fiber identification section for potential solutions.
- ✓ **Redesign patterns**: The repair vendors did not have standardized patterns to identify what cuts and sews they will do.
- ✓ **Listing the items for E-tail**: Determining best way to list product and describe repairs. Initially calling them "repaired" didn't tell the story, so more background info on the sewing partners was added via hangtag.

5.3. Challenge: Fiber Identification

Primary fiber is important for resale value and recyclability. The production and recycling methods for each fiber type varies, with each having different consequences for GHG emissions. Textile Exchange defines "preferred fiber or material" as "A fiber or raw material that delivers consistently reduced impacts and increased benefits for climate, nature, and people against the conventional equivalent, through a holistic approach to transforming

production systems." These fibers include wool, cashmere, leather, down, mohair, alpaca, and rubber.

To account for the amount of GHG emissions offset in this project, the primary fiber of each garment was tracked as part of the garment manifest. This process was discovered to be one of the most difficult aspects of the project as garments could only be identified based on the information provided on the tag. This not only drastically increased the labor required for sorting/tracking the garments, but the lack of tags on many garments increased the number of missing values in the data set.

To combat the issue of fiber identification, technology needs to be utilized. These devices range from compact hand-held to table-top to full-scale high-capacity machinery, and that use either optical sorting or new near-infrared (NIR) spectrometer technology. The microPHAZIR™ by ThermoFisher Scientific has proven vital for identification of the fibers contained in carpets to ensure proper recycling. Similar devices like the BASF trinamiX and the Sortile device are being piloted in textile sorting facilities across the world. These devices only take a few seconds to provide highly accurate fiber type readings and have already proven to be key in improving textile sorting capacity and creating a circular economy for textiles. Adoption of such devices in house at Goodwill can increase Goodwill's capacity and efficiency for sorting textiles, and clothing.

6. RECOMMENDATIONS

6.1 Keep expanding the database hub and map for repair businesses

The Call for Sewing Professionals was developed and launched October 25, 2021, with a link [view here] distributed via direct email and social media. Interested participants were directed to an entry form with standardized questions needed to determine the next steps, which included adding them to the hub database, map, and considering them for a paid case study. This Call for Sewing Professionals brought out submissions from local artists and small start-up businesses that were not easily found via online searches. The statewide calls garnered over twenty submissions of interested participants and could be utilized in future projects that had funding behind education and outreach, such as boosting social media posts. Not all submissions were qualified to participate due to the insurance and licensing requirements discussed in the 'Relevant Regulations" section of this report (Section 2.4b). The start of the database was initiated by the CPSC pilot projects in the City/County of Los Angeles, and the StopWaste Re: Source Database project. These lists were combined and expanded to include businesses based in San Francisco that were not previously mapped in previous projects.

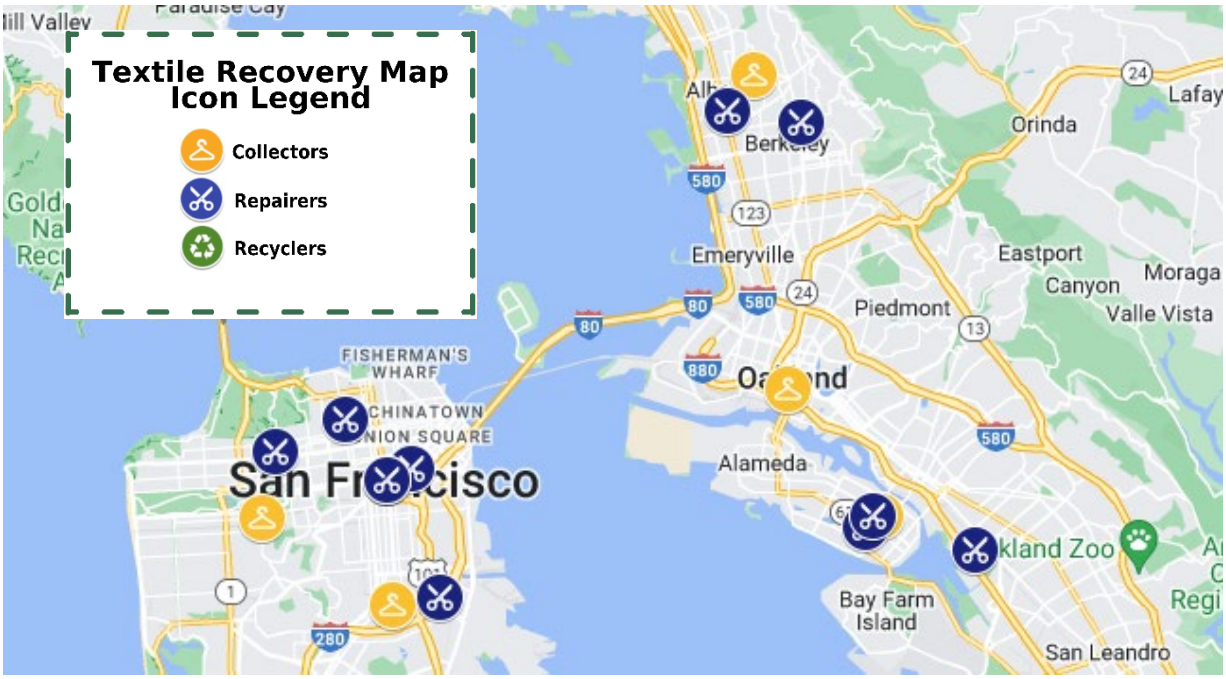


Figure 4. A screenshot of textile processors, including collectors, upcyclers/designers, and recyclers in the San Francisco region mapped for the pilot.

Additional funds and time can be used to find more processors and microprocessors. More processors are needed who can take in all fiber types at varying scales of capacity, especially for large scale upcycling and redesigns. Furthermore, funds can be used to offer recycling services to designers and thrifts to address blended fiber-content fabrics and mixed fabric scraps for textile-to-textile recycling.

6.2 Encourage thrifts, brands, and other stakeholders to hire sewing professionals and/or host mending workshops

Figure 5. Examples of mending workshops that Goodwill hosted during the timespan of the pilot project. (Left): Ciclo Sewing Lab, Remake, & Fashion Revolution Collaborative Clothing Swap and Workshop; (Middle): Goodwill and CBU Workshop, (Right): Everlane & Goodwill Collaborative Sewing Workshop

As the demand for clothing personalization and thrift shopping increases, the need for more mending and redesign workshops also increases. Several discussions are already in motion concerning the hiring of sewing operators at the Goodwill warehouse or in a Goodwill store. There is a greater value to customers mending their own garments or asking for a particular mend or repair to a garment at the time of purchase.

6.3 Invest in durable fabrics, repair, renovation, and recycling of textiles

Brands and local governments should spend funds in a manner that prioritizes reuse and repair and gives local businesses access to provide repair services. Green purchasing is a good model for large-scale buyers and government agencies to invest in markets for products that promote circularity. Purchasing materials that are easier to repair and/or are recyclable is important. Purchasing policies can be set by the government and also act as a tool for businesses to guide their own consumption. For example, offering repair services for government purchased textiles, such as uniforms and linens. Green purchasing programs can take a commitment to sustainability to the next level by finding ways to include repair and reuse in their purchasing decisions.

Outside Lands T-Shirt Surplus

Each year, the Outside Lands Music Festival is held at Golden Gate Park in San Francisco. At the closure of each festival, hundreds of extra t-shirts from volunteers and merchandising are left over that cannot be used at following festivals. To prevent these apparel items from going into the landfill, CPSC partnered with the SF Environment, DaD, and SCRAP to repurpose these t-shirts. DaD received eight cases of brand-new shirts from Outside Lands and repurposed them into 28 scarves and 143 tote bags. These scarves and tote bags were donated to the SF State University and SF Environment to be utilized in future mending workshops and other outreach events.

The surplus could have been reduced with accurate purchasing, green design, and a plan in-place for excess garments before the concert.

Another opportunity that arose from this pilot is for brands or retailers to buy damaged garments in bulk and do the repairs themselves. This would work best for brands and retailers that have their own retail platforms with an audience willing to purchase the repaired items at a slightly higher price point. It was discussed that Goodwill customers might prefer the deals and/or damaged goods rather than paying the price post-repair. Goodwill did discover that damaged items do sell well on the e-tailing site, with the right brand selection and description of the damage, the items sold which would have typically been included in aftermarket bales before this project.

6.4 Supporting relevant policies

In 2020, CPSC formed the Statewide Textile Recovery Advisory Committee (STRAC) and has hosted regular calls among industry experts, with intent to publish a report on recommended textile-specific legislation in California. In December 2021, the STRAC published a policy recommendation report outlining opportunities at every level of government, local, state and federal, to address barriers to textile circularity. The

recommendations included establishing partnerships, a public database of textile processors, green purchasing, disposal bans, mandatory recycling, and Extended Producer Responsibility.

Below are the logos of those organizations participating on the STRAC.

On February 16, 2023, Senator Newman introduced Senate Bill 707: Responsible Textile Recovery Act of 2023. SB 707 would require producers either individually or through the creation of one or more stewardship organizations, to establish a stewardship program for the collection, repair, and recycling of covered products, which includes any apparel, textile, or textile article that is unsuitable for reuse by a consumer in its current state or condition. The bill focuses on reuse, repair, and recycling of unusable textiles and contains a major repair component that supports California garment businesses and brings circular manufacturing jobs to the state. The repair component supports California's garment businesses, including washing and upcycling businesses to align with the Waste Hierarchy (see right). California's network of thrift and secondhand businesses would be utilized to collect unwanted textiles for sorting and recycling, with textiles that can be reused or repaired being sorted for those purposes. In doing so, SB 707 will expand on the work completed in this pilot project and provide financial support that

could reduce or eliminate the barriers for permanent repair programs. Extended Producer Responsibility (EPR) programs, such as the one proposed in SB 707 collect funds from producers of covered products and spends the funds to create recovery programs that meet the mandated performance requirements, such as diminishing disposal and increasing repair.

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ATTACHMENT A

Project Summary as approved by SF Environment on 10/26/2021

SAN FRANCISCO: TEXTILES REPAIR

CPSC California Product Stewardship Council

SF Environment
Our home. Our city. Our planet.
A Department of the City and County of San Francisco

PROJECT FUNDED BY SAN FRANCISCO DEPARTMENT OF THE ENVIRONMENT AND LEAD BY THE CALIFORNIA PRODUCT STEWARDSHIP COUNCIL

OPPORTUNITIES FOR INVOLVEMENT

PUBLICLY-FUNDED PILOT SUSTAINABILITY PROJECTS THAT WILL SEEK CONTRACTORS, SUCH AS:

- WASTE HAULERS
- SECOND-USE/THRIFT BUSINESSES
- INDUSTRIAL LAUNDRIES
- TEXTILE RENTAL BUSINESSES
- BRANDS/PRODUCERS
- TAILORS/MENDERS
- TEXTILE RECYCLERS

Visit our website www.calpsc.org!

The volume of garments facing end-of-life increased significantly between 2020 and 2021 as more residents cleaned their closets and updated home spaces, and thrift stores are at capacity for managing products their highest and best-use. And while they are not trained waste managers, thrift stores have become the stewards for pre-sorting unwanted items without much support for repair and upcycling damaged goods to ensure they are kept out of the landfill.

Meanwhile, an entire infrastructure for garment repair exists that includes local dry-cleaners, tailors, designers, upholsterers, artists, and other innovators This CPSC pilot seeks to connect this infrastructure with thrift stores to expand markets for textile products. For this collaboration, Goodwill staff will be trained on recovering eligible products, which will be processed through repair partners, and these products will ultimately be sold at one of Goodwill's established retail channels. Information, lessons learned, and recommendations from the pilot will inform future programs.

Funded through a grant from the San Francisco Department of the Environment, this project will identify best practices, identify gaps in funding, and recommend gaps in systems to increase textiles waste diversion, while expanding opportunities for regional textile reuse, repair, and renovation, and allowing recycling business to thrive.

goodwill

ATTACHMENT B

Calculation Summaries

Calculated total weight for repaired garments	GHG Footprint (Natural)	GHG Footprint (Synthetic)
Method: Sum of each garment weigh based on garment type and primary fiber	Method: WARM model	Method:
815.07	0.9264681	16.3014916
lbs	metric tons of CO2	metric tons of CO2
Average	8.6139799	metric tons of CO2

Pulled from citation (Cheng and Liang, 2021): Assumptions made for the GHG calculation include conventional M size ladies denim jacket as an example to conduct quantitative analysis and calculation of carbon emissions. Its styles contains: lapel, long sleeves, exposed placket, two left and right chest pockets, two diagonal open pockets, overlock stitching, two-line series, six buttons on the placket, two buttons on the pockets, three buttons on the cuffs, two buttons on the hem. The jacket has a shoulder width of 49.5 cm, bust of 128 cm, sleeve length of 60.5 cm, and a back middle length of 59.5 cm. The style is shown in Figure 1

Table 4. Calculations of carbon emissions in female jacket production.

Production processes	Result before substituting *K* value	The result after substituting the *K* value
Tailoring	$367.094\,kg + 178.445\,K_1$	372.269 kg
Sewing	$760.290\,kg + 8.077\,K_2$	761.235 kg
After finishing	244.633 kg + 22.3 kg	266.933 kg
Merge	$1.374\,t + 178.445\,K_1 + 8.077\,K_2$	1.4004 t

carbon dioxide density is 1.96 g/L, therefore, about 0.0294 kg of carbon dioxide is emitted per hour, So, the *K*1 setting value in this article is 0.029. It is assumed that a normal adult exhales 1 L of carbon dioxide per minute in the state of daily activities, that is, 60 L of carbon dioxide is emitted per hour, with a mass of 0.117 kg, that is, the set value of *K*2 in the text is 0.117. Substituting into the model, we can get the results of carbon emissions during the production of women's denim jackets as shown in Table 3.

It can be seen from the Table 4 that the carbon emission of denim jackets is the largest in the sewing stage and the smallest in the finishing stage. The carbon emission of denim jackets in the sewing stage is about two times that of the cutting stage. The industrial carbon footprint of denim jacket within the accounting boundary is 1.4004 t CO_2, of which the carbon footprint of the sewing process is the largest 761.235 kg CO_2, accounting for about 54.4%. The second step is cutting, and the industrial carbon footprint is 372.269 kg CO_2, accounting for about 26.7%. The last finishing link was the smallest, with the industrial carbon footprint of 359.583 kg CO_2, accounting for about 19.06%. If 800 denim jackets are produced in 1 day, the carbon emission of one denim jacket produced in 1 day is 1.4004t/800 = 1.7505 kg.

ATTACHMENT C

Outreach Metrics

Outreach Metrics

Topic	Date	Reach	Likes/Engagement	Comments	Shares	IG Likes
Event: Clothing Swap	9/10/22					
SF Garment Repair Webinar/In-peron Event (Boosted for $160 on IG)	9/9/22	15218	85	4	22	47
SF Garment Repair Press Release	9/22/2022					
SF Garment Repair Webinar + In-Person Event SM Post (boosted for $160 on IG)	9/9/2022	15472	93	5	23	48
SF Garment Repair Webinar Recording SM Post	10/5/2022	115	8	0	2	6
KALW Ft. SM Post	10/6/2022	720	40	4	4	17
SF State News SM Post	10/14/2022	240	35	3	7	24
SF Textile Repair Webinar	5/24/23	189	17	0	2	11
SF Textile Repair Webinar Recording	6/12/23	244	25	1	3	10

Press and Publications

Date	Publication Source / Presentation	Title	Link	Presenter(s)	Number of Viewers	Notes
9/23/2022	Waste Advantage	Garment Repair and Reuse Pilot Succeeds in Diverting Textile Waste from the Landfill, Supporting Local Jobs, and Creating Beautiful Garments	https://wasteadvantagemag.com/garment-repair-and-reuse-pilot-succeeds-in-diverting-textile-waste-from-the-landfill-supporting-local-jobs-and-creating-beautiful-garments/			
10/3/2022	KALW News	Goodwill and the California Product Stewardship Council partner on used apparel	https://www.kalw.org/kalw-news/2022-10-03/goodwill-and-the-california-product-stewardship-council-partner-on-used-apparel			
10/13/2022	SF State News	SF State students give fresh look to unwanted clothing through repair and redesign	https://news.sfsu.edu/news-story/sf-state-students-give-fresh-look-unwanted-clothing-through-repair-and-redesign			
6/18/2023	Mission Local	Goodwill project finds clothing repair sustainable, but expensive	https://missionlocal.org/2023/06/goodwill-project-finds-clothing-repair-sustainable-but-expensive/			

Outreach Events

Date	Location	Title	Link	Presenter(s)	Number of Registrants/Viewers	Notes
9/7/2022	CRRA Conference	Leaders in Textile Reuse and Recycling from Publicly Funded Pilots	https://static1.squarespace.com/static/62c60383595e6812f3af0369/t/63112de5d65f0d114d15e8bc/1662070251580/program-2022FINALsmall2.0.pdf	Joanne	75 (attendees)	In-person event
9/27/2022	SF State	Exhibition of Redesigned Garments from Project to Divert Fashion from Landfill	https://fina.sfsu.edu/exhibition-redesigned-garments-project-divert-fashion-landfill	Joanne	50 (attendees)	In-person event
9/28/2022	Online	San Francisco Textile Recovery Webinar	https://youtu.be/KraU5fZGtwY	Joanne, Connie	170 (viewed)	Webinar
10/19/2022	Treasure Island	Week of Goodwill	https://sfgoodwill.org/a-week-of-goodwill/	Joanne	100+	In-person event
5/31/2023	Online	SF Textile Pilot Webinar	https://youtu.be/5Q6mV12FkF0	Joanne, Connie, Julie	141 (viewed)	Webinar
5/11/2023	SF State	SFSU RUNWAY 2023 : KINETIC	https://www.eventbrite.com/e/runway-2023-kinetic-tickets-609985863137	-	100+	In-person event