

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

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Chairperson: Richard Branham

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Date Defended: 16 April 2012

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

FURTHERING THE RECLAIMED MATERIALS EXPERIENCE

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Chairperson: Richard Branham

Date approved: 07 May, 2012

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[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*

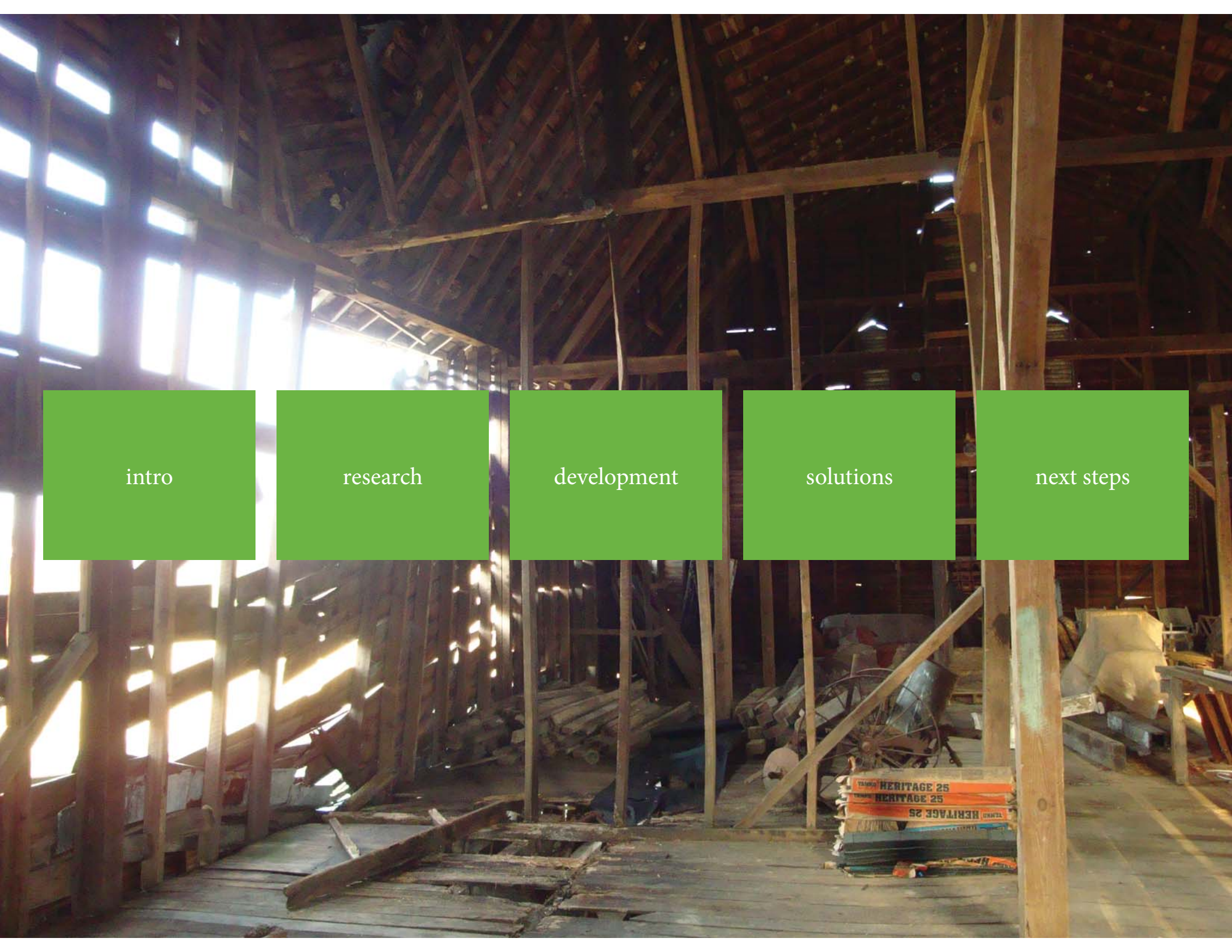
## **Committee**

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.*

*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.*

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 ft<sup>2</sup> and 1,000 ft<sup>2</sup>), respectively, when demolished.

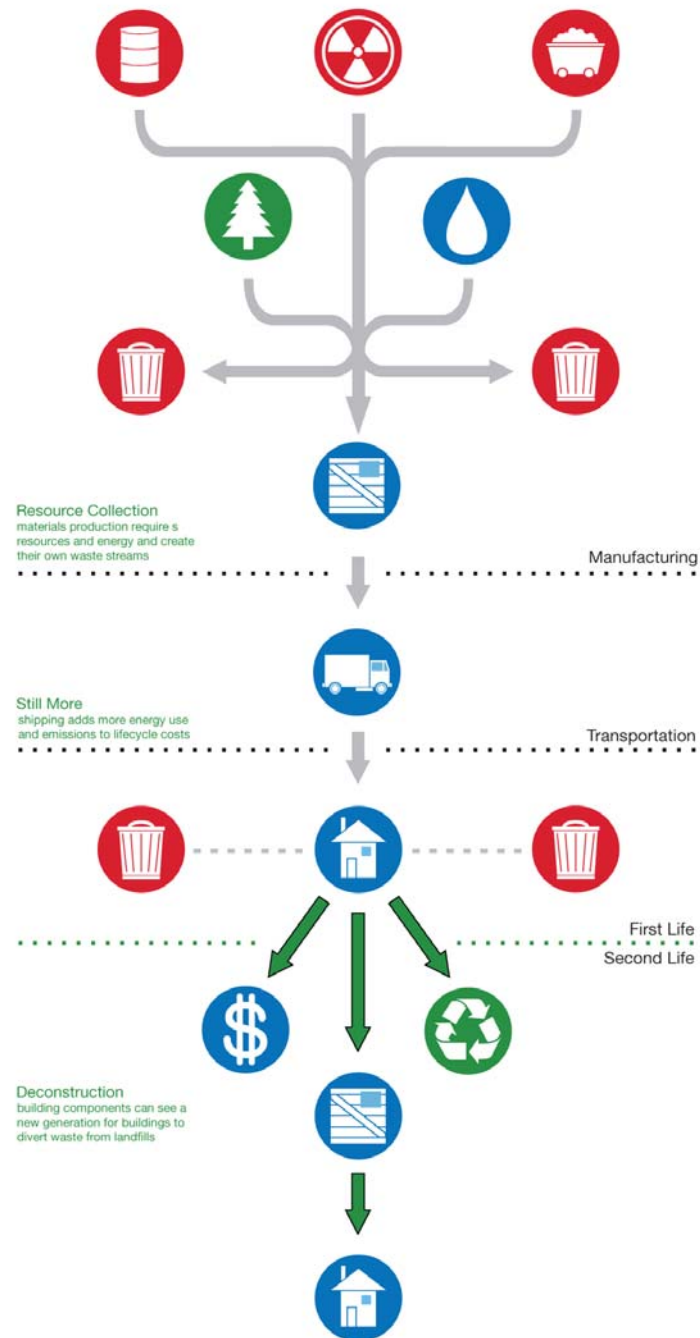


# where do these materials go?

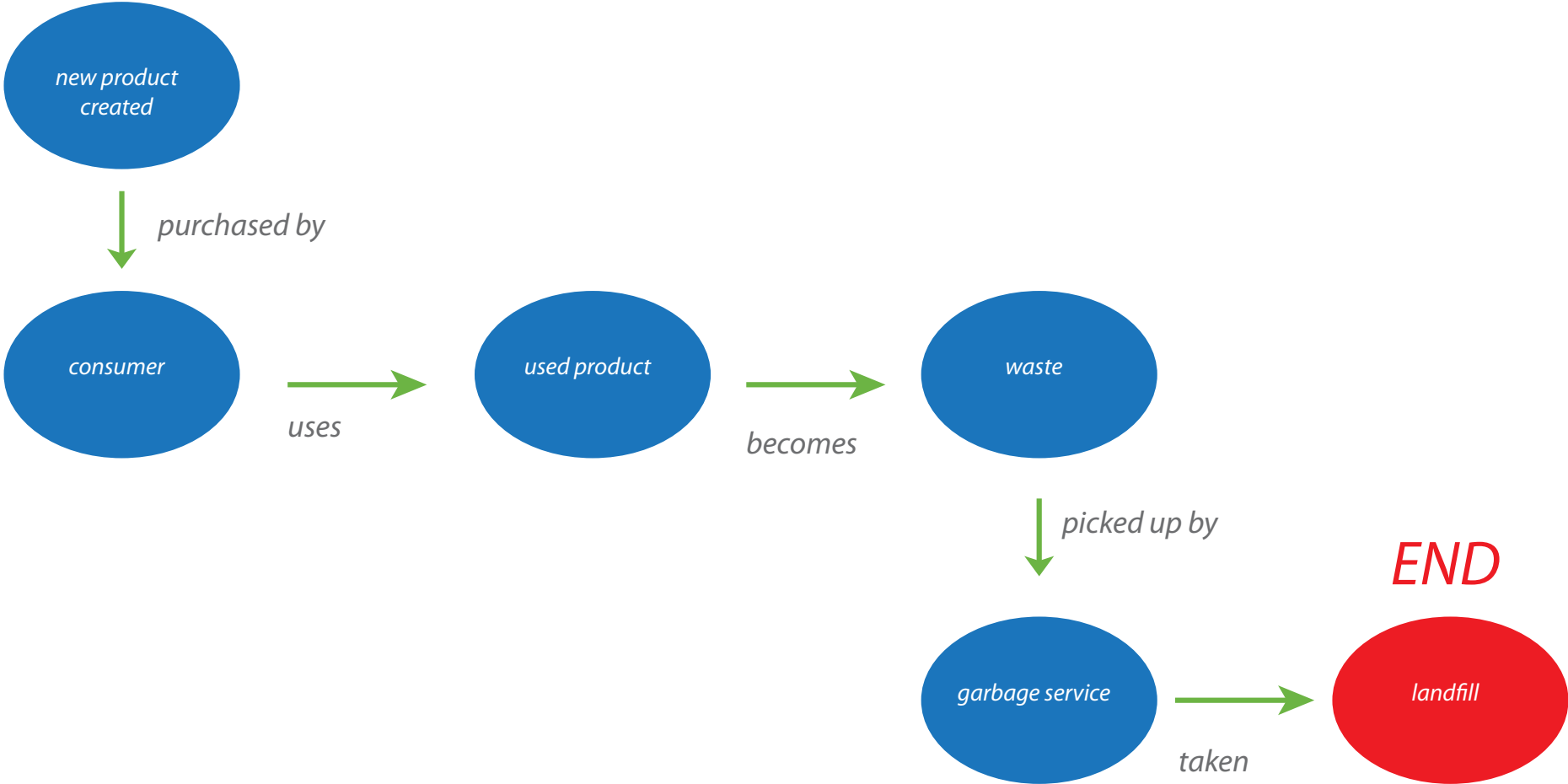
*landfill*

*recycling center*

# materials life cycle



# landfill cycle



# *landfill cycle*

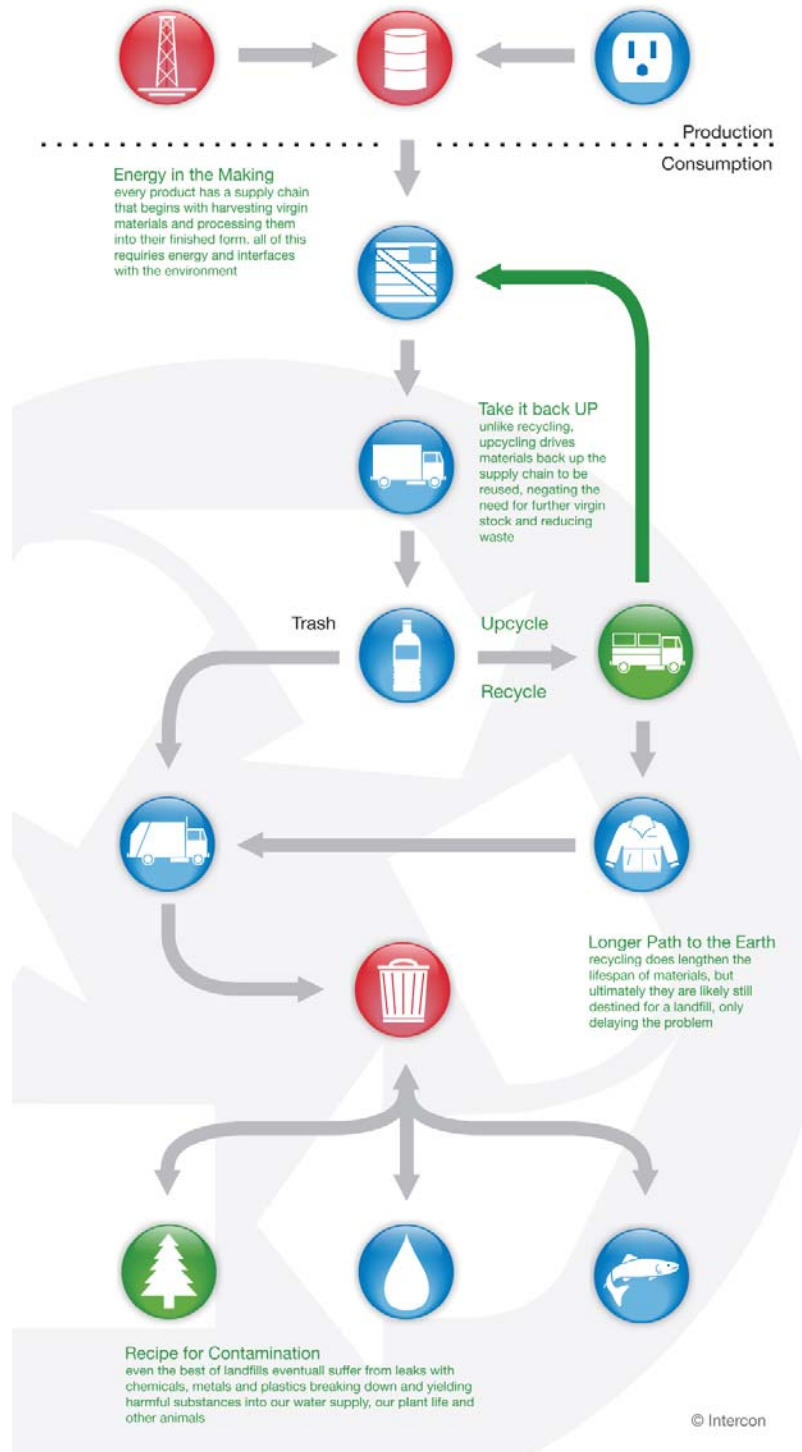
## *Why do people use this model?*

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

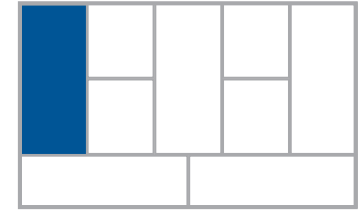
*What unique service do they provide that generates revenue?*

# The Business Model Canvas

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

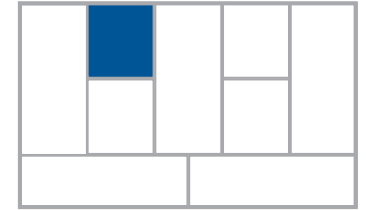
Donors:

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

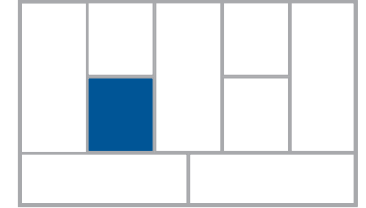
The ReStore's main task is the sale of items in a retail outlet, which supports their parent organization, Habitat for Humanity. Without keeping a well-stocked retail inventory, they would be unable to do this.

## 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

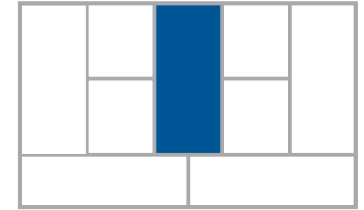
The regular paid staff runs the day-to-day operations. A steady flow of volunteers is crucial to assisting the staff and making the store run.

## 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

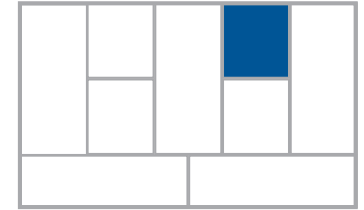
With a constant flow of new donations occurring, customers know to constantly return to see what new materials have shown up.

## 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.

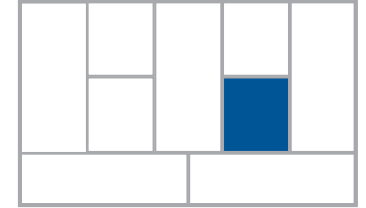
## communities

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.

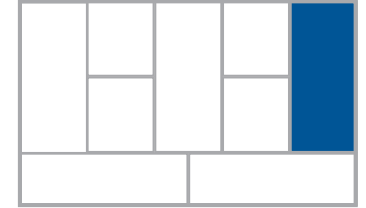
## physical

- 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

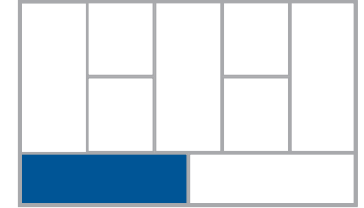
## high volume buyer

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

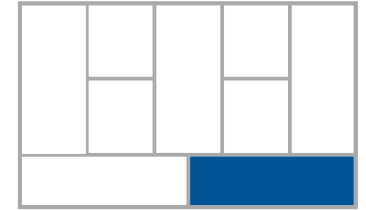
Larger donations allow ReStore to stock more valuable merchandise, which provides them with a steadier revenue stream.

## 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*

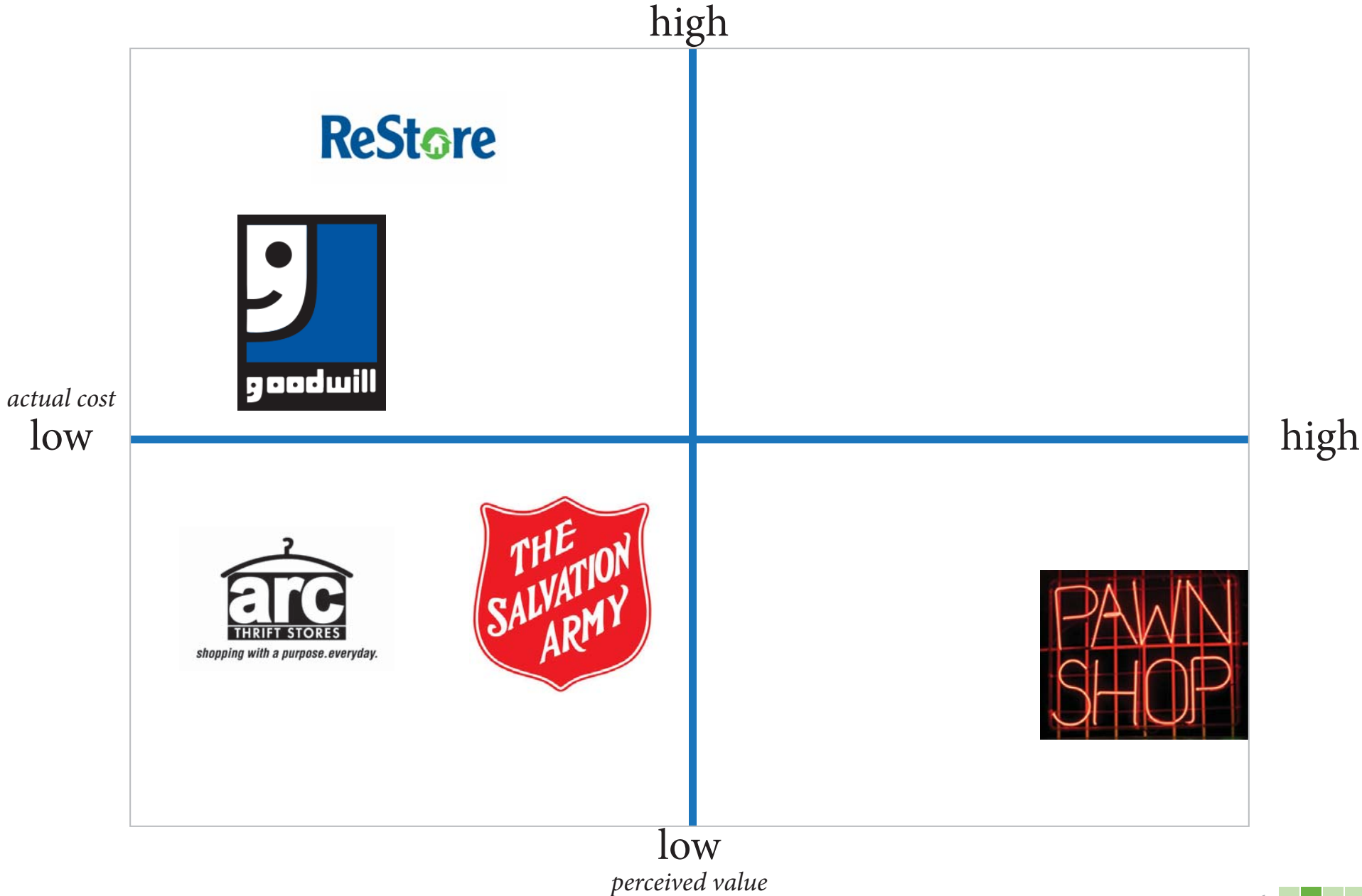
## asset sales

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

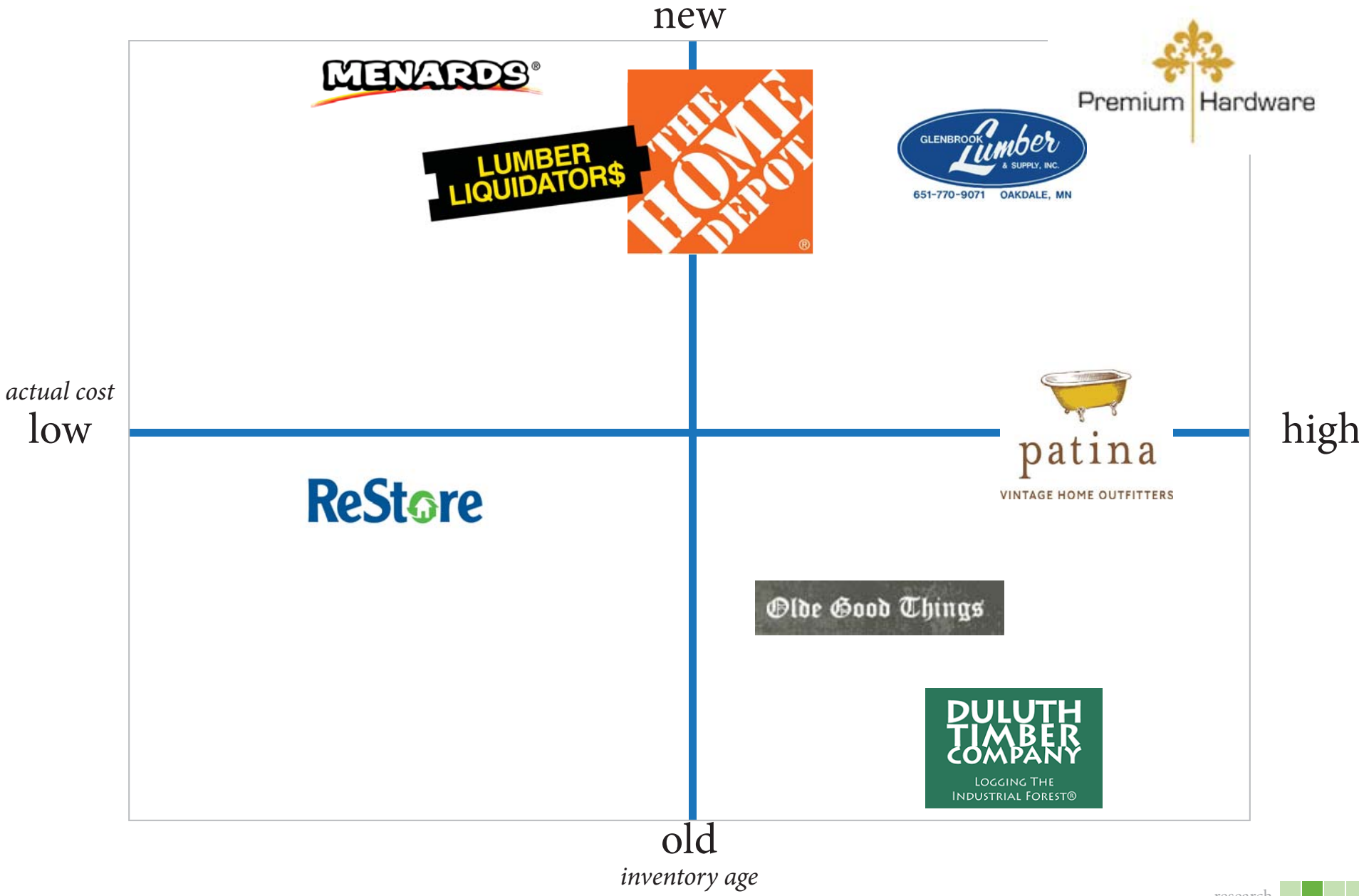
## monetary donations

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
<b>occasional shopper</b>	The customer who stops in 1-2 times per month. They almost always purchase something during their visit. Average spending: \$40
<b>window shopper</b>	The customer who stops in at least once per week, but only buys something around 20% of the time. Average spending: \$8
<b>frequent buyer</b>	The customer who stops in 1-3 times per week and buys something at least 50% of the time. Average spending: \$5-15
<b>high volume buyer</b>	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

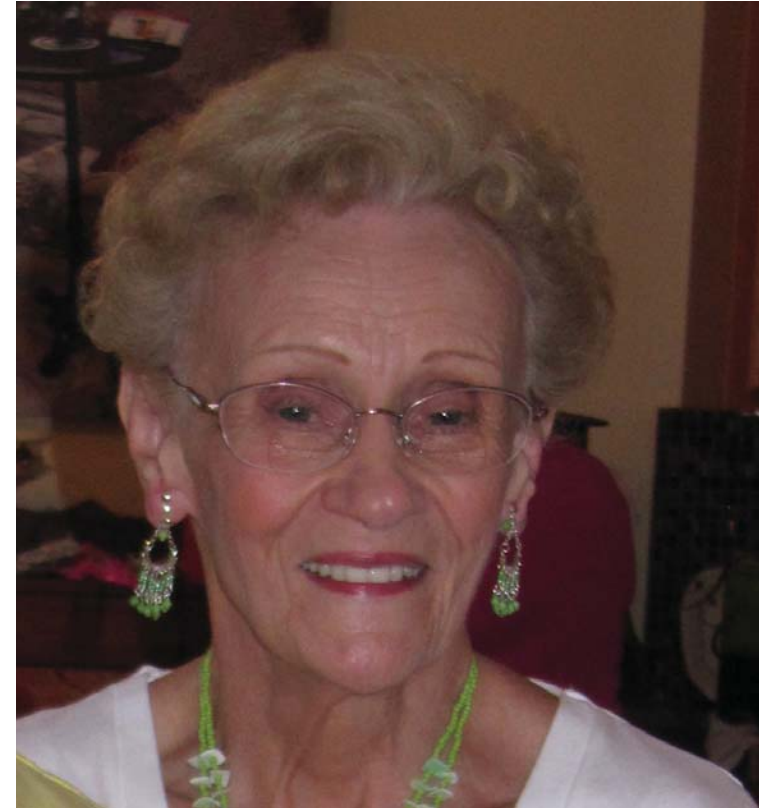
occupation: retired

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
<b>organized inventory</b>	A cleaner store layout that has clearly marked sections and legible signage.
<b>extended retail experience</b>	A way to connect with the store beyond the physical space, possibly through an improved website or better advertising.
<b>live inventory</b>	A way to check the store's inventory from your computer or phone, saving you time and money.
<b>greater reach</b>	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

	<b>occasional shopper</b>	<b>window shopper</b>	<b>frequent buyer</b>	<b>high volume shopper</b>
<b>organized inventory</b>				
<b>extended retail experience</b>				
<b>live inventory</b>				
<b>greater reach</b>				

# 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

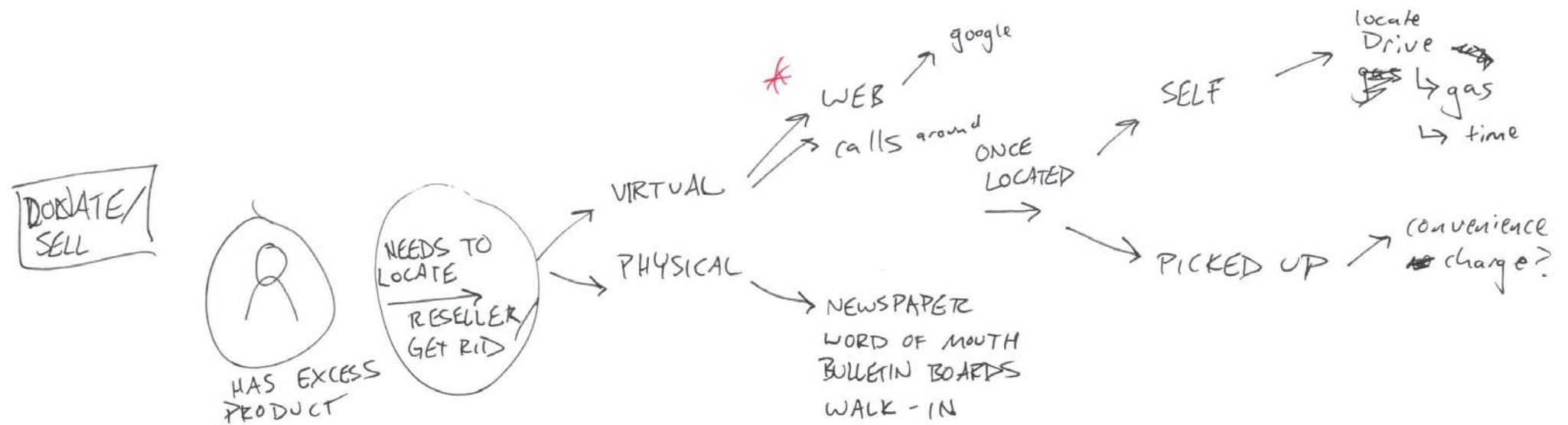


# experience mapping

*What does the customer go through?*

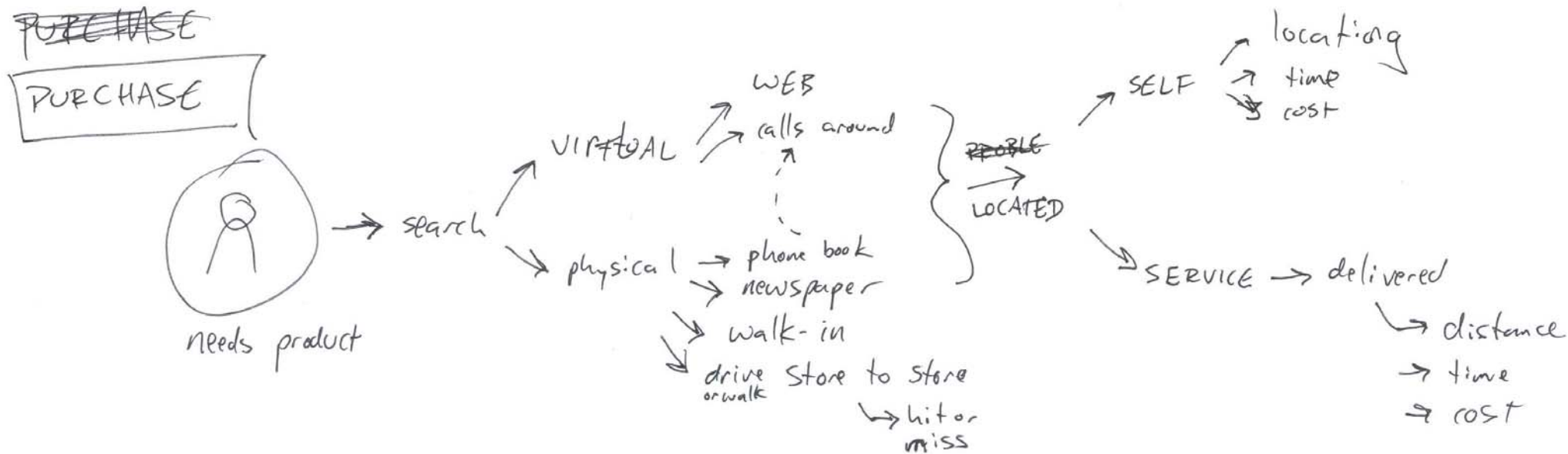
# customer experience

## 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

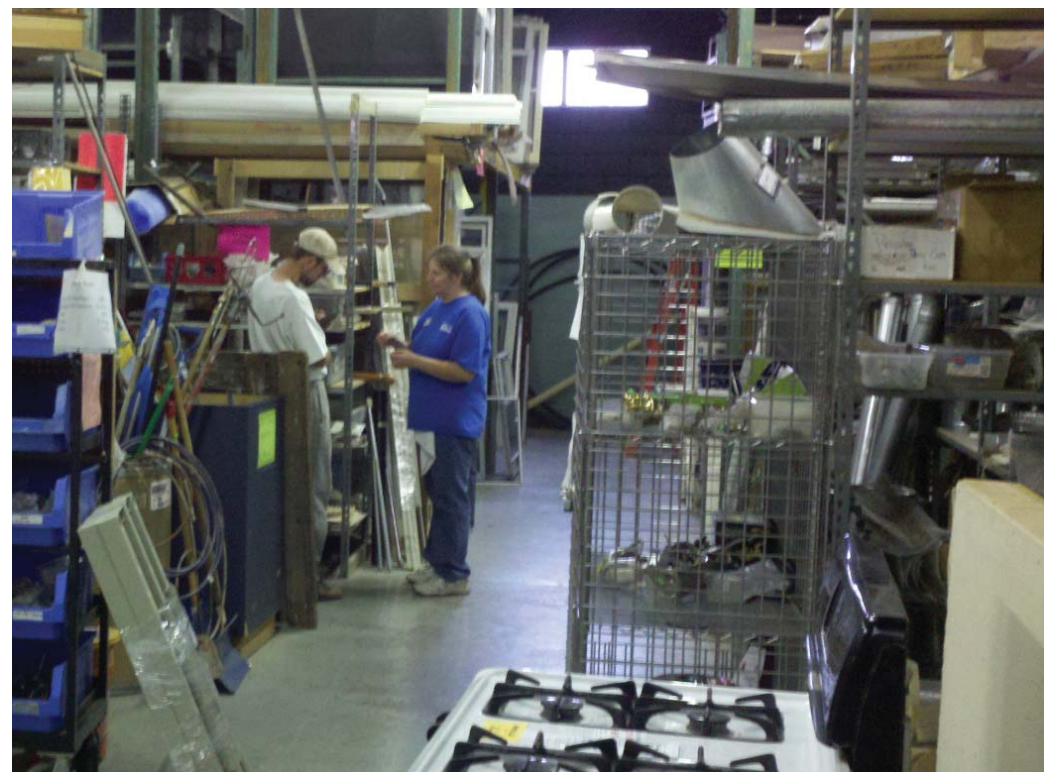
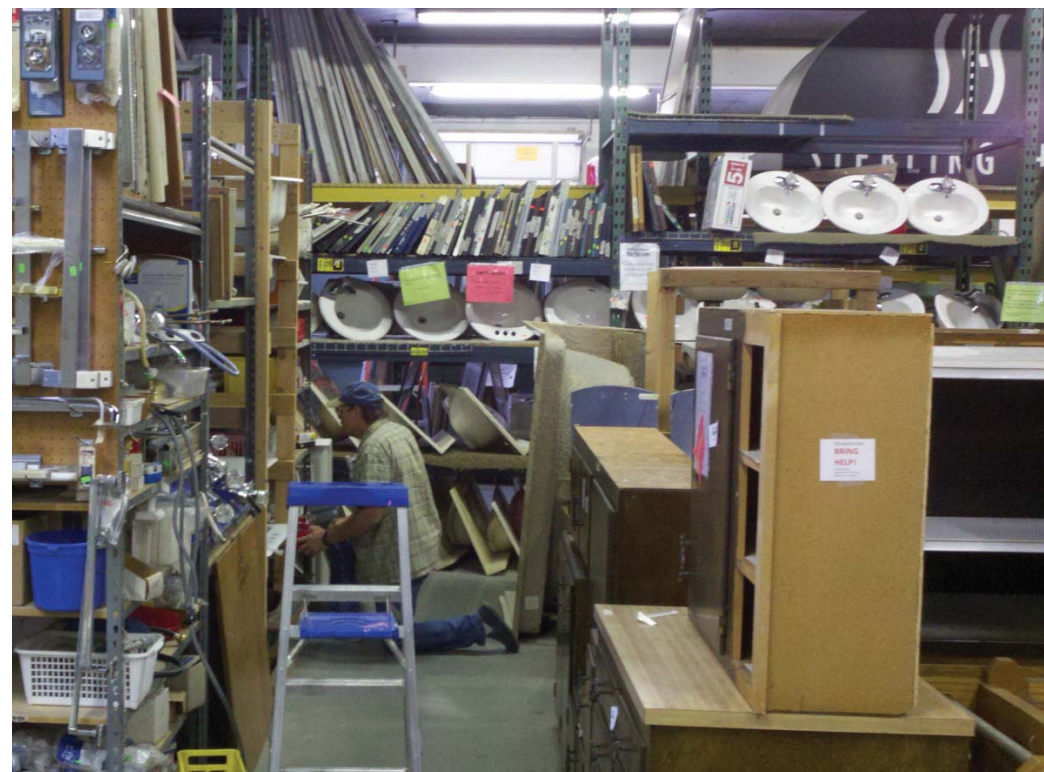


## cash / wrap

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*

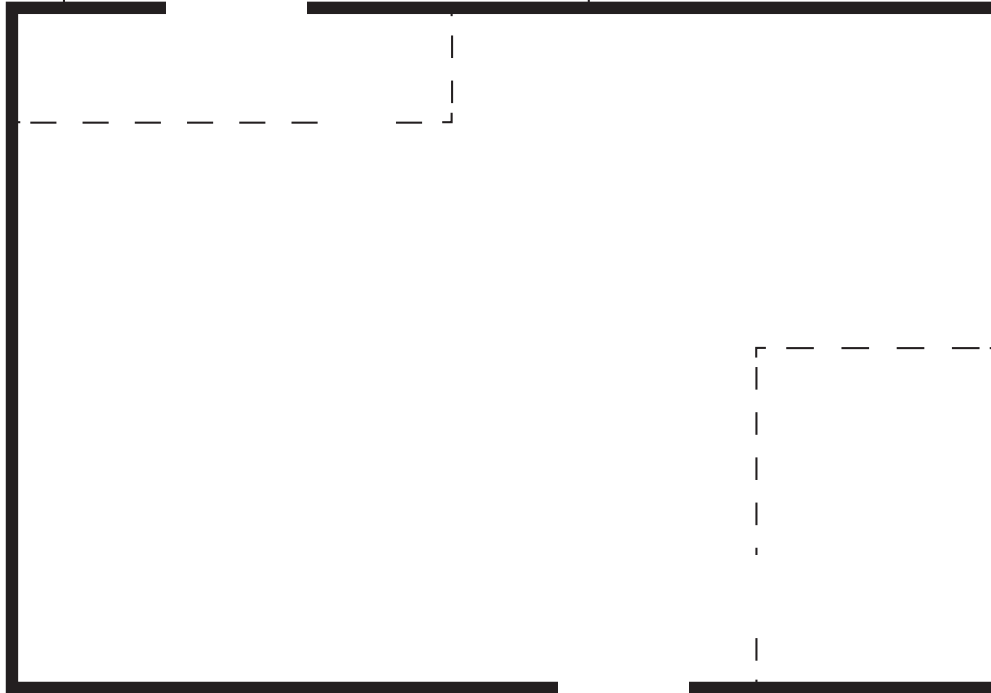
## donation intake

computerized inventory syncs with network  
standardize the process to improve efficiency



## sales floor

flexible architecture  
improved wayfinding  
better space planning & organization  
widened aisles



## cash / wrap

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

# existing virtual space

## index page

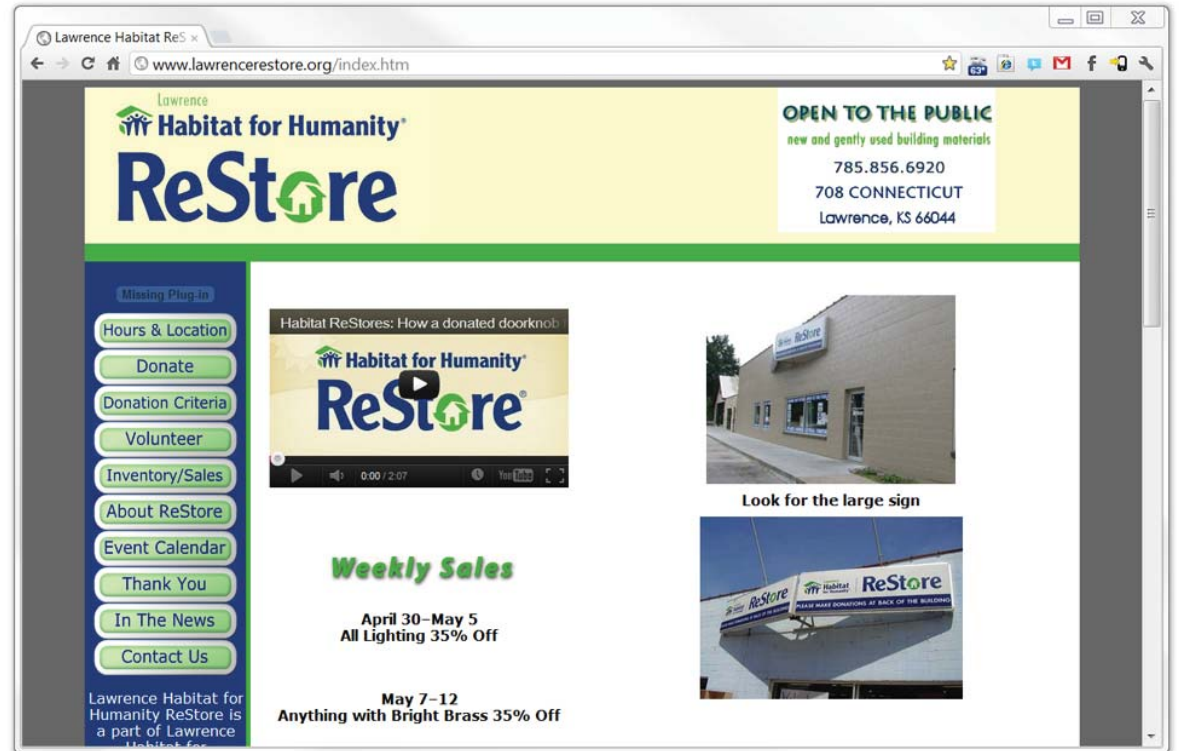
### pros

good navigation categorization

### cons

poor graphic layout

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

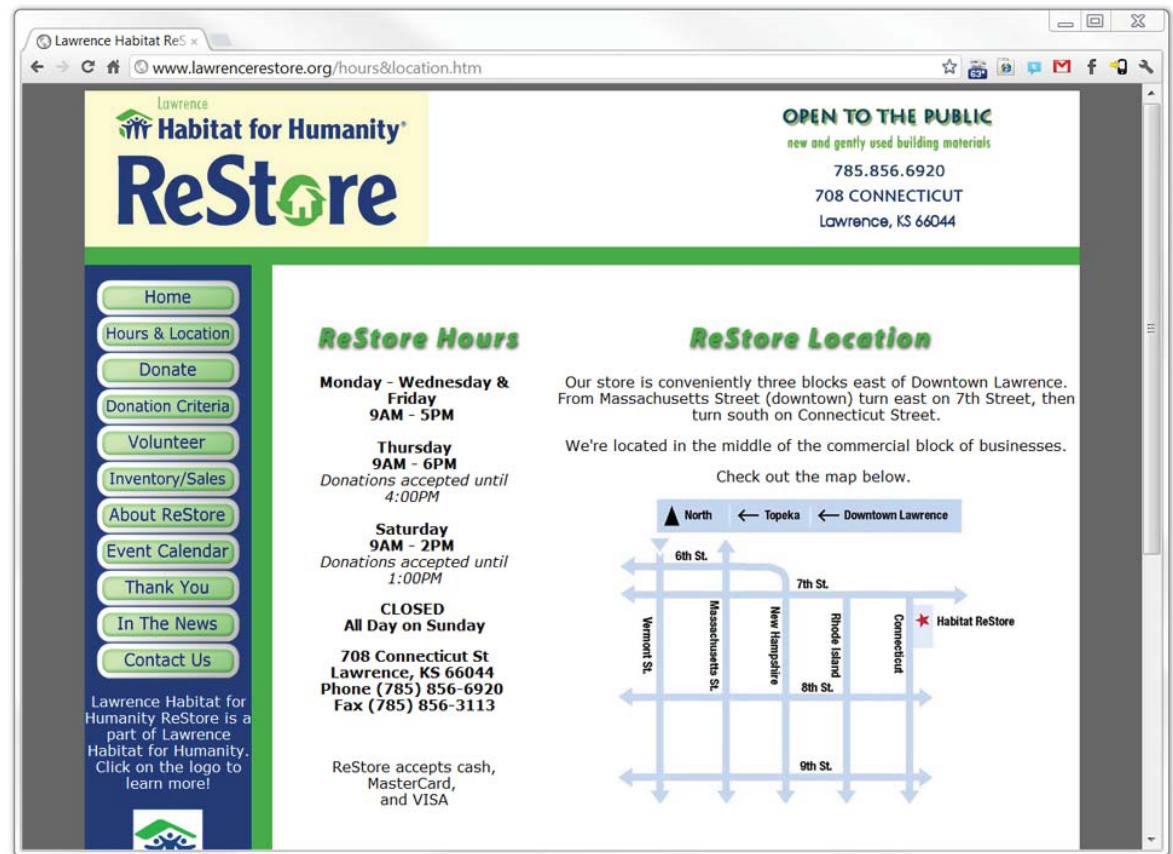


# existing virtual space

## 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

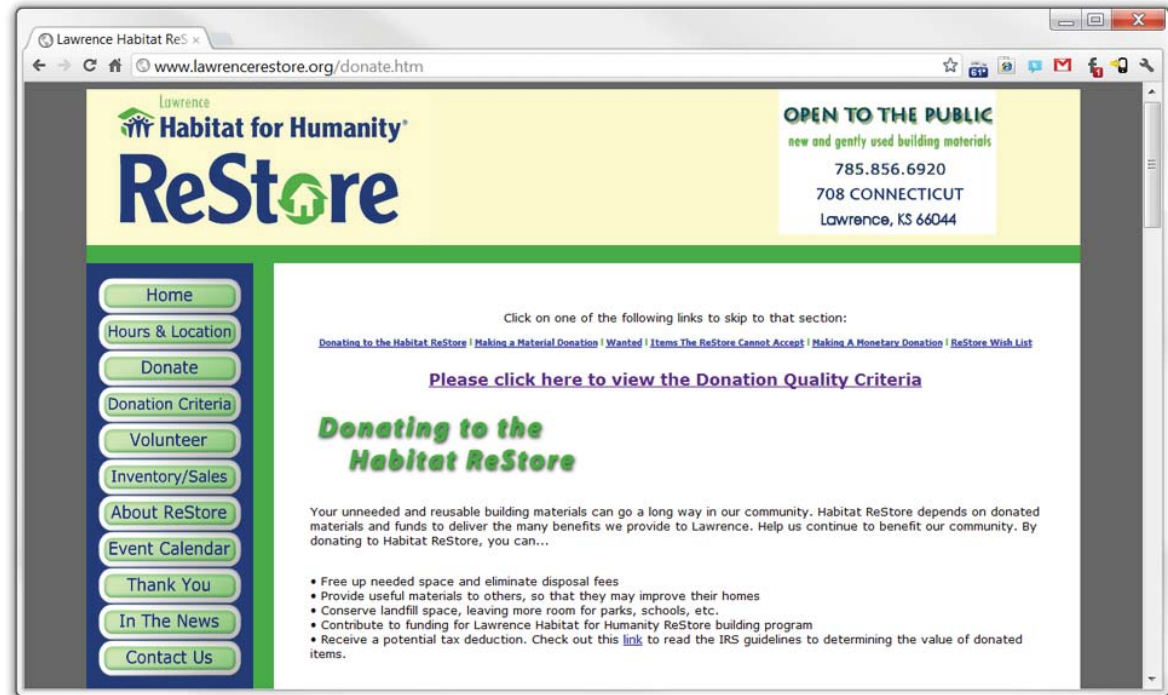
## donations page

### 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

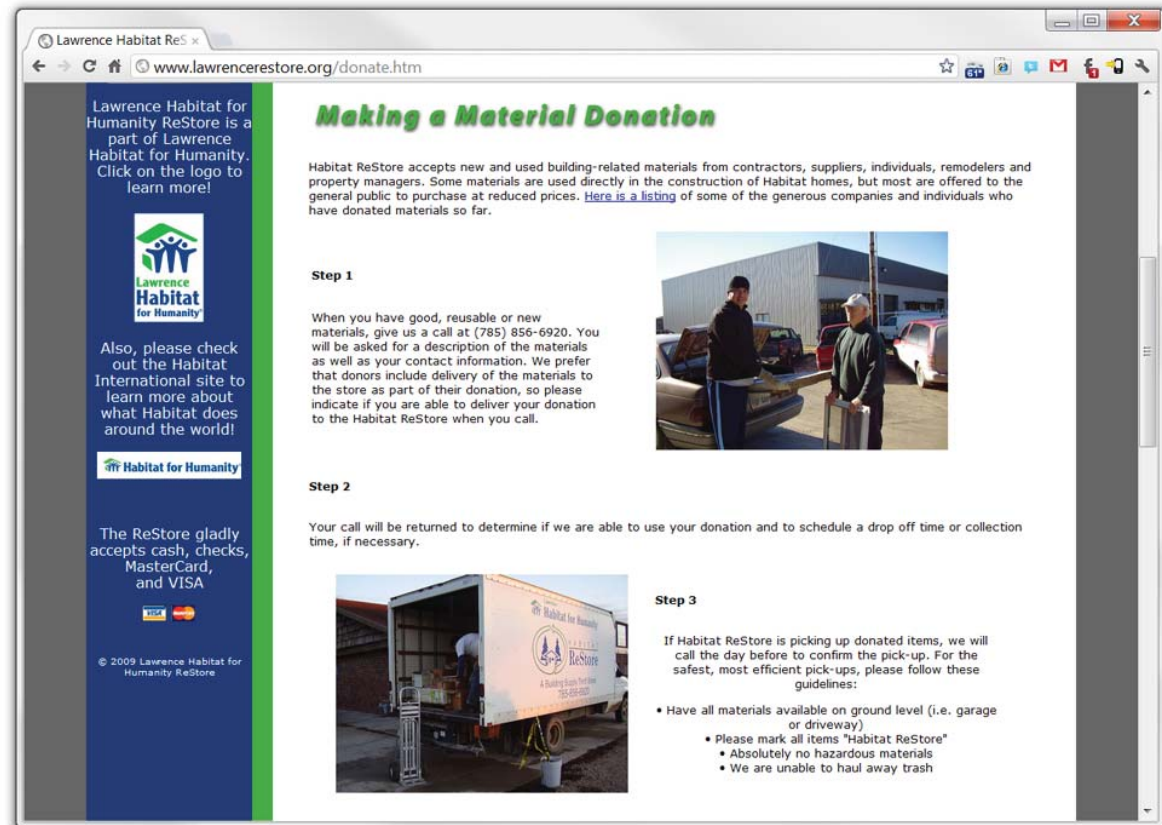


# existing virtual space

## donations page (cont'd)

pros  
instructions listed

cons  
confusing process

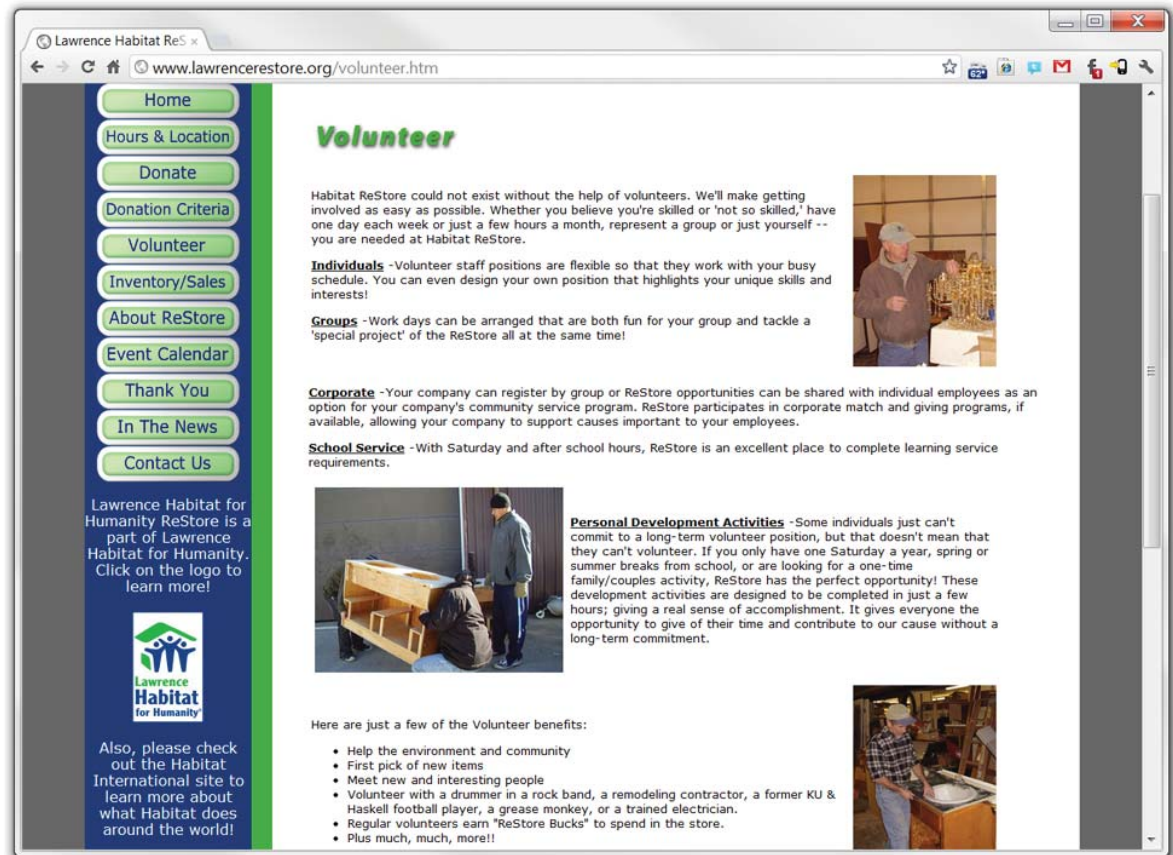


# existing virtual space

## volunteer page

pros  
basic volunteer information listed

cons  
confusing to read through  
poor informational hierarchy

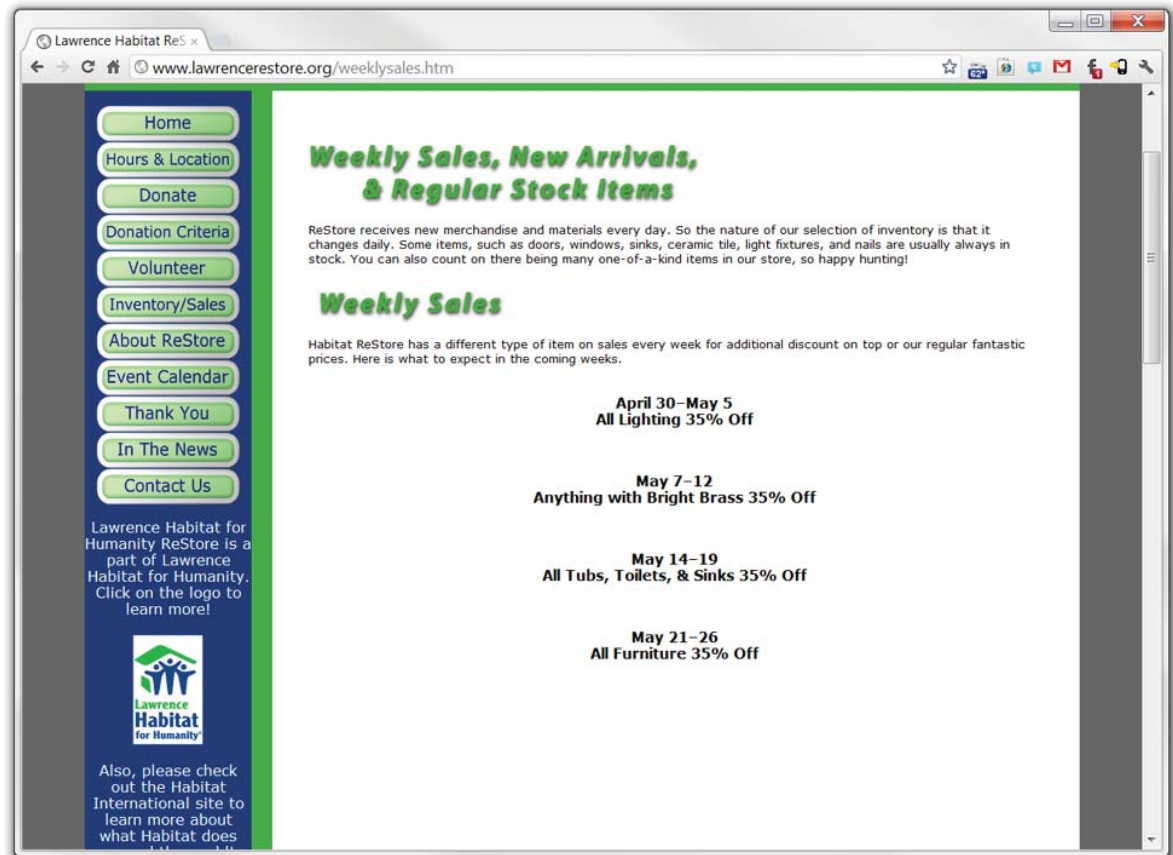


# existing virtual space

## inventory page

pros  
listing of weekly sales

cons  
no sub-navigation for inventory  
no individual listings

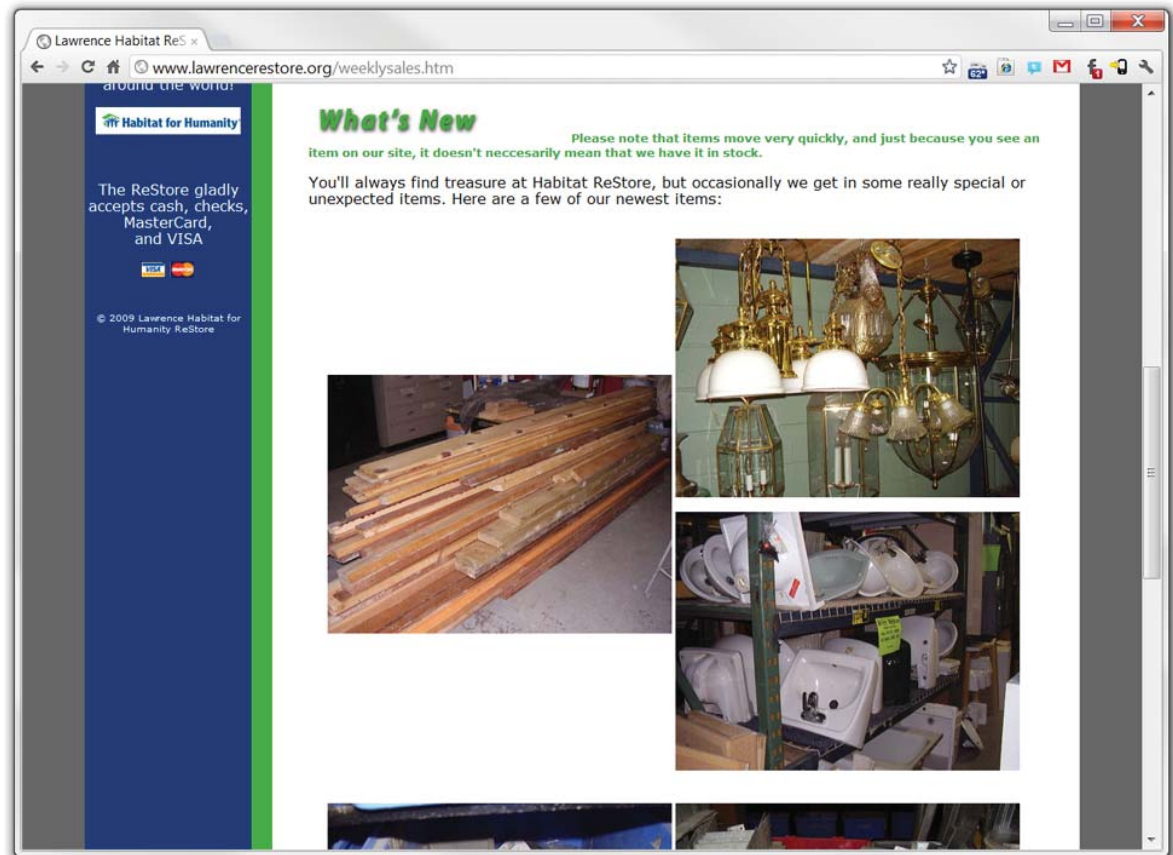


# existing virtual space

## inventory page (cont'd)

pros  
photos

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



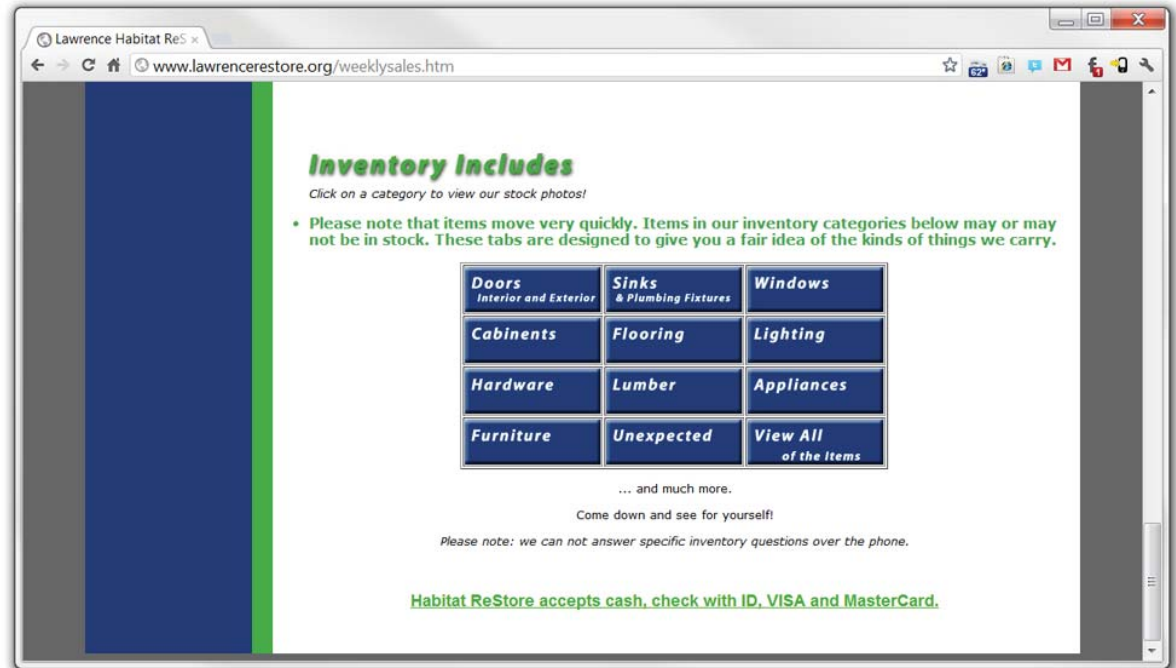


# existing virtual space

## inventory page (cont'd)

pros  
inventory listing

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



# potential virtual space

possibilities

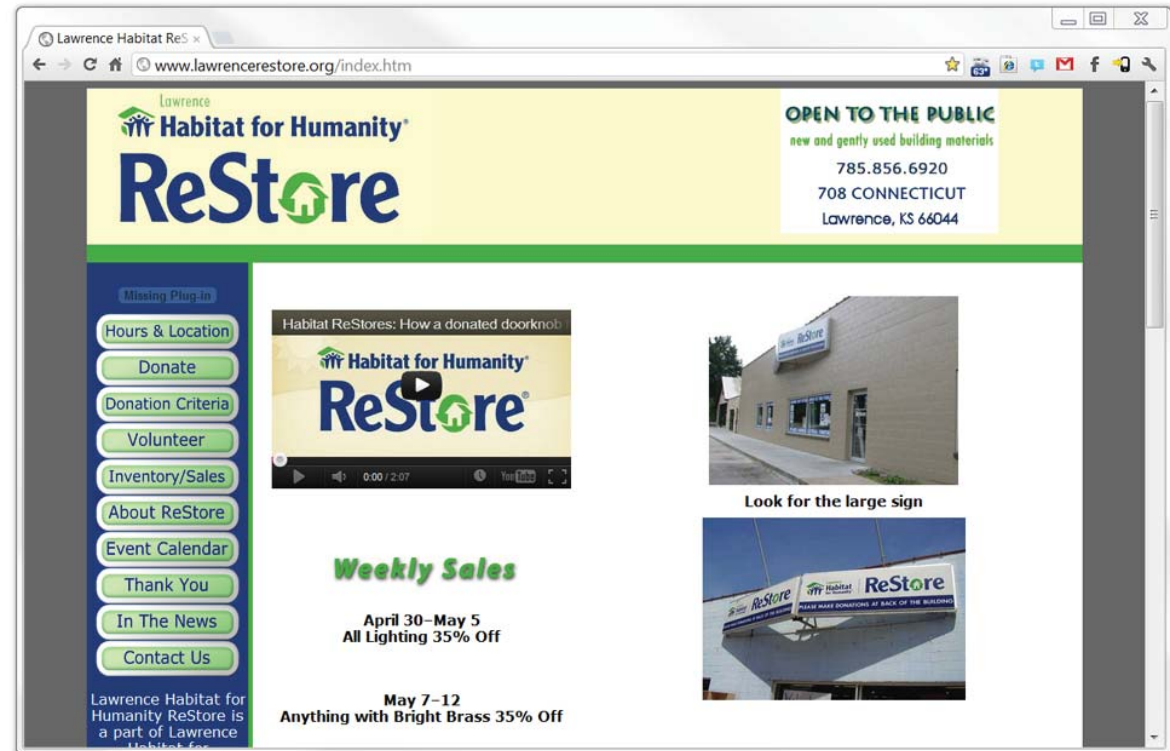
improved donations page

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

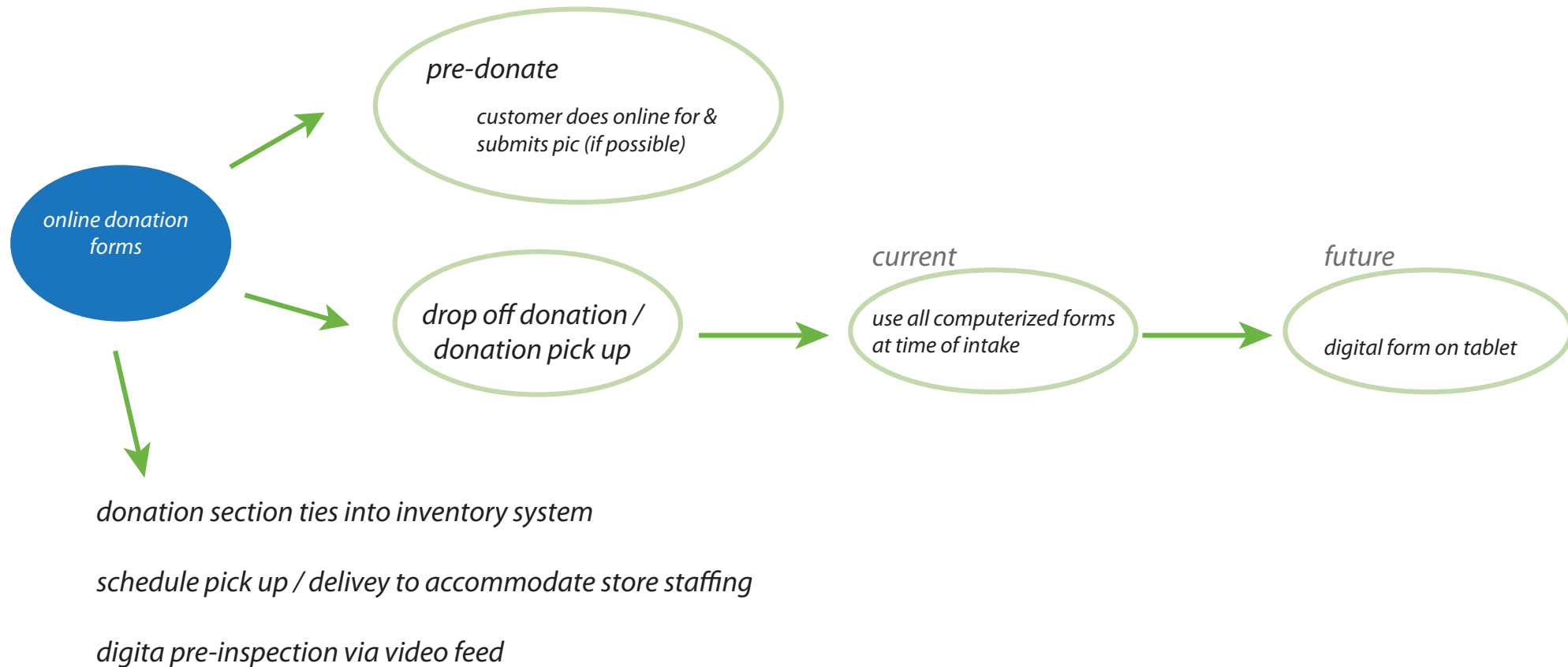
online pick up & drop off scheduling

digital pre-inspection via video feed

# *potential virtual space*

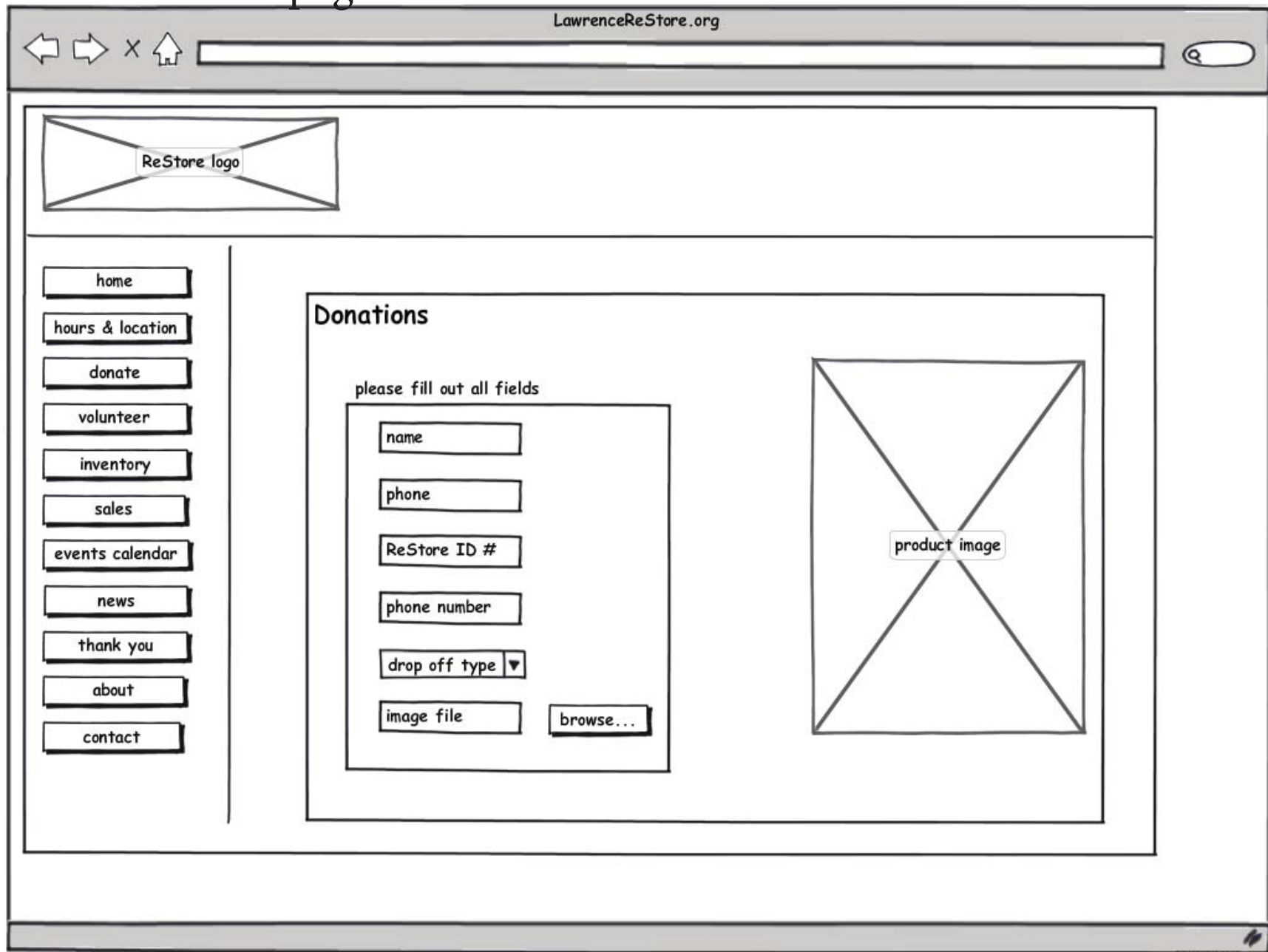
improved donations page

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

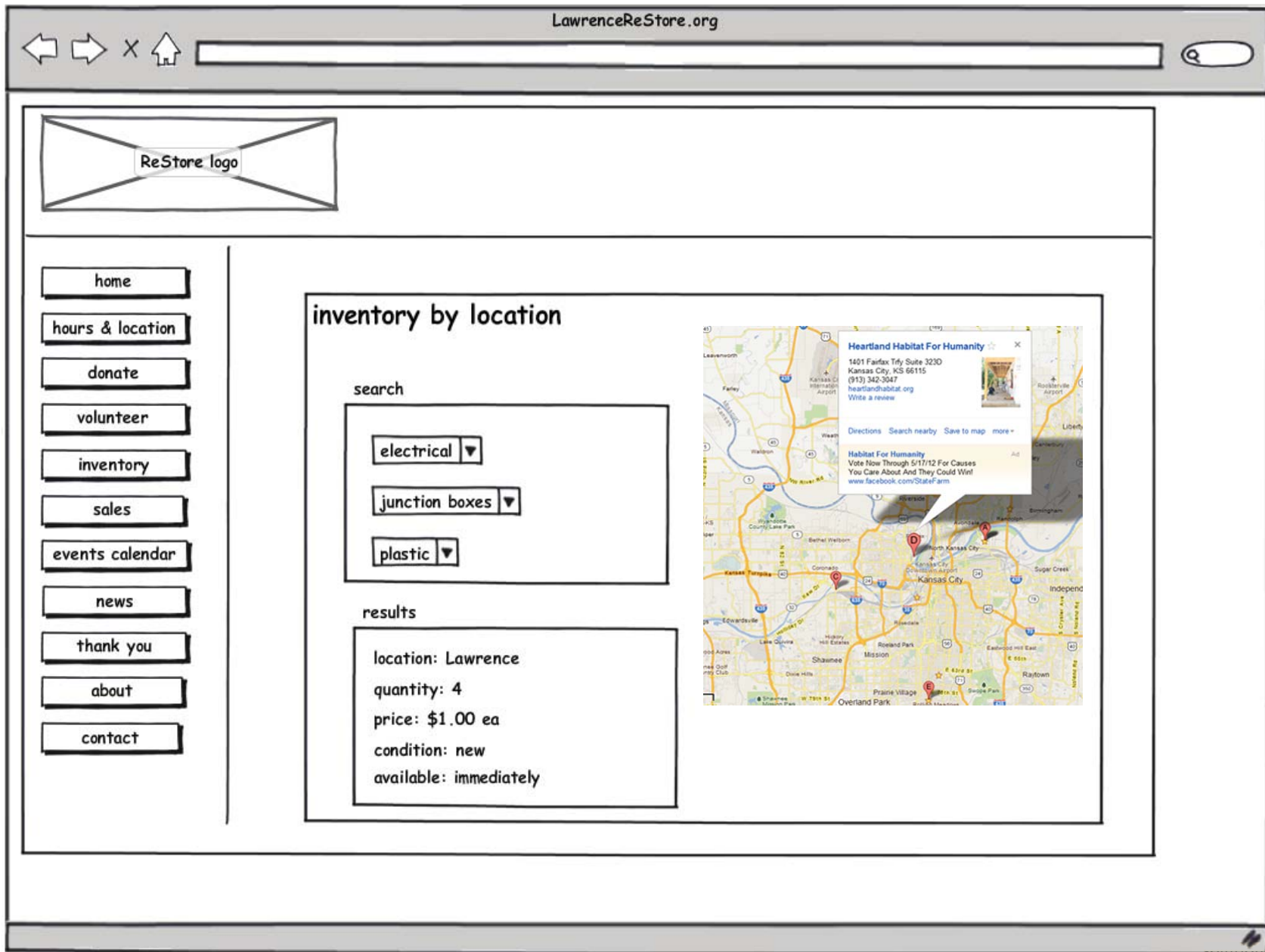
sync with phone or GPS to direct

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.*

