

FURTHERING THE RECLAIMED MATERIALS EXPERIENCE

By

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Submitted to the graduate degree program in the School of Architecture, Design and Planning and Graduate Faculty of the University of Kansas in partial fulfillment of the requirements for the degree of:

MASTER OF ARTS IN DESIGN MANAGEMENT

Chairperson: Richard Branham

Michael Eckersley

Wally Meyer

Date Defended: 16 April 2012

The Thesis Committee for Robert A. Bartels

certifies that this is the approved version of the following thesis:

FURTHERING THE RECLAIMED MATERIALS EXPERIENCE

Chairperson: Richard Branham

Date approved: 07 May, 2012

[Chairperson's original signature is required. You should type your committee chair's name below the line and have her/him sign above the line. If your committee consisted of a chair and co-chair, both signatures are required. Other committee members' signatures are optional ONLY on the acceptance page.]

[Acceptance page should be numbered ii.]

ABSTRACT

A comprehensive study of the reclaimed materials industry and ways it could be improved from a management standpoint by working through a Design Management problem solving approach.

Project Objectives:

To improve the sourcing of reclaimed materials within a local arena.

To develop a framework using these improvements that could be replicated on a larger scale throughout other Habitat ReStores.

To improve design research and development skills and demonstrate gained knowledge through a project that would cover a broad spectrum of Design Management principles.

Scope of Work:

The topic is specifically related to the reclaimed materials industry and ways to improve the buyer's and seller's experience in relation to the location and sale of materials as seen through the lens of the Habitat ReStore structure.

Concepts contained within this presentation have been developed through the collection of qualitative and quantitative research data, user testing, prototyping, applied design methodology, and existing references.

Problem:

Reclaimed building materials are everywhere but finding them is difficult.

How does design apply?

Examine the problem through the eyes of the customer and apply the gathered data to produce new solutions that will improve the experience for both the buyer (customer) and seller (ReStore).

Solutions:

Provide a set of potential changes to the physical space to improve the customer's experience.

Provide a set of potential changes to the virtual space that would improve the customer's experience.

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Advancing the Reclaimed Materials Experience

*“Simplify complexity and do it at scale.”
- Don Norman*

Graduate Thesis - MA Design Management

Committee

Richard Branham, *chair*

Michael Eckersley

Wally Meyer

16 April 2012



intro

research

development

solutions

next steps

intro

research

development

solutions

next steps

this building is not trash.



motivation for project

“People waste materials.”

The concept for this thesis project had two main driving forces behind its conception:

1. My personal interest and experience within the materials industry and a frustration that developed from trying to locate reclaimed materials for personal and professional projects.
2. An observation of the massive amounts of waste the construction industry produces and the idea that a possible solution to this problem could be developed through using a design approach.

project objectives

To improve the sourcing of reclaimed materials within a local arena.

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problem

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How does design apply?

Examine the problem through the eyes of the customer and apply the gathered data to produce new solutions that will improve the experience for both the buyer (customer) and seller (ReStore).

solutions

Provide a set of potential changes to the physical space to improve the customer's experience.

Provide a set of potential changes to the virtual space that would improve the customer's experience.

intro

research

development

solutions

next steps

analysis of materials (industry? cycle?)

a quick overview of terms

the reclaimed materials industry

trash

recycling

What is a reclaimed material?

Reclaimed materials: Waste materials and byproducts that have been recovered or diverted from the waste stream for reuse.

1. <http://www.epa.gov/greenhomes/TopGreenHomeTerms.htm>

examples include:

windows

doors

raw lumber

siding

plumbing parts

electrical parts

Where do reclaimed materials come from?

deconstruction

commercial renovations

residential renovations

Where do reclaimed materials come from?

deconstruction is...

“The careful and systematic dismantling of a building structure to maximize the recovery of valuable building materials. Deconstruction is an environmentally friendly alternative to demolition, which produces large quantities of debris requiring disposal.”

1. <http://www.epa.gov/greenhomes/TopGreenHomeTerms.htm>

Where do reclaimed materials come from?

commercial renovations

The renovation, construction, and deconstruction of commercial spaces provides for a large variety of excess, usable material. Some examples include:

- steel I-beams
- various metal components
- concrete
- cinder blocks
- corrugated roofing materials
- glass / windows
- old office furniture sets
- fasteners such as nuts and bolts

Where do reclaimed materials come from?

residential renovations

Residential renovation, construction, and deconstruction projects produce excess materials similar to commercial ones, but on a smaller scale. Some examples include:

- dimensional lumber (studs, joists, etc.)
- concrete
- cinder blocks
- vinyl & aluminum siding
- roofing materials
- glass / windows

How are reclaimed materials used?

commercial uses

new construction
renovations
building repairs
creation of art

residential uses

renovations
decoration
new construction

other uses

hobby & craft projects
educational purposes (shop classes, engineering teaching examples, etc.)

material waste

In 2003, construction and demolition (C&D) materials generated was estimated at 5.01 million tons for nonresidential construction.

On a per building basis, demolition waste quantities are often 20 to 30 times as much as C&D materials generated during construction.

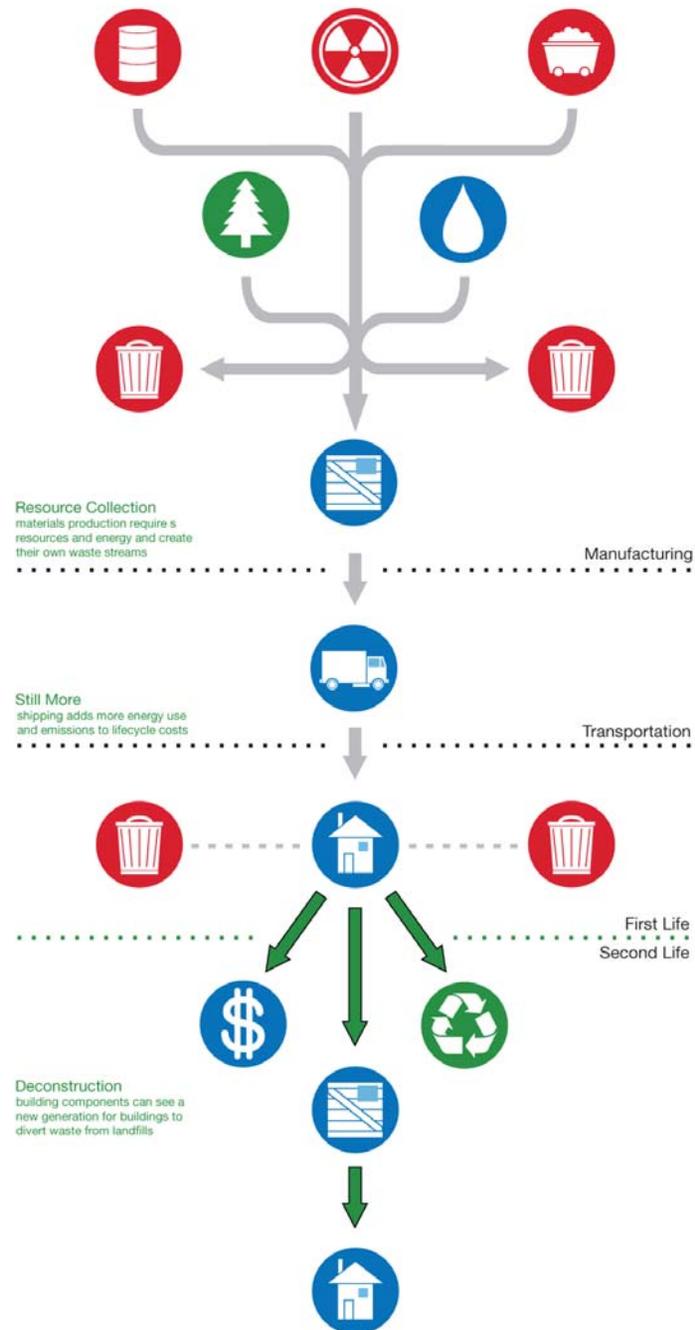
Thus, the average single-family and multi-family houses are assumed to be that of 1975 (1,600 ft² and 1,000 ft²), respectively, when demolished.

where do these materials go?

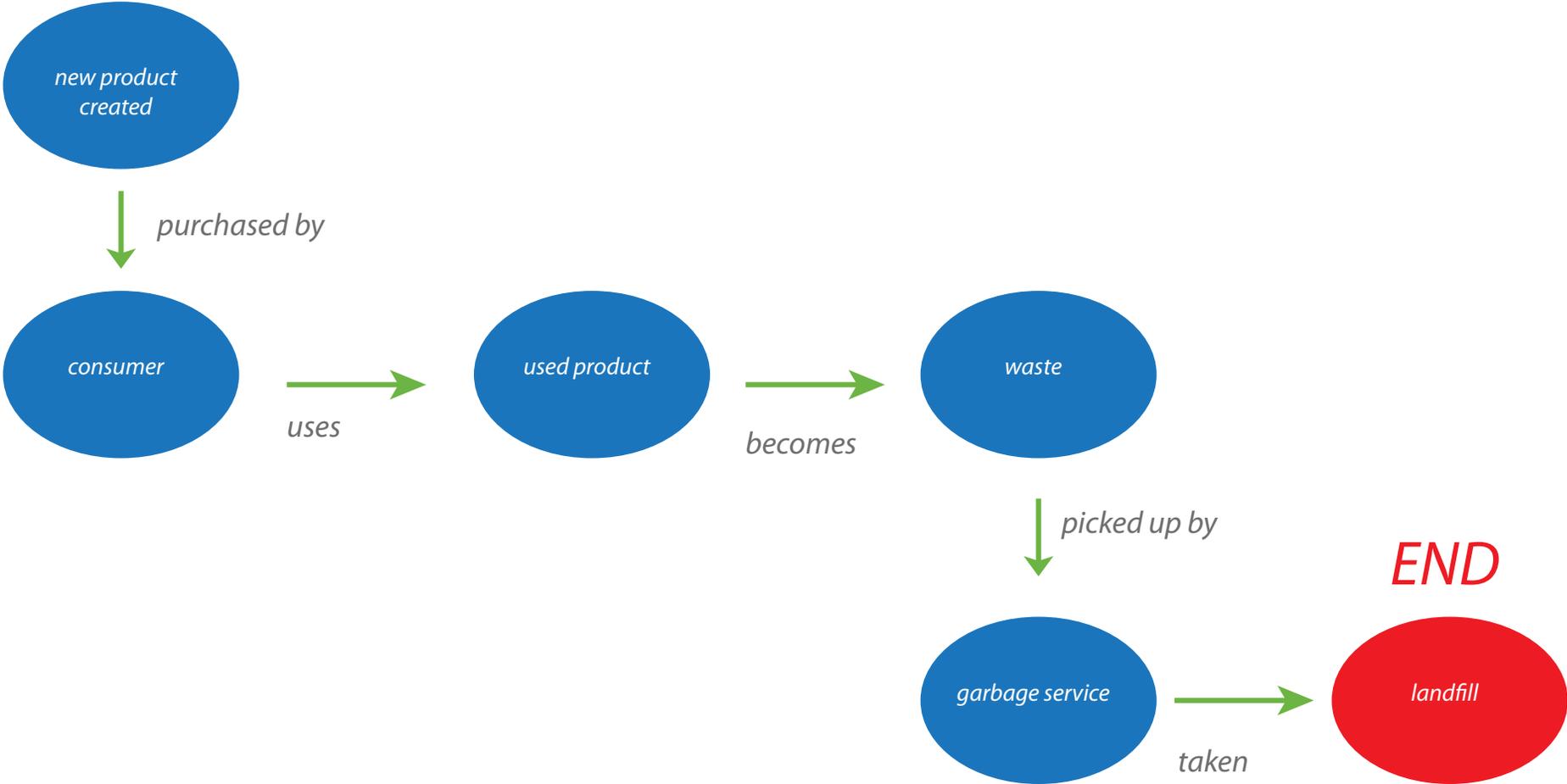
landfill

recycling center

materials life cycle



landfill cycle



landfill cycle

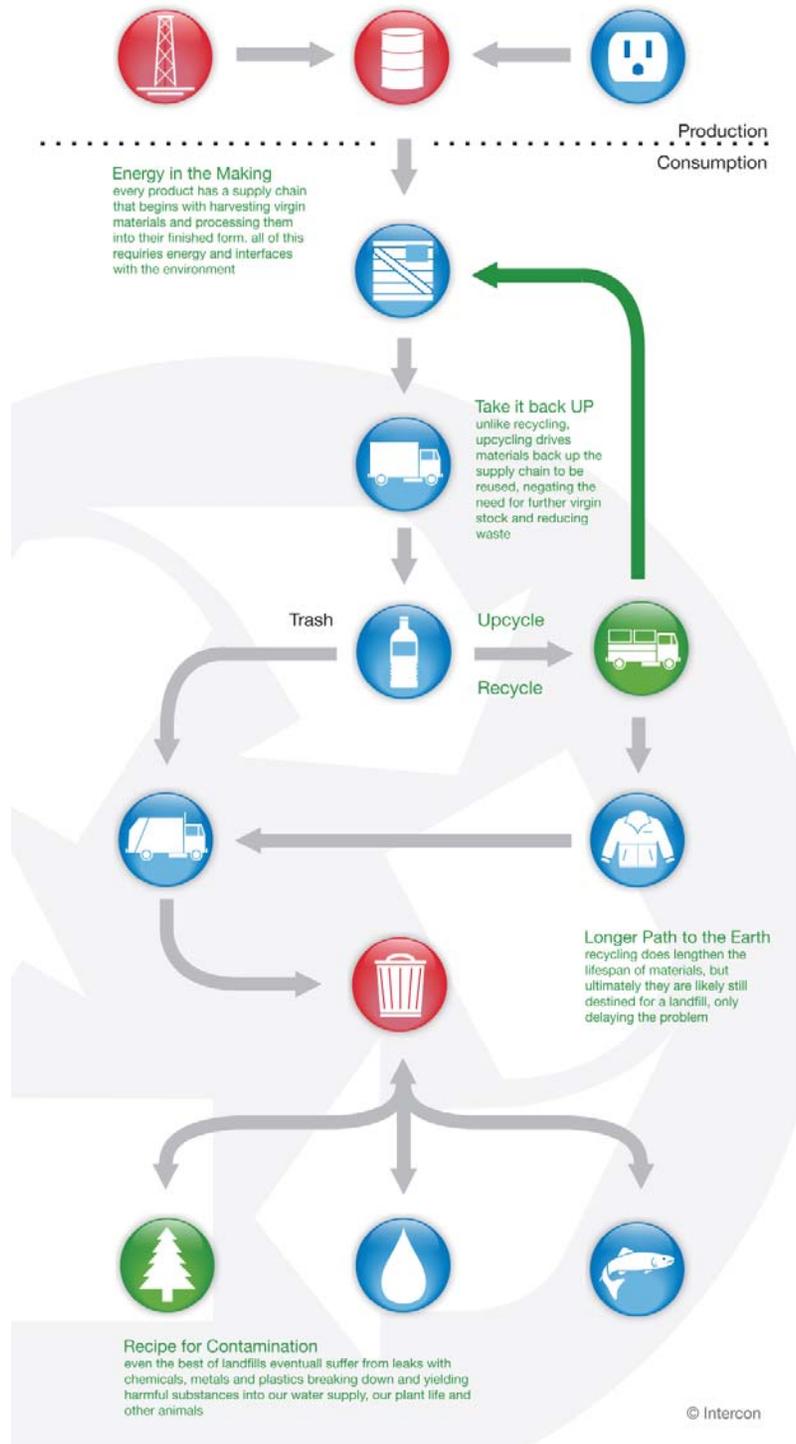
Why do people use this model?

efficient
easy for consumer

Why shouldn't people use it?

waste
environmental

recycling cycle



recycling cycle

Why do people use this model?

to promote best ecological practices

self-satisfaction

monetary gain via bottle exchanges, aluminum recycling, etc.

Why don't people use it?

inconvenience

higher initial costs

laziness

framing the problem



Why ReStore?

Local setting.

Real situations.

Real people.

Fits personal project criteria.

ReStore business model

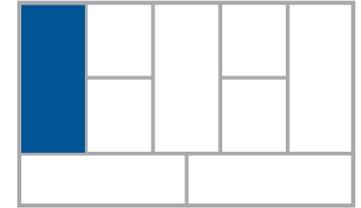
What unique service do they provide that generates revenue?

The Business Model Canvas

<p>Key Partnerships The network of suppliers and partners that make the business model work.</p>	<p>Key Activities The most important things a company must do to make its business model work.</p>	<p>Value Propositions The bundle of products and services that create value for a specific Customer Segment.</p>	<p>Customer Relationships The types of relationships a company establishes with specific Customer Segments.</p>	<p>Customer Segments The different groups of people or organizations an enterprise aims to reach and serve.</p>
	<p>Key Resources The most important assets required to make a business model work.</p>		<p>Channels How a company communicates with and reaches its Customer Segments to deliver a Value Proposition.</p>	
<p>Cost Structure All costs incurred to operate a business model.</p>			<p>Revenue Streams The cash a company generates from each Customer Segment (costs must be subtracted from revenues to create earnings).</p>	

Key Partnerships

The network of suppliers and partners that make the business model work.



The Business Model Canvas

Strategic alliances between non-competitors

Habitat for Humanity

Other ReStore branches

Buyer-supplier relationships to assure reliable supplies

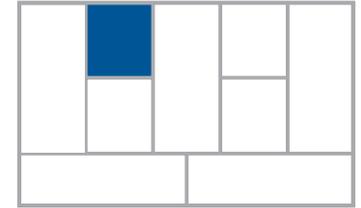
Donors:

local businesses and contractors

- Donate overstock, wrong item deliveries, left over materials, etc.
- Gives donors a tax write off and helps ReStore stock valuable inventory.

Key Activities

The most important things a company must do to make its business model work.



The Business Model Canvas

maintain retail inventory in-store

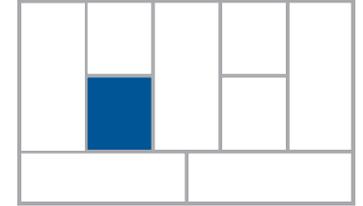
The ReStore's main task is the sale of items in a retail outlet, which supports their parent organization, Habitat for Humanity. Without keeping a well-stocked retail inventory, they would be unable to do this.

be available to accept donations

The ReStore's entire inventory is comprised of donations, so the availability of staff to receive donations at all times is the highest priority.

Key Resources

The most important assets required to make a business model work.



The Business Model Canvas

physical

The ReStore building, the delivery truck, general operations equipment.

intellectual

The ReStore brand, which connects them to their parent organization, Habitat for Humanity. This connection allows people to immediately recognize their non-profit business structure.

human

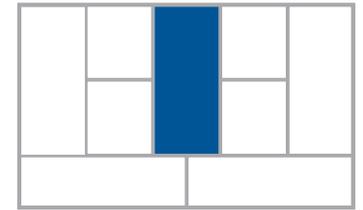
The regular paid staff runs the day-to-day operations. A steady flow of volunteers is crucial to assisting the staff and making the store run.

financial

Its not-for-profit structure allows ReStore to accept donations and resell items for profit while still getting tax breaks that help keep them in business.

Value Propositions

The bundle of products and services that create value for a specific Customer Segment.



The Business Model Canvas

pricing

Reclaimed goods are always cheaper because of their used status.

material variety

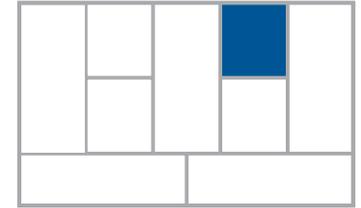
With a constant flow of new donations occurring, customers know to constantly return to see what new materials have shown up.

location

The Lawrence ReStore is located on the edge of the city's oldest sector, which is filled with old buildings needing constant attention. The owners of these buildings like the ReStore's location in relation to their neighborhoods and the convenience it provides. Many customers are walk-ins.

Customer Relationships

The types of relationships a company establishes with specific Customer Segments.



The Business Model Canvas

personal assistance

A real person is always available to help customers at the ReStore, both in-store and on the phone.

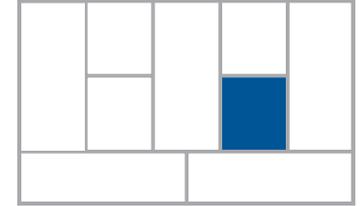
communities

A large part of the Lawrence ReStore experience relies heavily on a small community of regular shoppers. Many don't buy every time, but if they're in and see something that someone they know could use, they make a point of letting that person know. This sort of informal network helps the ReStore to advertise without advertising.

(Communities outlined in greater detail below.)

Channels

How a company communicates with and reaches its Customer Segments to deliver a Value Proposition.



The Business Model Canvas

virtual

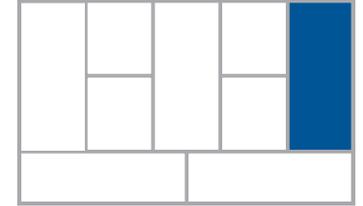
Website with general information about the ReStore and its products.

physical

- In-store bulletin board posting events, sales, and general store information.
- Word of Mouth advertising.
- Occasional print ads for larger sales or events.

Customer Segments

The different groups of people or organizations an enterprise aims to reach and serve.



The Business Model Canvas

occasional shopper

The customer who stops in 1-2 times per month. They almost always purchase something during their visit.

Average spending: \$40

window shopper

The customer who stops in at least once per week, but only buys something around 20% of the time.

Average spending: \$8

frequent buyer

The customer who stops in 1-3 times per week and buys something at least 50% of the time.

Average spending: \$5-15

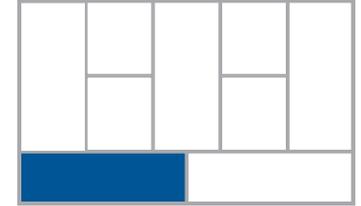
high volume buyer

The customer who only stops in 1-2 times per month, but does so to make larger purchases.

Average spending: \$100+

Cost Structure

All costs incurred to operate a business model.



The Business Model Canvas

cost-driven model

The ReStore focuses on minimizing costs wherever possible.

fixed costs

ReStore operations costs, such as rent, utilities, & salaries, fluctuate very little from month to month.

variable costs

Minimal. Costs such as delivery truck fuel can be considered variable.

economies of scale

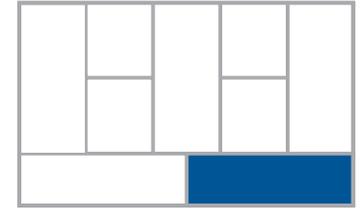
Larger donations allow ReStore to stock more valuable merchandise, which provides them with a steadier revenue stream.

economies of scope

Due to their affiliation with HFH and the general helpful nature of the organization, ReStore enjoys community support in ways that other businesses don't. Examples are financial donations, time & service donations for item repairs, etc.

Revenue Streams

The cash a company generates from each Customer Segment (costs must be subtracted from revenues to create earnings).



The Business Model Canvas

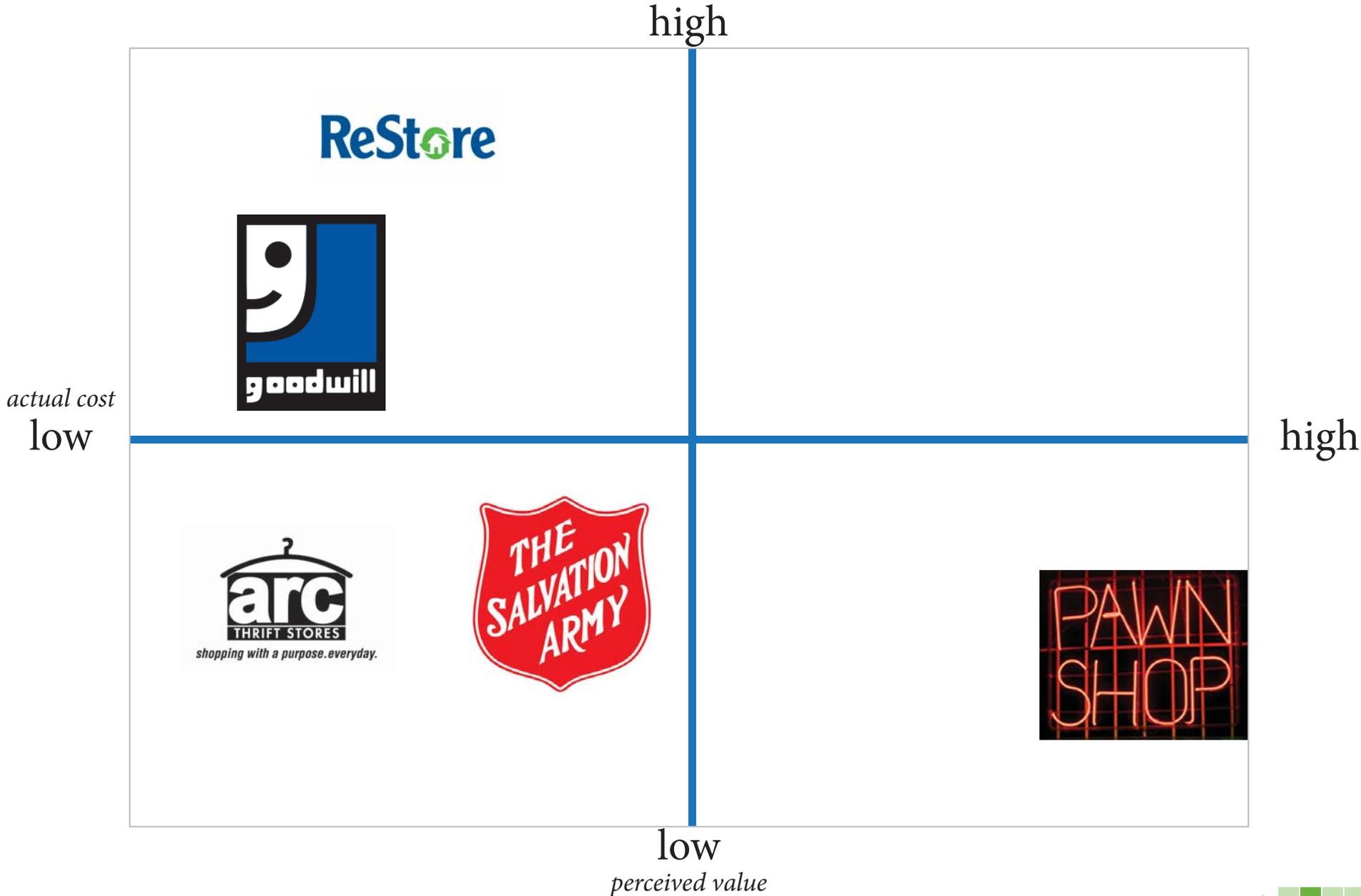
asset sales

The ReStore's main revenue source is the sale of merchandise.

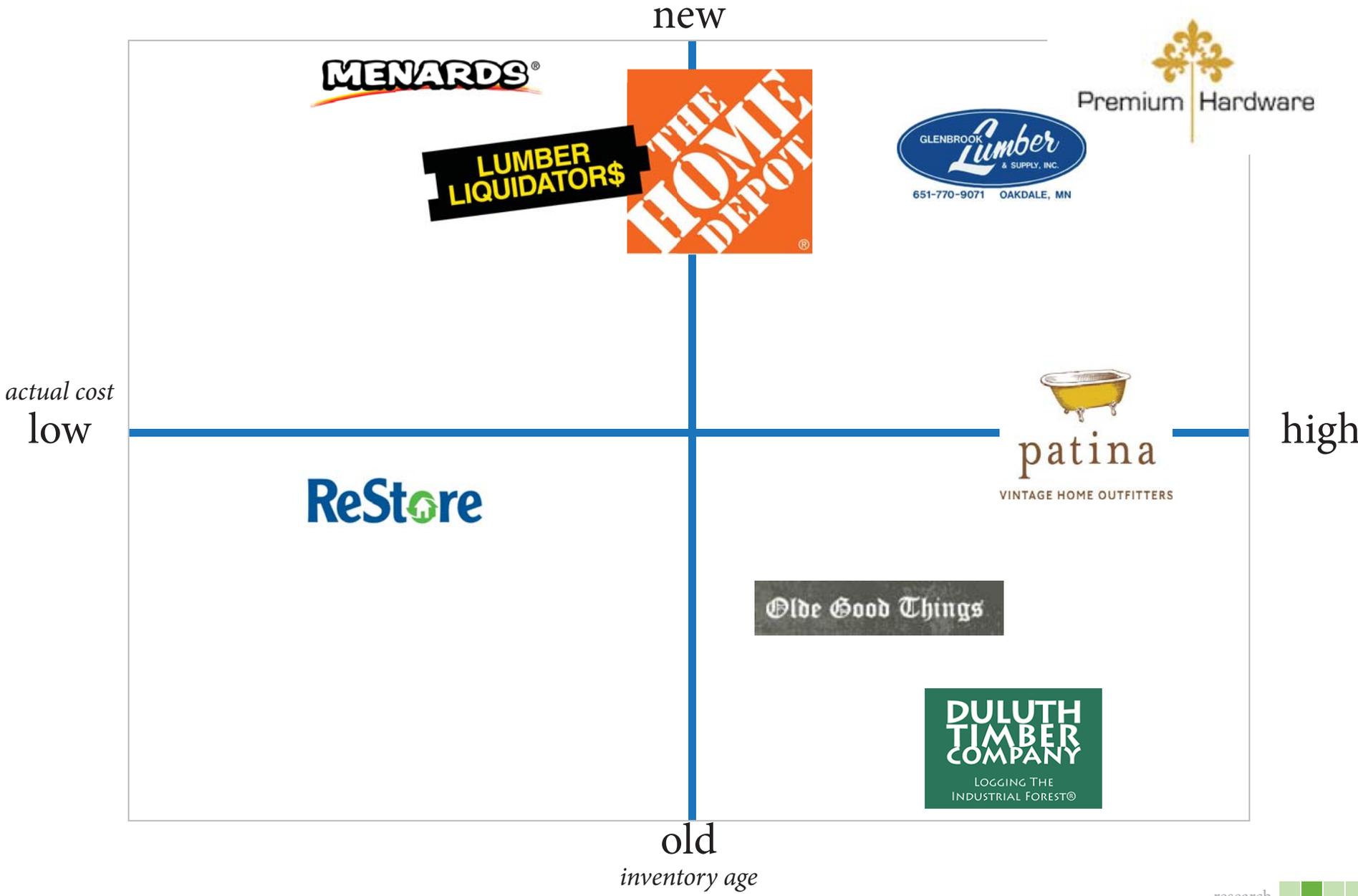
monetary donations

The ReStore also enjoys the occasional monetary donations from various local and national businesses.

comparable services



materials industry offerings



ethnographic research methodology

method: USER INTERVIEWS

method: OBSERVATION

method: SURVEYS & QUESTIONNAIRES

method: SHADOWING

method: USER INTERVIEWS

purpose

Interviews were conducted with ReStore staff and customers willing to take a minute to talk. These proved to be an invaluable resource for knowledge and user insight.



Still from interview with Michele Johnson, Lawrence Habitat ReStore manager.

method: USER INTERVIEWS

findings

insight into user needs

insight into ReStore staff wants and needs

knowledge of ReStore system

greater knowledge of reclaimed materials industry

method: OBSERVATION

How was it applied?

Observation played a big role seeing the more subtle interactions between customer and environment.



method: OBSERVATION

findings

People move in unpredicted ways.
Spotting the confused or lost is easy.

method: SURVEYS & QUESTIONNAIRES

Reclaimed Materials

your profession

student
CPA
UX Engineer
Attorney
Industrial designer
Technical Director
graphic design designer
Graphic Designer
prj mgr fabrication
Agriculture
Design Engineer
Teacher
Sales
Stock Broker
15 responses

Please list any hobbies or general interests you may have.

design, furniture, fitness, reading, architecture
Golf, flying, hunting, woodworking
Video Games, playing music (guitar), music in general, skiing, fishing, shooting guns at targets, shooting guns at animals, cars, boobs, money
Reading; travel; dining out; watching TV; going to movies; spending time with friends; spending time with family; playing with my dog.
music, cars, design, art, sports
Photography, camping, dogs
anything crafty that saves the environment and a buck
design, basketball, painting
Running, design, screenprinting, cooking, biking
General home repairs/ motorcycles
Light woodworking, gardening, remodeling projects, reading, music
baking, travel and bike riding
I enjoy golfing, working out, yard work, spending time with my family, boating, and fixing up my house.
I dig longboarding at night, computers, graphic design, drinking cheap beer, country music, anything outdoors, traveling
Remodeling my house.
15 responses

When working on a building or hobby project, what is your main source of raw materials? Please name specific sources and why you choose them over others. Ex: Thrift store, scrap yard, Home Depot, recycling center, etc.

Habitat ReStore Survey Bob Bartels - KU Design Thesis

Age: 43
Gender: male female
Profession: Contractor
Hobbies / General Interests:
Boating
What informational sources do you use to locate specific materials? Please name sources. Ex: Newspaper, an internet site, etc.
Internet.
Reasons for choosing ReStore? → Good old things - antique Arch. materials
Moved from East Coast where Green Demolitions.com was nice
Things you love about the ReStore experience? Source for discount material
Now to ReStore close to Topeka.
Any thoughts on things you'd like to see improved?
more selection or internet listed w/ photo.

Habitat ReStore questionnaire 3-12-12

Interviewee: _____

**The interview will be formatted like a casual discussion, but these are some major points I'd like to touch on.*

Describe your typical customer.
Where do they come from? How often do they shop at your store? Etc.

Describe the typical customer's shopping experience.
How do they find you? How do they interact within the store? Callers? Mostly walk-ins? Etc.

What do you do if you don't have a particular item a customer is looking for?

What sort of marketing do you do?

How do your customers connect with you?
Phone? Word of mouth? Website? Etc.

Describe the donation process.

Describe your typical donor.

Where do those materials usually come from?
Deconstruction? Rural? Industrial? Commercial? Residential? Etc.

What are some of your most popular items?

How are those materials sourced?
Contractors? Home owners? Etc.

Do you ever turn away a donation?
If so, why? What sort of secondary sources do you direct them to?

What sort of shelf life do your materials have?

Do you have any competition? If so, who and how do you compete?

How was it applied?

There were two main surveys: one done through an email service to acquaintances all over the country, and another done in-store to gather basic demo- and psychographic information. A sample template was also drawn up for one-on-one interviews.

method: SURVEYS & QUESTIONNAIRES

findings

People have a wide range of individual needs but their overall service needs are basically the same.

People want:

- online listings of materials

- an easier way to find things in the store

- standardized pricing on common items

method: SHADOWING

ReStore Staff

Several days were spent at the ReStore facility watching how staff interact with the environment and the store's retail system. Besides watching, I also got a change to work as an employee does to improve my insight into the experience.

Michele Johnson, Manager

The majority of the shadowing was done with Michele. This proved to be a valuable experience, for not only were her interactions able to be monitored, but she would also provide input into various situations.

Byron, regular volunteer

Byron does much of the handling of donation intake. From picking up larger donations on the Friday truck runs to managing the intake of drop-off donations, he is very active in the store.

hourly employees

Handle day-to-day operations such as cash registers, donation intake, and floor inventory.

volunteers

Either there on own accord or court-appointed. Asked to help with basic tasks such as cleaning off new donations, shuffling inventory, helping with deliveries, or assisting customers.



user analysis

behavior modes

personas

need requirements

need cluster matrix

needs-based directives & solution architecture

behavior modes

mode	description
occasional shopper	The customer who stops in 1-2 times per month. They almost always purchase something during their visit. Average spending: \$40
window shopper	The customer who stops in at least once per week, but only buys something around 20% of the time. Average spending: \$8
frequent buyer	The customer who stops in 1-3 times per week and buys something at least 50% of the time. Average spending: \$5-15
high volume buyer	The customer who only stops in 1-2 times per month, but does so to make larger purchases. Average spending: \$100+

persona 1

occasional shopper

Jim

age: 43

occupation: medical sales

store visits: 1-2 per month

average trip spending: \$40

Jim does a lot of home improvement projects in his free time, which is limited.

He always ends up finding something he thinks he could use somewhere whenever he visits. The ReStore is a novelty experience for him.

He likes the ReStore because he can usually find odd items to fit the needs of his various projects. Much of his time is spent wandering the aisles since he never knows exactly where anything is located.



persona 2

window shopper

Darlene

age: 72

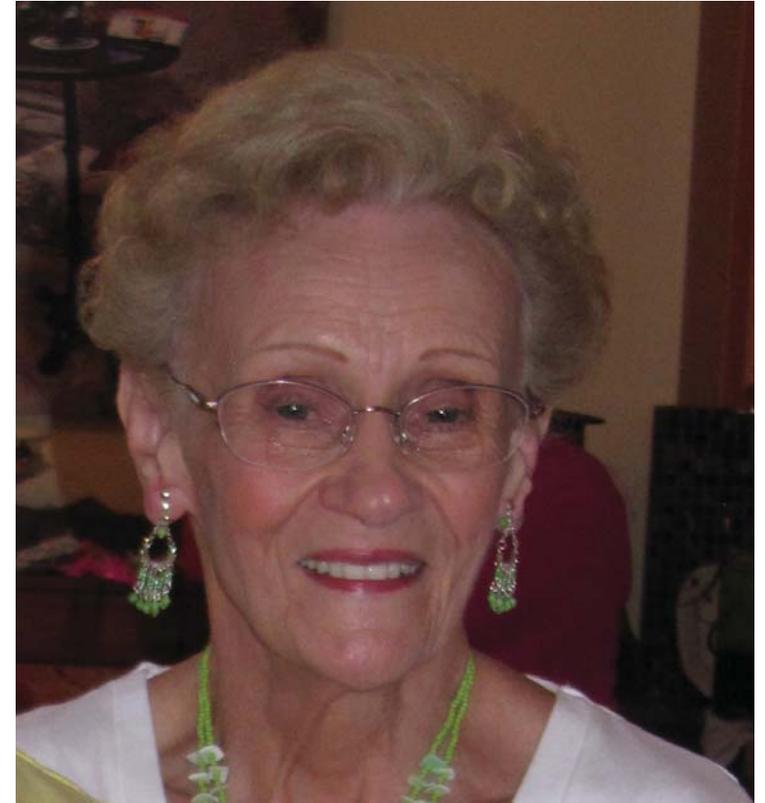
occupation: retired

store visits: 1+ per week, buys 20% of the time

average trip spending: \$8

Darlene likes ReStore for its low prices, random materials, and friendly social atmosphere.

would like to be able to find things more easily in the store instead of having to always ask for help.



persona 3

frequent buyer

Ann

age: 60

occupation: nurse

store visits: 1-3 per week, buys at least 50% of the time

average trip spending: \$5-15

Ann likes the ReStore because of the constant influx of new inventory.

She spends a lot of her free time doing craft projects so the ReStore's eclectic inventory is a perfect fit for her interests.

Ann would like to have an easier way to check new inventory that doesn't require her to stop into the store, as she is also a busy mom and is always strapped for time. She feels like the store is very cluttered and things are hard to find.



persona 4

high volume buyer

Steve

age: 52

occupation: contractor

store visits: 1-2 per month

average trip spending: \$100+

Steve likes ReStore for its occasional stock of larger building materials.

The location is convenient for him since he works on a lot of older homes in the same area.

He would like to be able to check inventory while on jobsite to save time instead of having to visit. He would be a more frequent shopper if they had a wider variety of heavy materials.



need requirements

requirement	description
organized inventory	A cleaner store layout that has clearly marked sections and legible signage.
extended retail experience	A way to connect with the store beyond the physical space, possibly through an improved website or better advertising.
live inventory	A way to check the store's inventory from your computer or phone, saving you time and money.
greater reach	The ability to check the inventory of other stores in the area beyond the Lawrence store without having to travel to them.

needs cluster matrix

	occasional shopper	window shopper	frequent buyer	high volume shopper
organized inventory				
extended retail experience				
live inventory				
greater reach				

needs cluster matrix

	occasional shopper	window shopper	frequent buyer	high volume shopper
organized inventory	1. 			
extended retail experience			2. 	
live inventory				
greater reach				

needs-based directives & solution architecture

1. improved inventory organization

logical organization

improve signage
improve space layout
increase shelf space to free up floor space

standardized electronic system

electronic inventory connected to

logical organization

improve signage

logical organization

improve signage

1. extend the experience

relevant services

building references

increase online presence

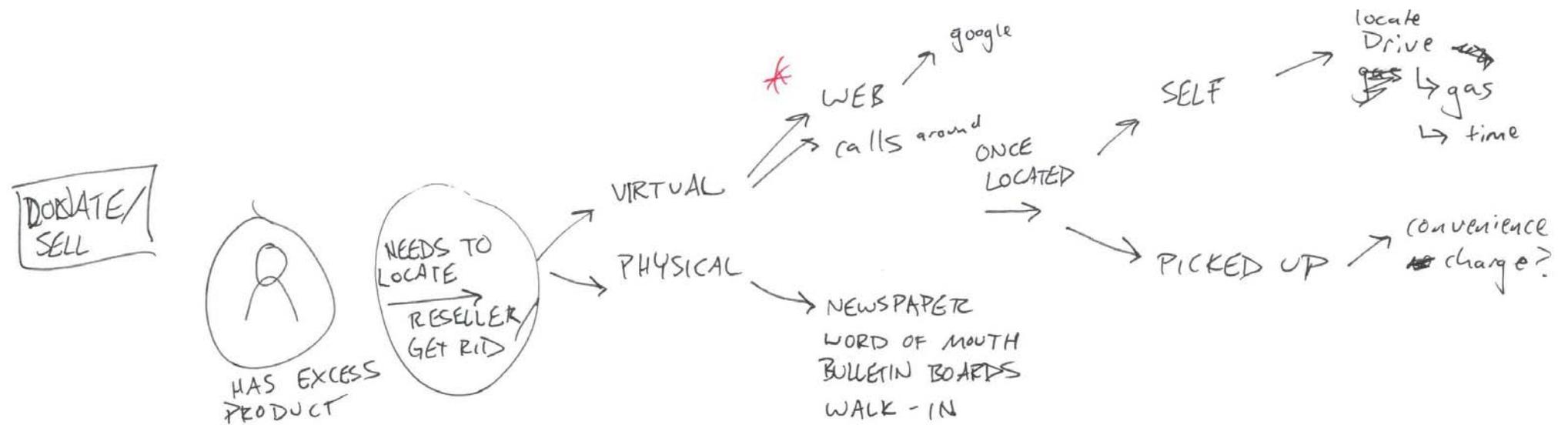
building references

experience mapping

What does the customer go through?

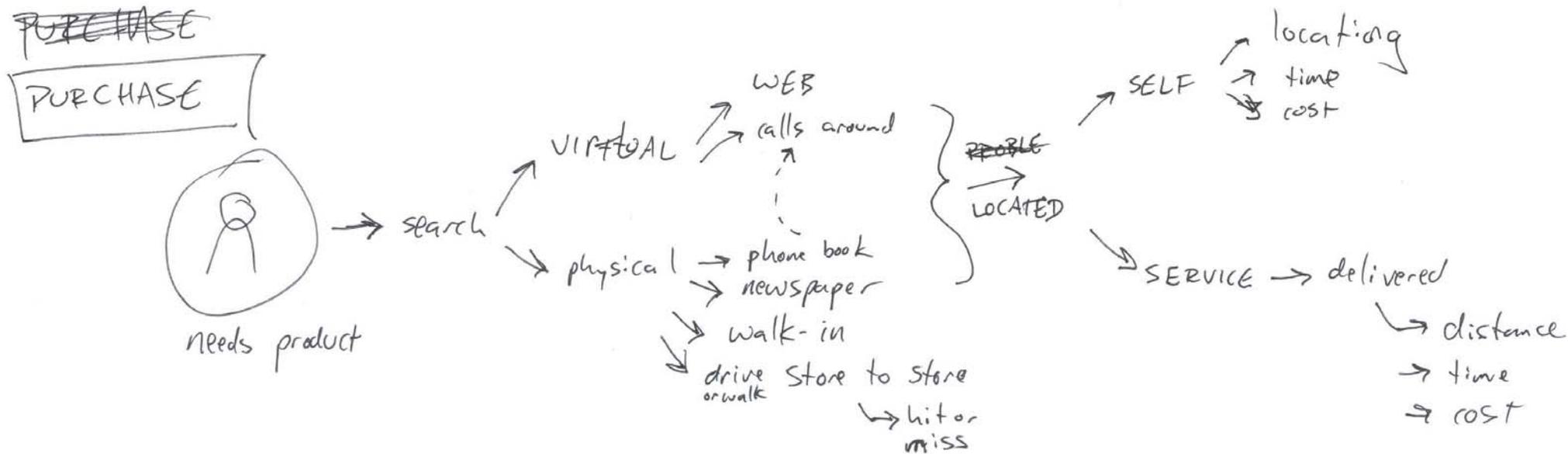
customer experience

donating



customer experience

shopping



intro

research

development

solutions

next steps

collision - common ground

how do these two pieces meet?

Where are the service gaps?

What are some improvements that could be made?

what do we do with this common ground?

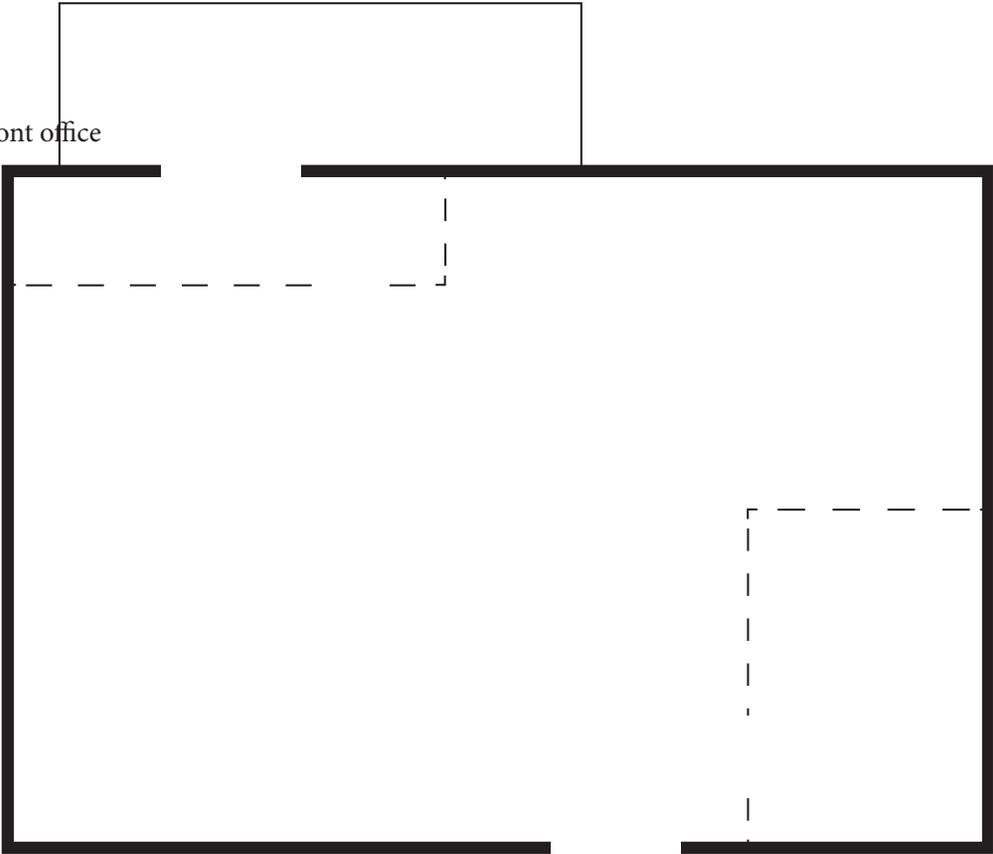
solution 1 - physical improvements

solution 2 - virtual improvements

existing physical space

donation intake

paper forms
no scheduling for drop offs
intake information not connected to front office



cash / wrap

paper-based accounting system
no connection to donation area or
other ReStore outlets
sporadic employee attendance

sales floor

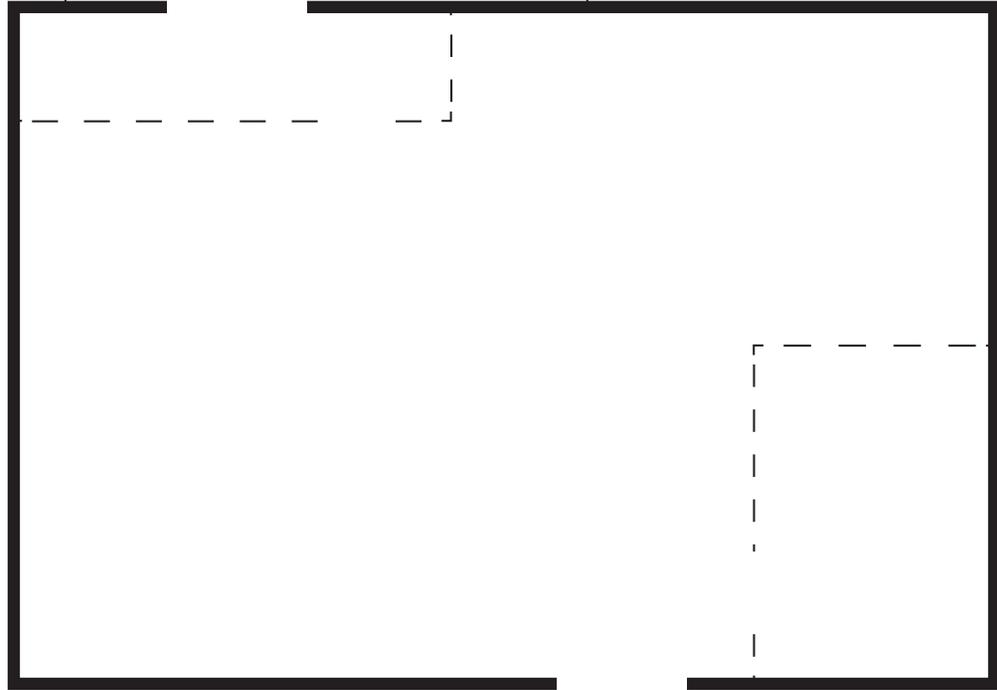
disorganized
poor or no signage
lack of spacial flow between aisles and sections
difficult to find specific items
scattered inventory



potential physical space

donation intake

computerized inventory syncs with network
standardize the process to improve efficiency



cash / wrap

barcode inventory
computerized inventory syncs with network
improve help & info availability

sales floor

flexible architecture
improved wayfinding
better space planning & organization
widened aisles

existing virtual space

index page

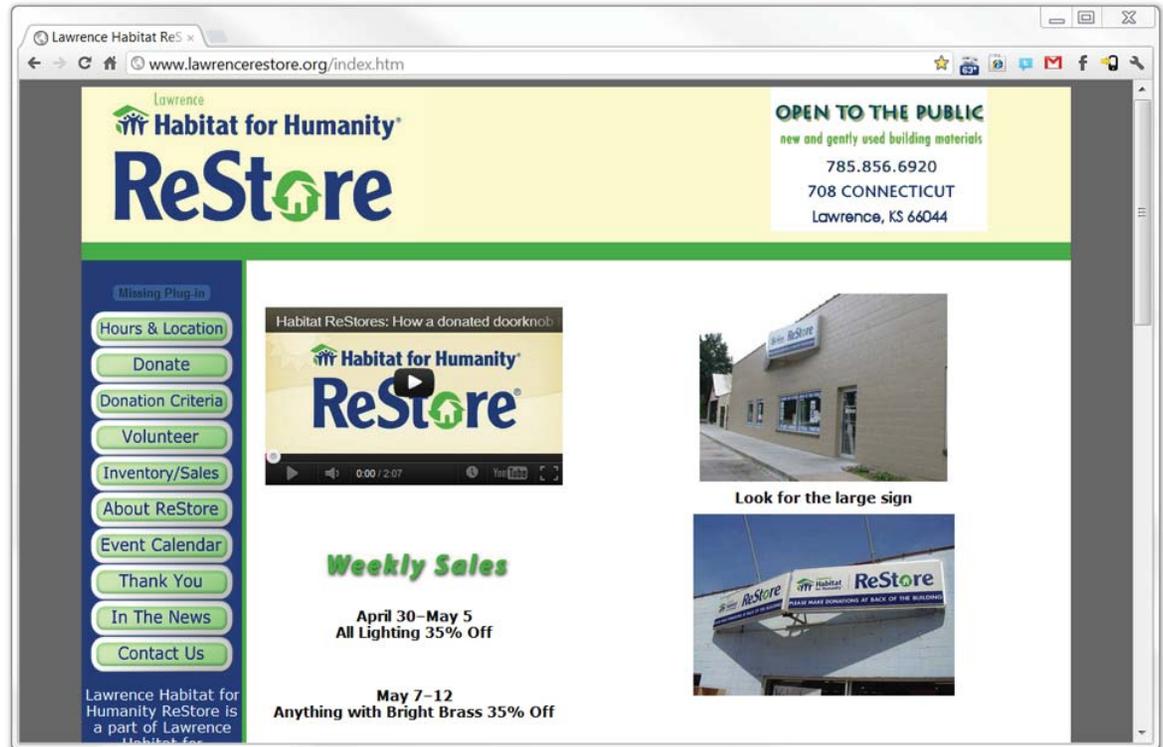
pros

good navigation categorization

cons

poor graphic layout

- eye doesn't know where to go
- lack of information hierarchy

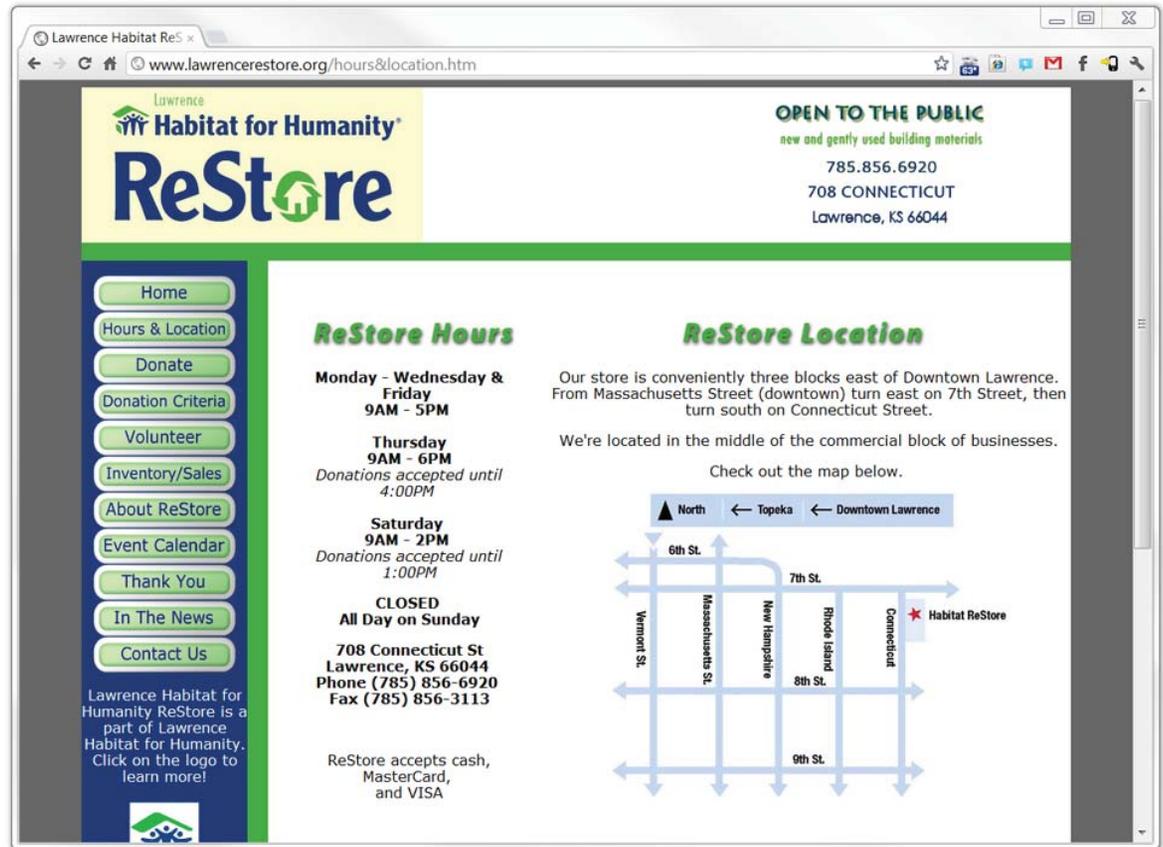


existing virtual space

hours & location page

pros
hours listed
simple map is helpful

cons
poor graphic layout
- lack of visual hierarchy
- no current page heading /
highlight on nav



existing virtual space

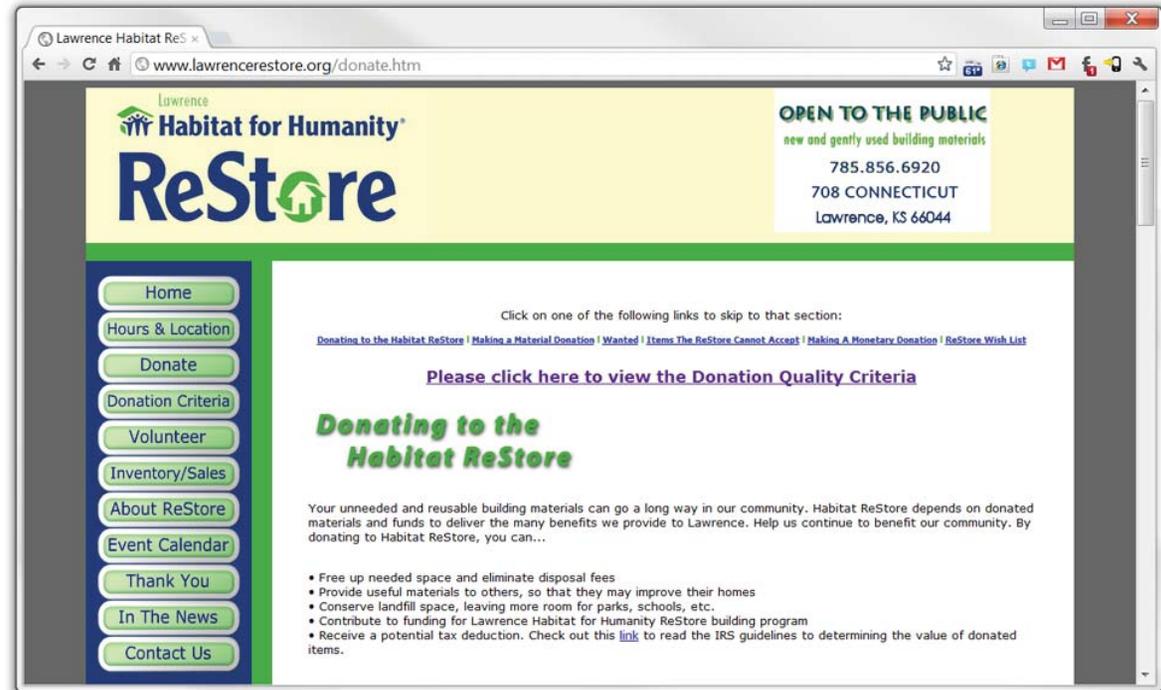
donations page

pros

- simple overview of donations
- criteria for acceptance

cons

- poor graphic layout
- lack of visual hierarchy
- no current page heading / highlight on nav
- low dynamic user interaction



existing virtual space

donations page (cont'd)

pros
instructions listed

cons
confusing process

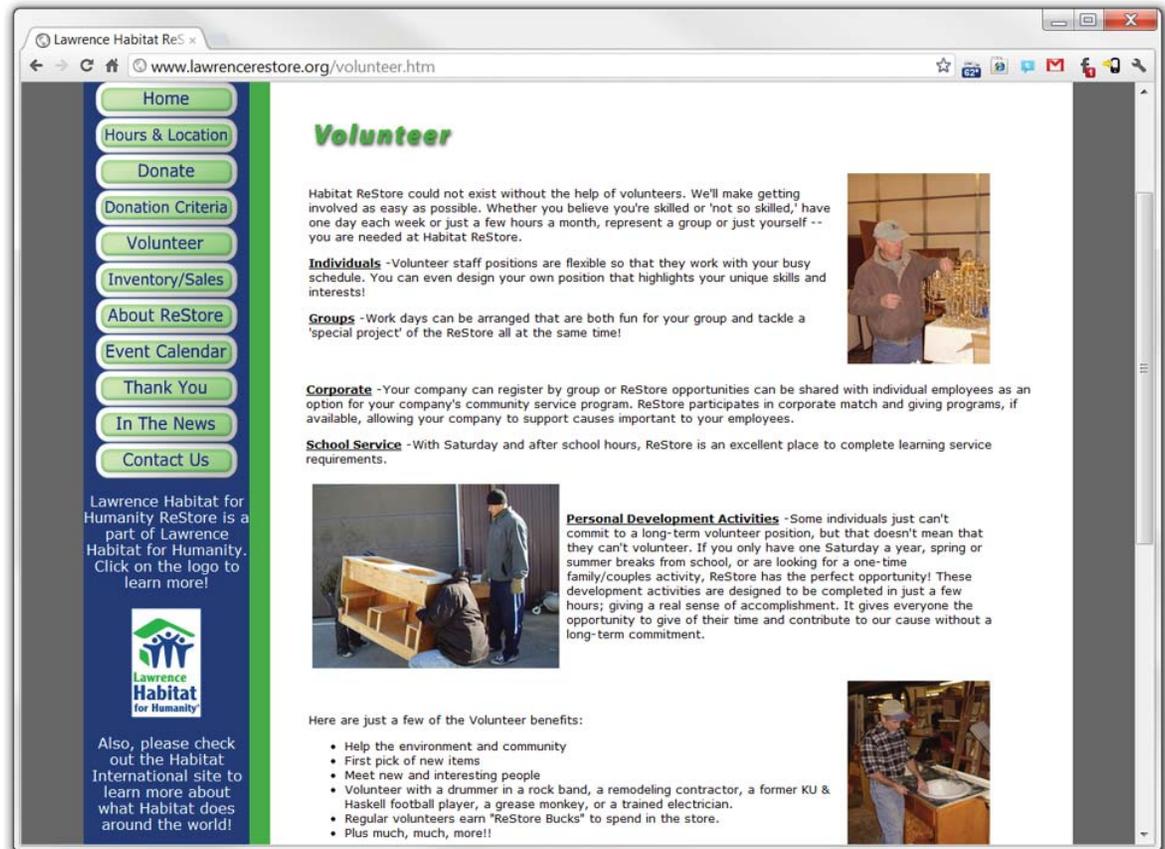
The screenshot shows a web browser window with the URL www.lawrencerestore.org/donate.htm. The page is titled "Making a Material Donation" and provides instructions for donors. On the left side, there is a blue sidebar with the Lawrence Habitat for Humanity logo and text: "Lawrence Habitat for Humanity ReStore is a part of Lawrence Habitat for Humanity. Click on the logo to learn more!" Below this, it says "Also, please check out the Habitat International site to learn more about what Habitat does around the world!" and "The ReStore gladly accepts cash, checks, MasterCard, and VISA". The main content area is white with a green header. It includes a paragraph: "Habitat ReStore accepts new and used building-related materials from contractors, suppliers, individuals, remodelers and property managers. Some materials are used directly in the construction of Habitat homes, but most are offered to the general public to purchase at reduced prices. [Here is a listing](#) of some of the generous companies and individuals who have donated materials so far." The page is divided into three steps: **Step 1**: "When you have good, reusable or new materials, give us a call at (785) 856-6920. You will be asked for a description of the materials as well as your contact information. We prefer that donors include delivery of the materials to the store as part of their donation, so please indicate if you are able to deliver your donation to the Habitat ReStore when you call." **Step 2**: "Your call will be returned to determine if we are able to use your donation and to schedule a drop off time or collection time, if necessary." **Step 3**: "If Habitat ReStore is picking up donated items, we will call the day before to confirm the pick-up. For the safest, most efficient pick-ups, please follow these guidelines:" followed by a bulleted list: "• Have all materials available on ground level (i.e. garage or driveway)", "• Please mark all items 'Habitat ReStore'", "• Absolutely no hazardous materials", and "• We are unable to haul away trash". There are three images: one showing two people at a car, one showing a Habitat ReStore truck, and one showing a Habitat ReStore logo.

existing virtual space

volunteer page

pros
basic volunteer information listed

cons
confusing to read through
poor informational hierarchy

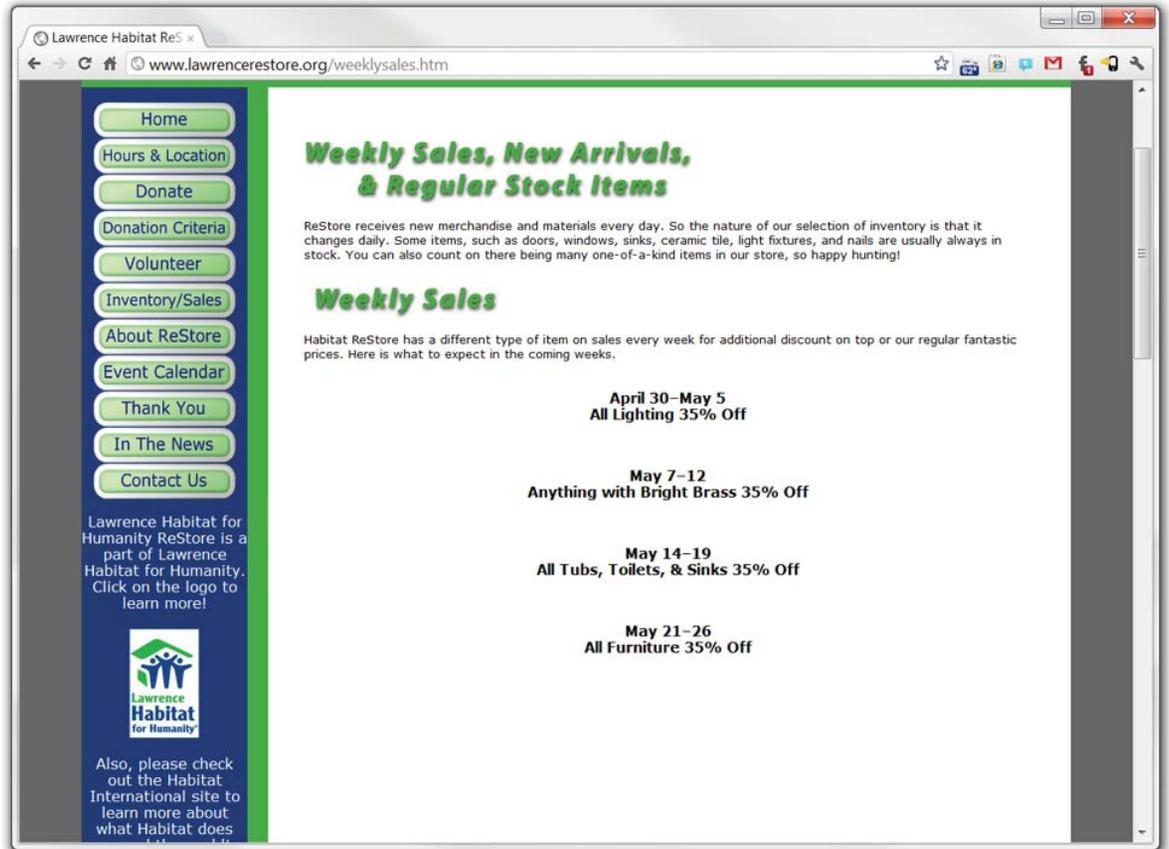


existing virtual space

inventory page

pros
listing of weekly sales

cons
no sub-navigation for inventory
no individual listings

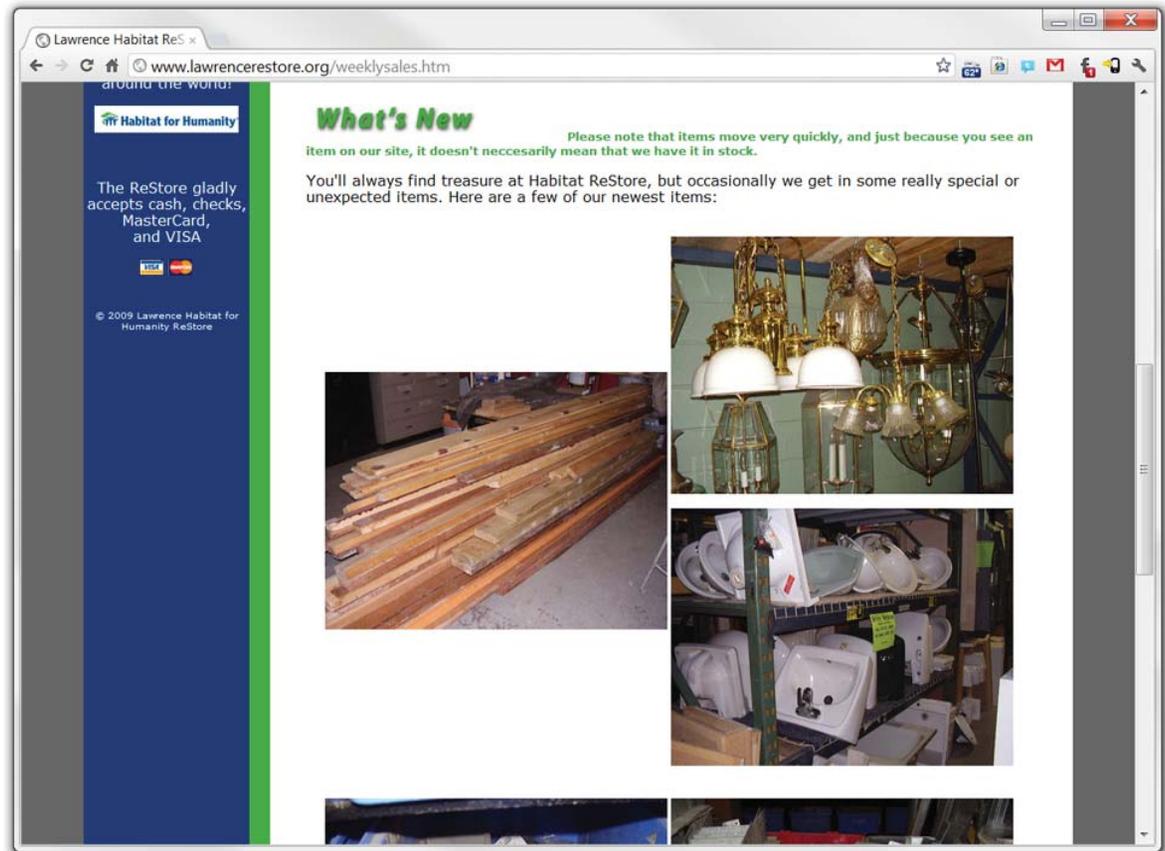


existing virtual space

inventory page (cont'd)

pros
photos

cons
photos aren't actual inventory
no individual listings of product

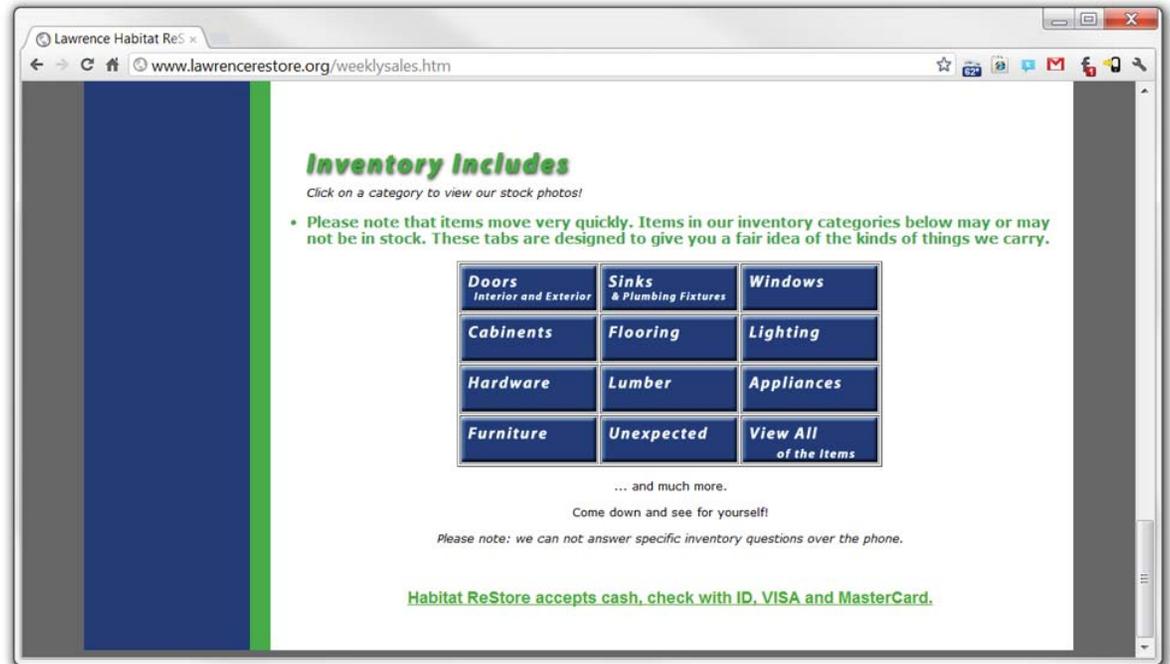


existing virtual space

inventory page (cont'd)

pros
inventory listing

cons
what looks like button field is only a
table of inventory selections



potential virtual space

possibilities

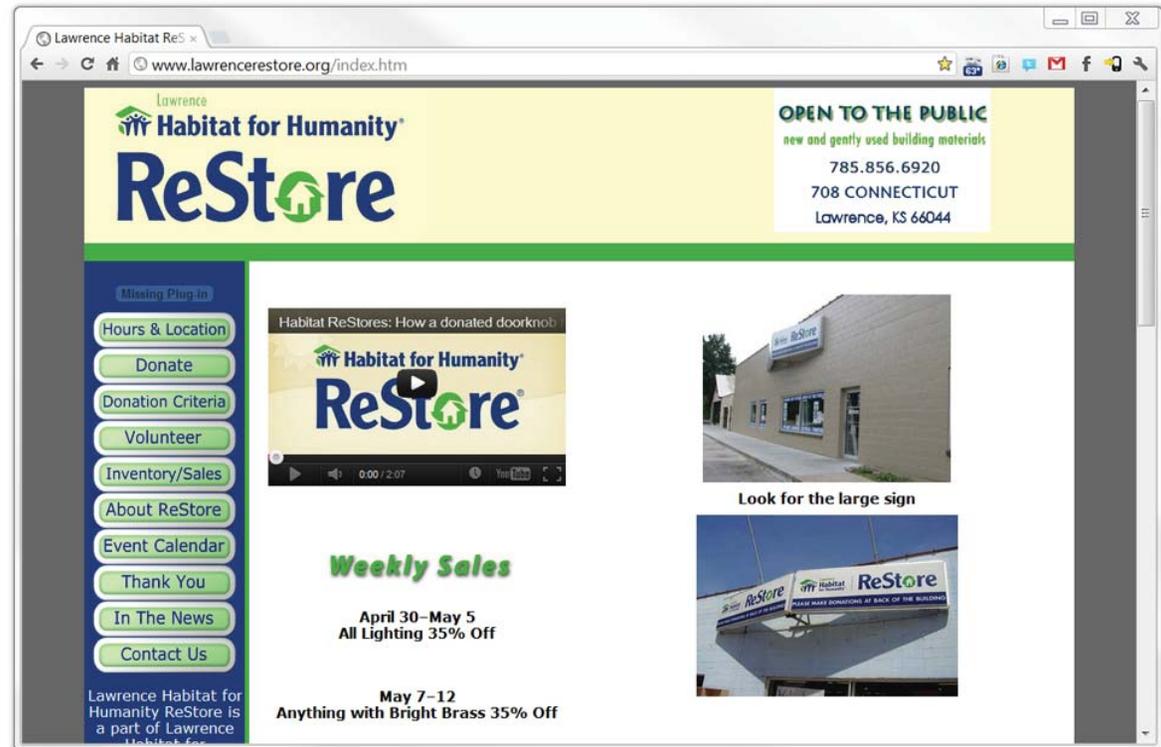
improved donations page

new location / map feature

new login feature for employees, volunteers,
& customers

improved inventory page

index page



potential virtual space

improved donations page

possibilities

pre-donation

customer fills out form online & submits pic of items

drop off donation / donation pick up

paper forms sync with computer forms

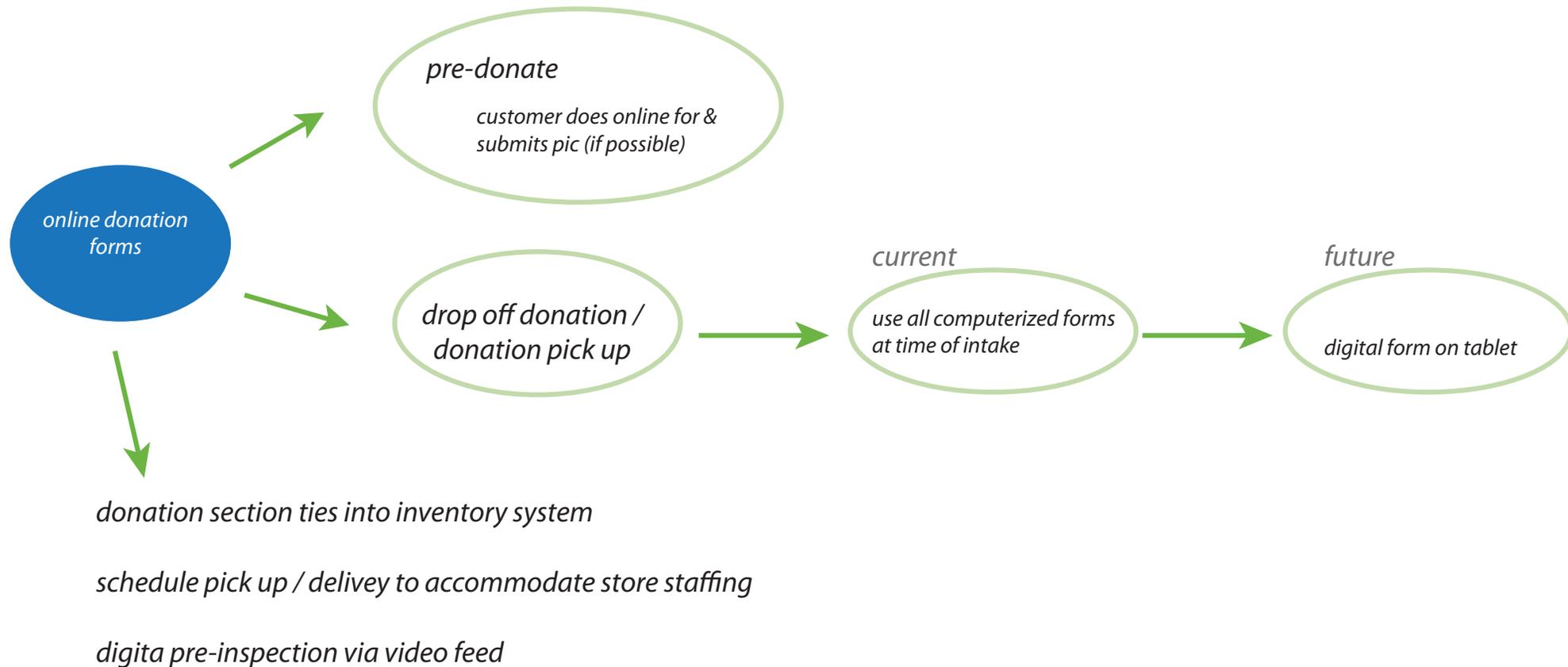
online pick up & drop off scheduling

digital pre-inspection via video feed

potential virtual space

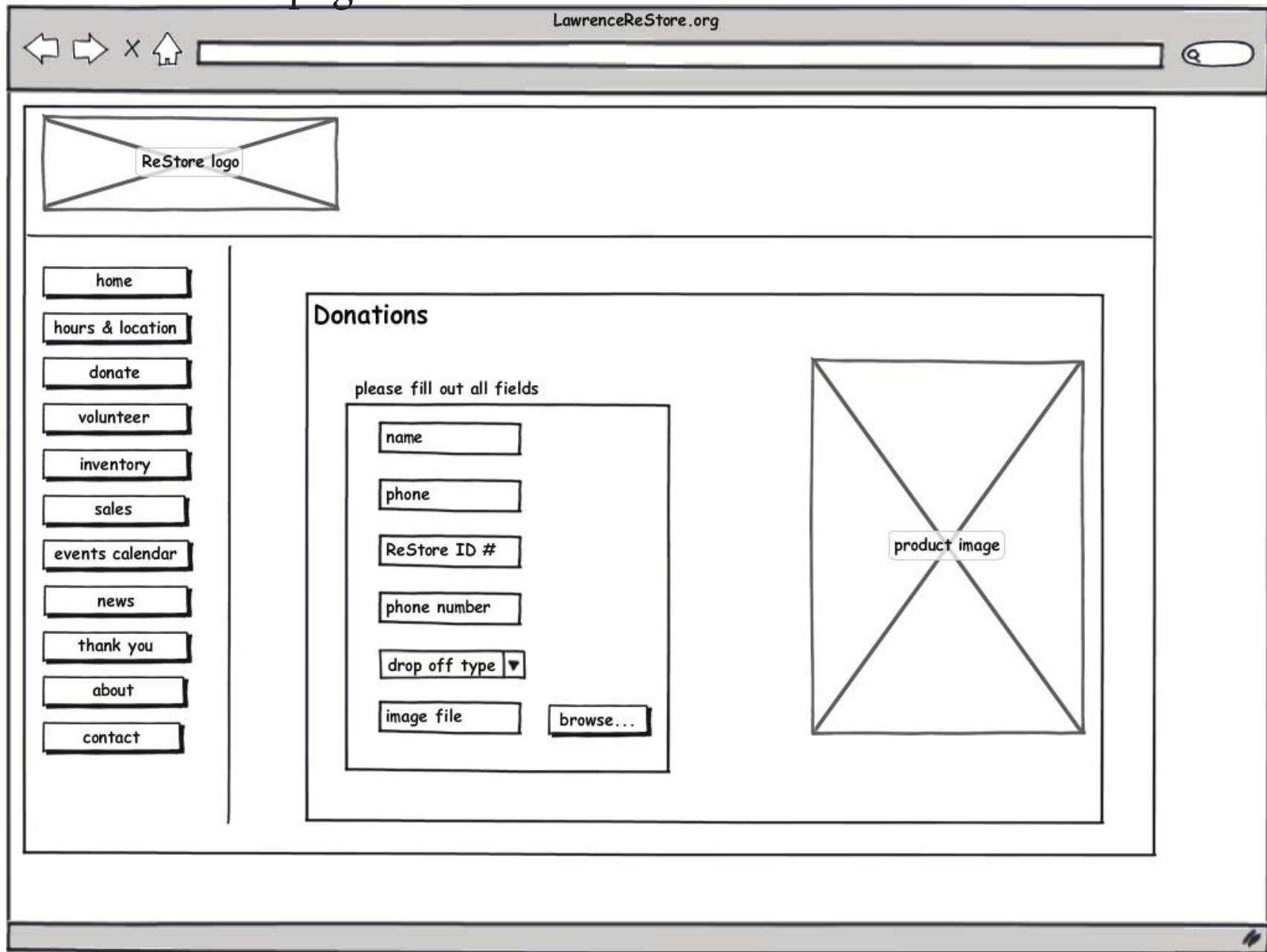
improved donations page

possibilities



potential virtual space

improved donations page



potential virtual space

new mapping page

possibilities

show rough materials location

show local ReStore

- shows other ReStores in area

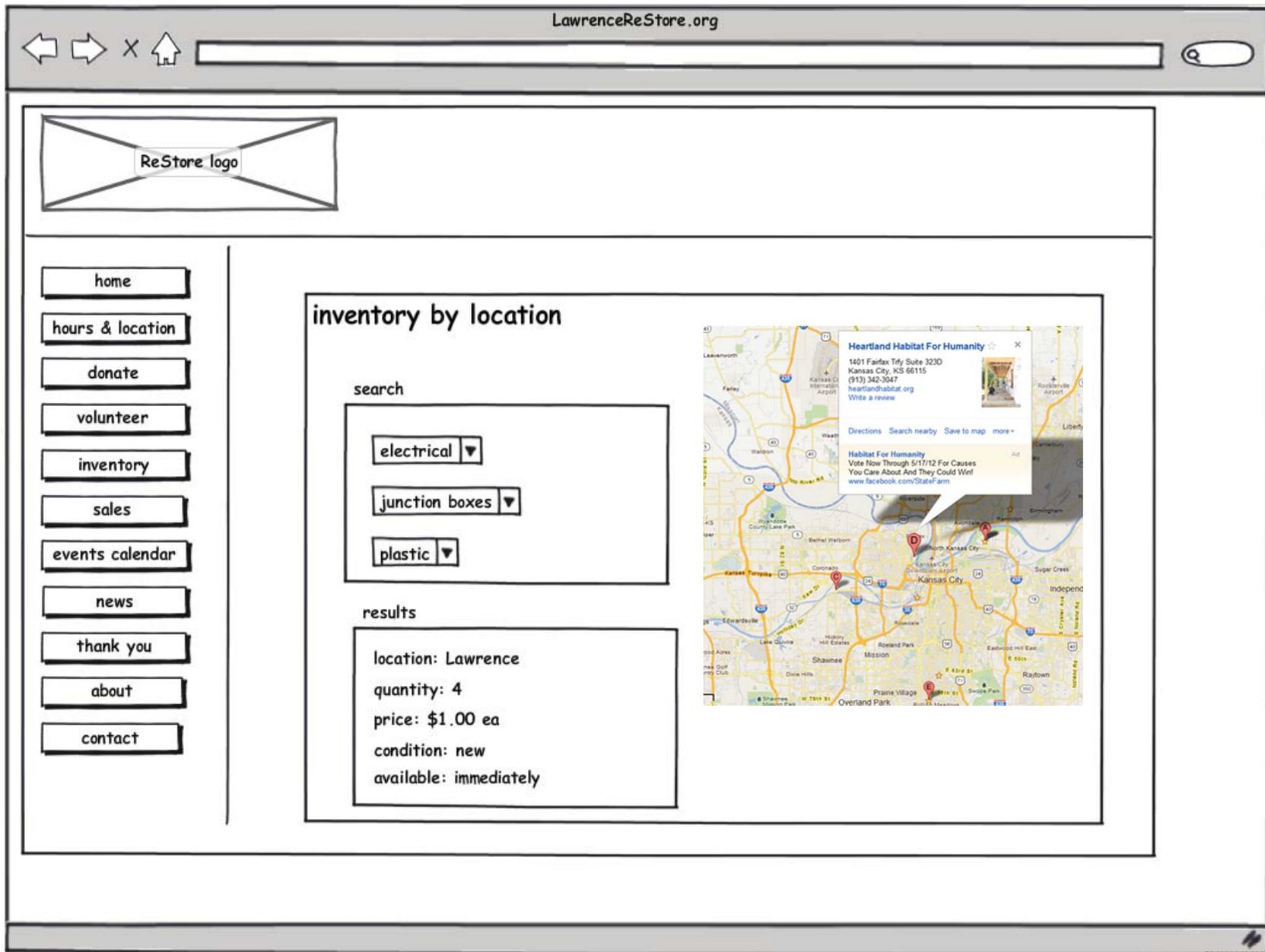
- sync with phone or GPS to direct

shows other local resources

- Habitat for Humanity offices

potential virtual space

improved map page



potential virtual space

other web solutions

help & info sources

“how to” section

basic calculators

“projects” section for possible uses of reclaimed materials

“building with reclaimed” section - how they are used

basic construction information

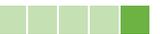
intro

research

development

solutions

next steps



possible next steps

Submit to Habitat ReStore for possible implementation.

Take findings and create own offering.

Submit findings to other non-profit for possible implementation.

Thank You.

