# ACSA Collaborative Practice Award

## 2015-2016 Winner Submission Materials

PROJECT RE_

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# PROJECT RE_

facilitates a partnership between three non-profits: a university affiliated design build entity, a material repurposing center, and an apprentice training program. Its mission is to:

## REUSE MATERIALS

incorporate used materials and promote deconstruction to facilitate landfill diversion

## RESTORE COMMUNITIES

utilize participatory design processes to strengthen capacity of community residents

## REBUILD LIVES

teach people trade skills and professional knowledge for securing a living wage

## PEDAGOGICAL FRAMEWORK

Students were asked to develop the project featuring reused and repurposed materials. The design showcases multiple, marketable building products that can be brought into mass production. Processes employed were refined for use in educational community workshops and job training to reinforce the public interest dimension of work.

### 6 SEMESTER + 1 SUMMER PROCESS

CURRICULUM with 3 CORE years + 2 ADVANCED STUDIO OPTION years

### DESIGN BUILD + PUBLIC INTEREST DESIGN

8 FOURTH / FIFTH YEAR UNDERGRADUATES

1 FACULTY DIRECTOR + 2 FELLOWS

4 GRADUATE CONSTRUCTION MANAGEMENT STUDENTS + 1 FACULTY

### EACH INVEST 1 SEMESTER or up to 2 YEARS

18 CU STUDIO + 9-12 CU CONSTRUCTION ADMIN CO-REQUISITE

8 GRADUATE DRAMA LIGHITNG DESIGN COLLABORATORS + 1 FACULTY

2 NON-PROFIT PARTNERS

### SUPPORT from 4 FOUNDATIONS + 3 CORPORATIONS

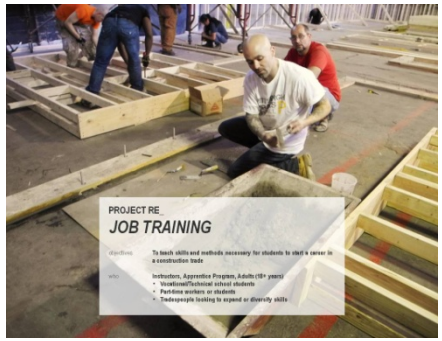
PROFESSIONAL CONSULTANTS + CITY INSPECTORS

View of studio, canopy, and community room from the woodshop.

## CONCEPT

The space will be used by the non-profit partners as a **community workshop, job training facility, and fabrication center** for value added projects ranging in scale from furniture to buildings. Products and housing prototypes developed at PROJECT RE_ will be used to sustain the center and fund the next community outreach projects.


Simplified business concept diagram generated by faculty program director

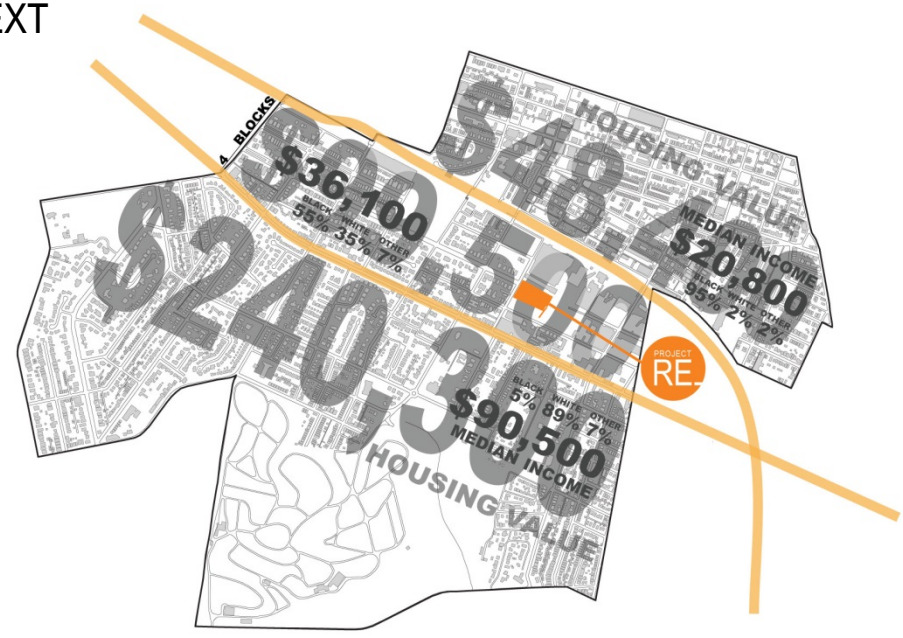




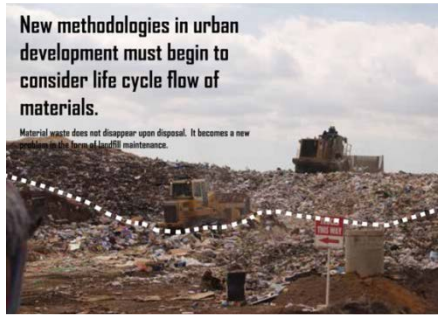


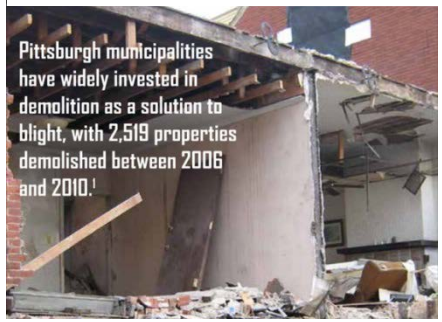
Excerpts from program development document generated by a fellow

## CONTEXT




Location diagram with 2010 US Census data



Excerpts from a student generated publication to raise awareness of local construction waste issues











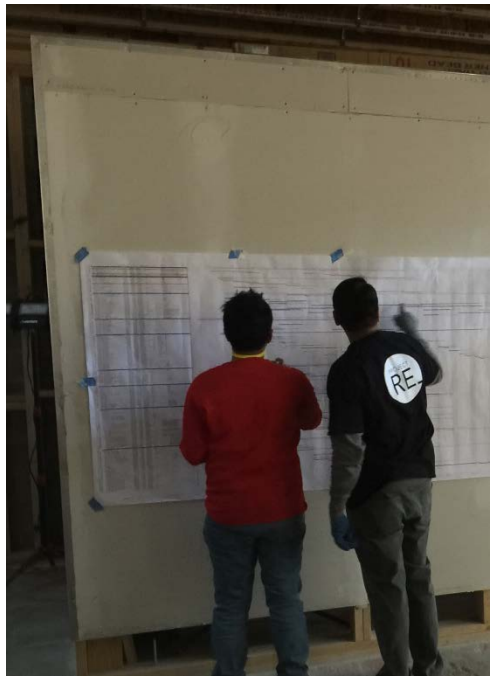


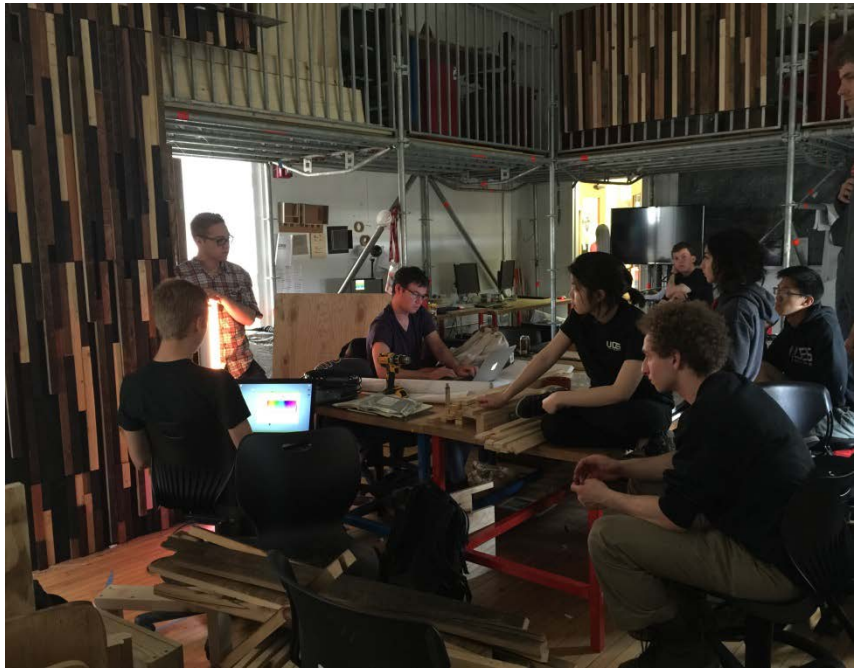





## CLIENT DESIGN REVIEW

The three year process involved close collaboration between partners and stakeholders. Activities included client space planning sessions, design reviews, a public build event, construction updates, and a public exhibit to raise awareness.


## ACADEMIC COLLABORATION

Undergraduate students worked closely with graduate construction management students to coordinate scheduling and site logistics. Graduate school of drama students contributed extensive knowledge of lighting design and equipment.

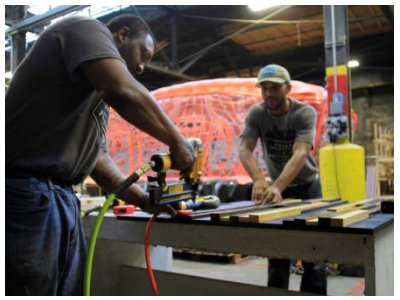
## PROFESSIONAL COORDINATION

The students gained experience working with professional consultants including structural and mechanical engineers; HVAC, electrical, and fire suppression system subcontractors; steel fabricators; and lighting designers.







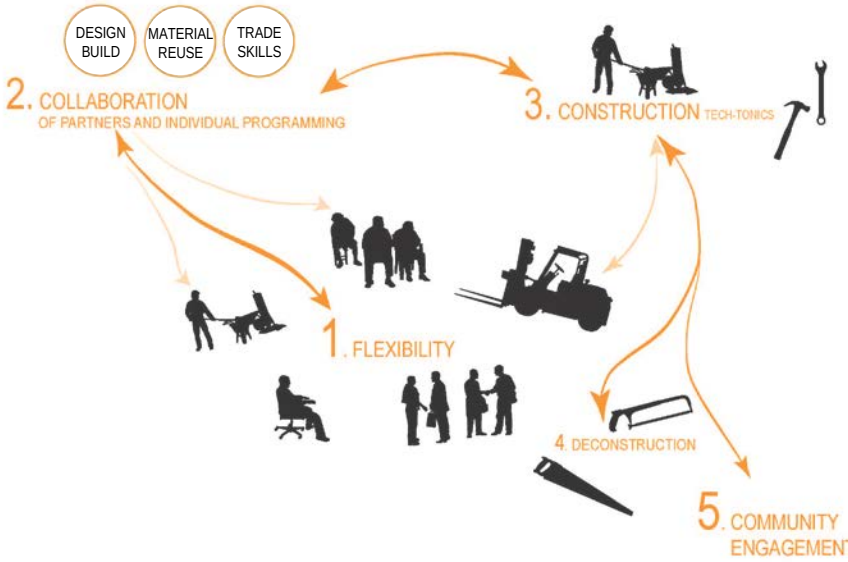

Exterior cladding construction in progress in woodshop

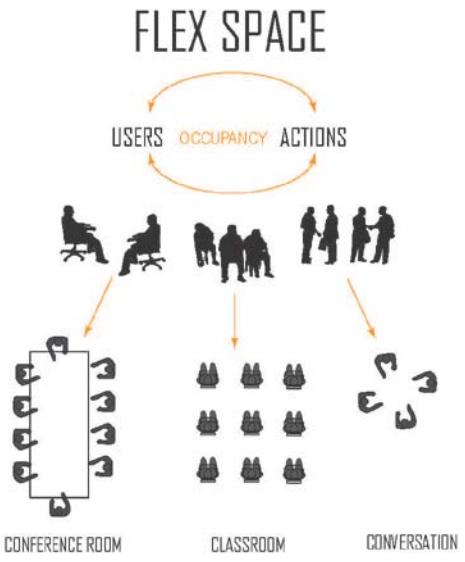
## CONSTRUCTION TRAINING

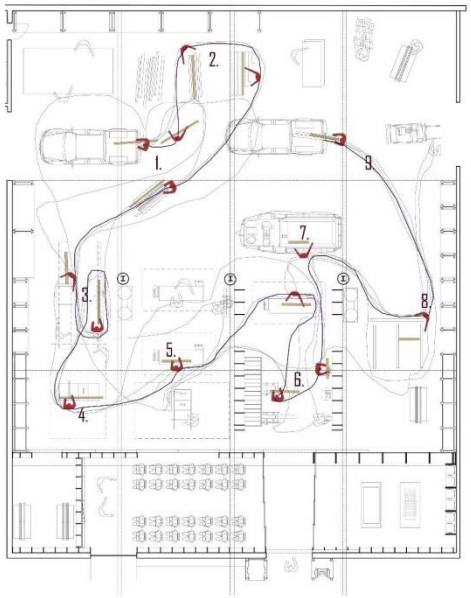
Students worked with a cross section of construction industry professionals, including fabricators, journeymen, laborers, and craftsmen. A master carpenter demonstrated carpentry techniques and a high level of craft for students. Apprentices-in-training assisted with construction as an exercise in learning and honing their carpentry skills from modular framing to refined finishes.

## DESIGN CRITERIA

Through research, students explored spatial relationships and program necessary to meet project goals.



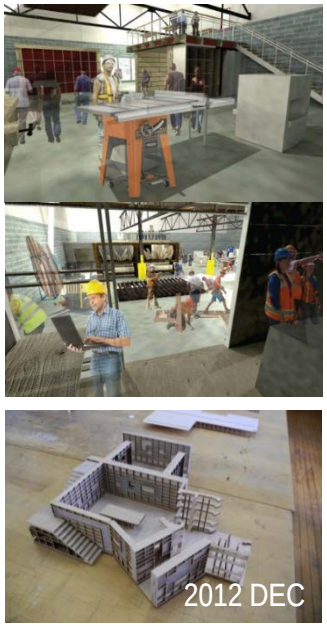
Early design priority and space planning diagrams

## DESIGN PROCESS

In the Fall of 2012, students met with the clients to understand their needs. By 2015, the project included the efforts of 22 undergraduate students, 1 faculty director, 2 fellows, 15 graduate construction management students, 12 graduate drama lighting students, 2 supporting faculty, and over 140 contributors. Students learned collaborative working methods that will be valuable in professional practice.

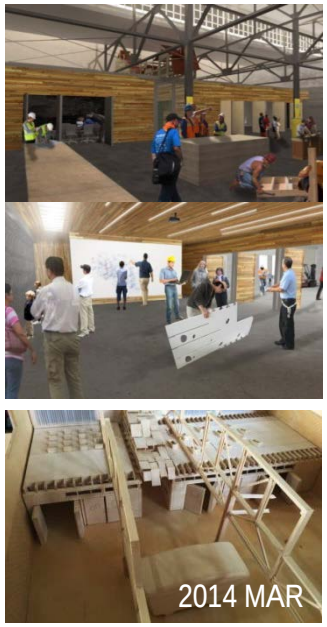
2012 OCT

Schematic working session with project partners to understand current space usage and plan workshop and community area

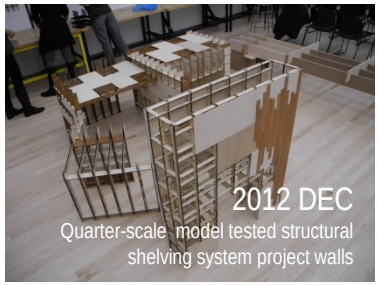


2012 DEC

2013 MAY

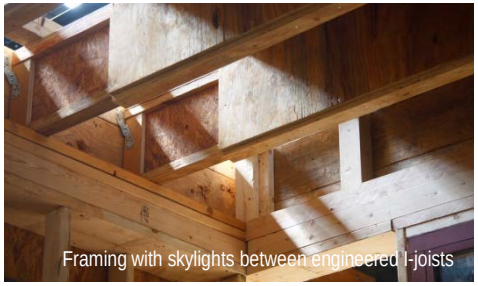


2014 MAR



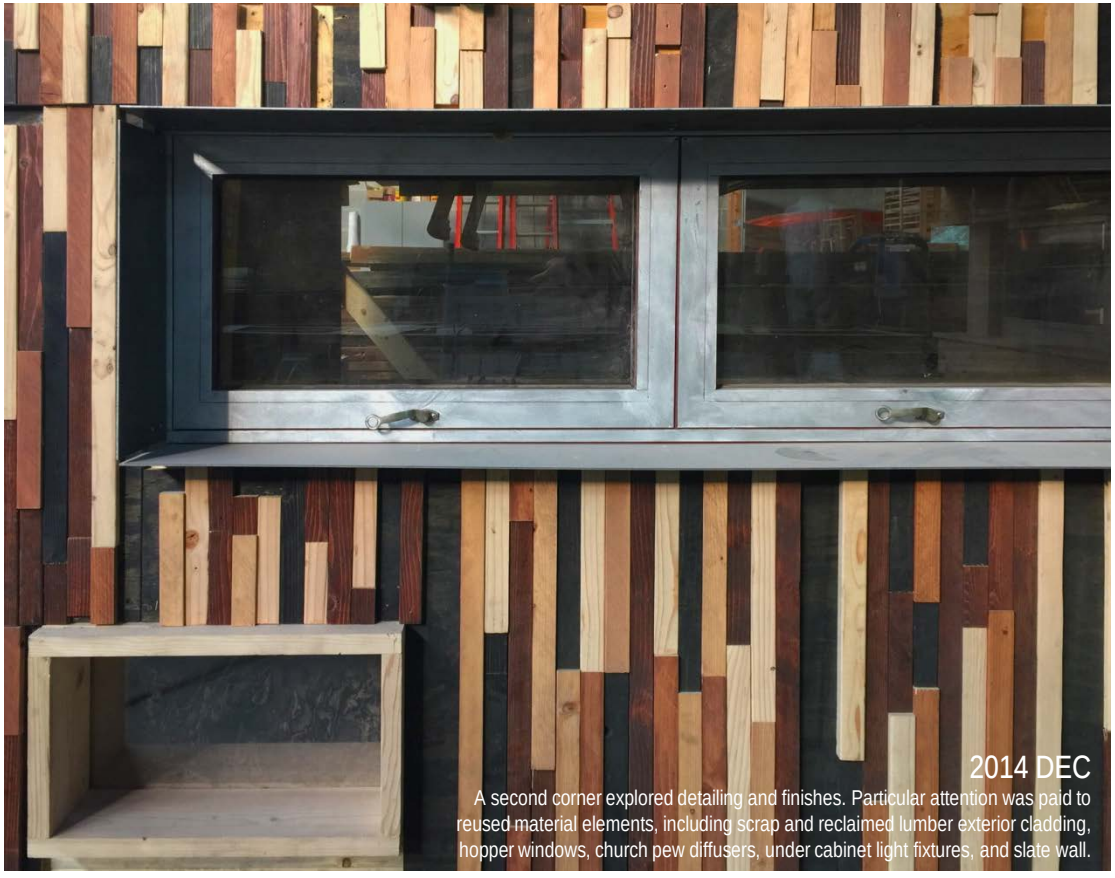














## PROTOTYPING

The studio teaching pedagogy is predicated on full-scale prototyping. Mock-ups were built by undergraduate and graduate construction management students to test design and construction principles. Each iteration and element was evaluated according to scope, quality, cost, and time.

# DESIGN

## STONE CUTTING SHOP
- stone cutting training
- custom cut stone components

## PREFABRICATION AREA
- value added product and housing assembly

## METAL SHOP
- metal work training
- custom hardware production
- CNC plasma cutter training

## DIGITAL FAB LAB
- production for value added products
- introduction to digital design tools
- CNC router training

## TOOL STORAGE + SPRAY BOOTH
- lockable storage for tools
- ventilated room for protecting finish work

## WOODSHOP
- carpentry training
- community workshops + demonstrations
- prototyping of value-added products
- tool usage and safety procedures
- used building material processing training

## STUDIO
- design workspace
- project coordination + collaboration
- pin-up space + drawing storage

## GALLERY
- display of community workshop projects
- showcase value added products
- advertise Project RE_ mission + goals

## COMMUNITY ROOM
- community workshops + demonstrations
- meetings + presentations + public events
- sustainability + business development classes

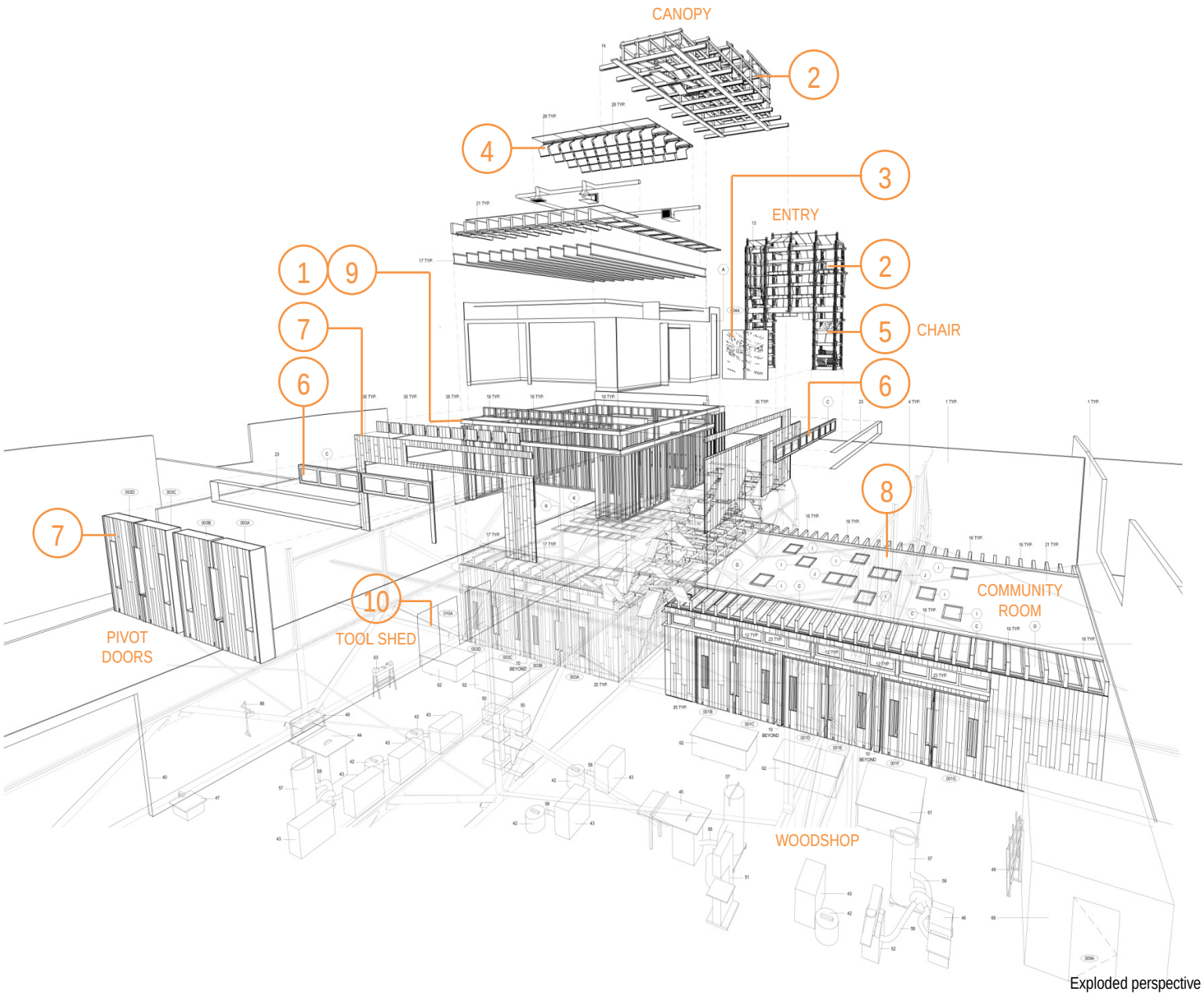
Project RE_ plan


WOODSHOP

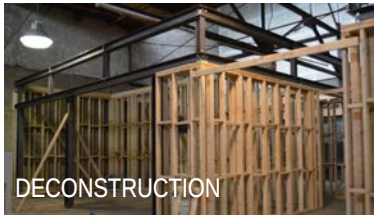

COMMUNITY ROOM


GALLERY

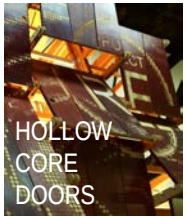
# MATERIAL REUSE

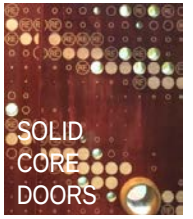



Exploded perspective

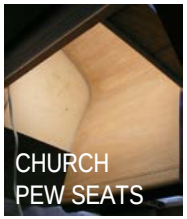


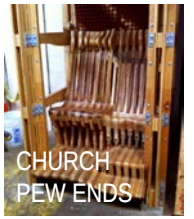

Framing designed for deconstruction



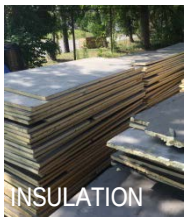

Door reuse in entry, canopy, and front doors




Church pew reuse in ceiling and entry chair

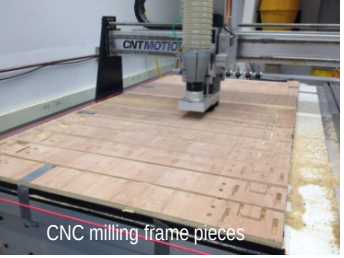

Hopper window reuse in transom
Scrap and reclaimed lumber reuse in cladding

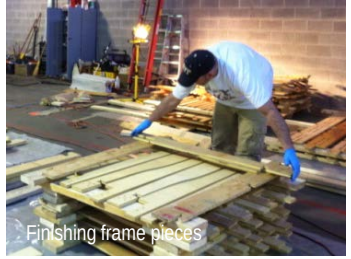



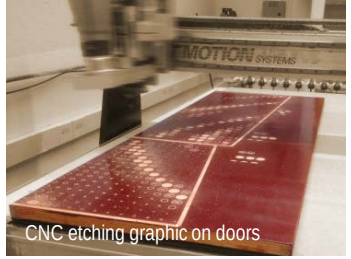

Slate reuse in community room chalkboard wall
Insulation reuse in wall cavities


Fiberglass and church pew reuse in tool shed

A material repurposing center identified underutilized items in their inventory and materials typically diverted to landfills. Students invested time in designing processes for giving them new life. Each building element is a marketable building product or strategy.


CNC milling frame pieces


Finishing frame pieces


CNC etching graphic on doors


Milling aluminum hardware

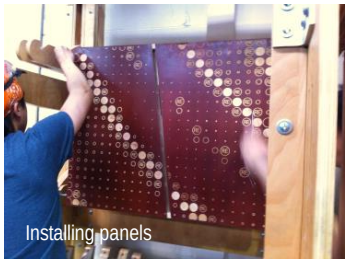

Fabricating church pew chair


Fabricating ergonomic ladder


Leveling aluminum entry feet

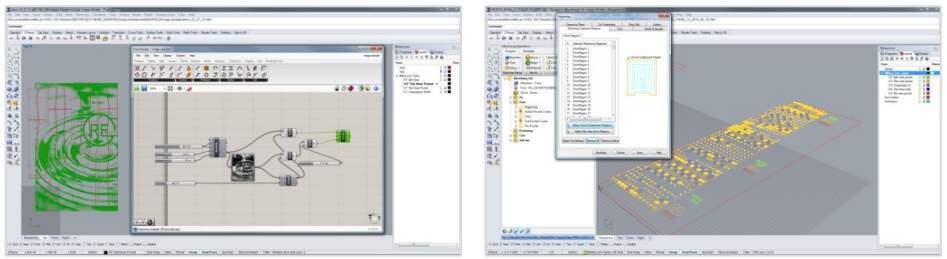

Assembling entry frame bridge

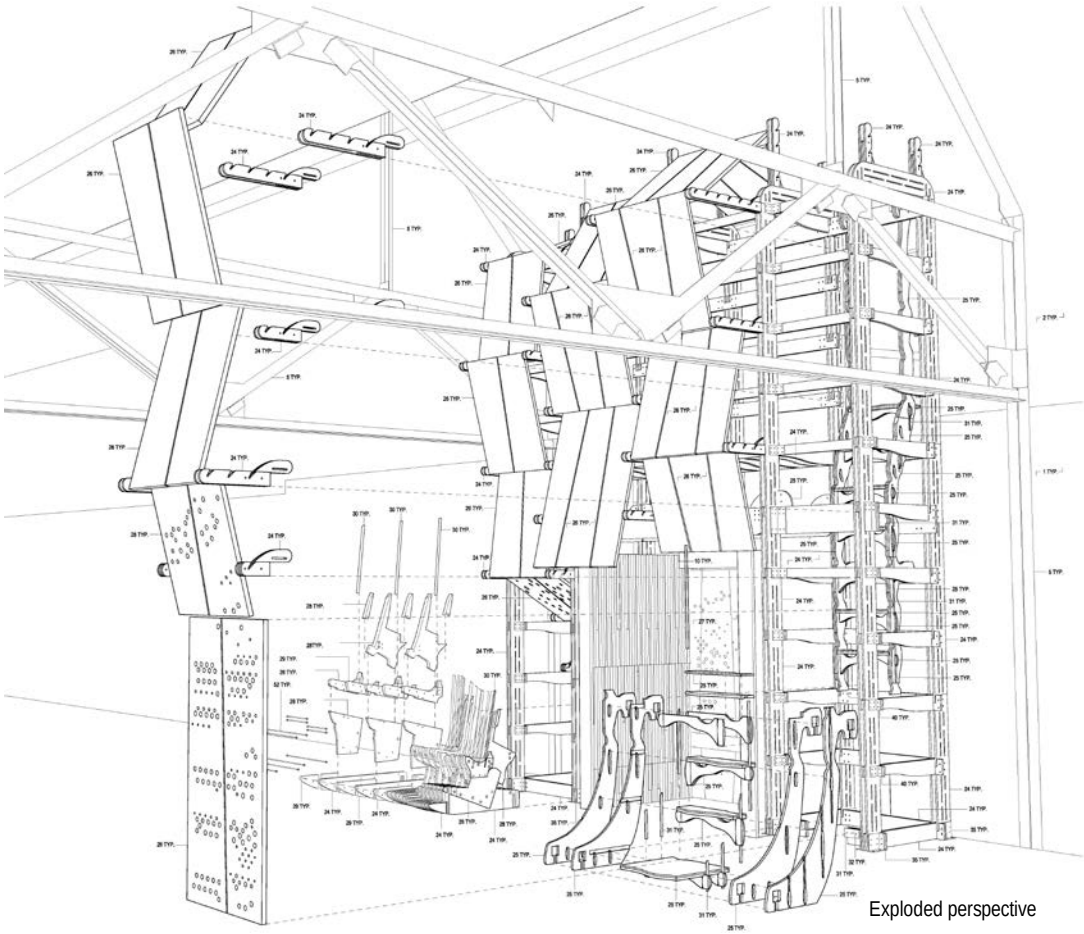

Assembling entry frame


Installing panels

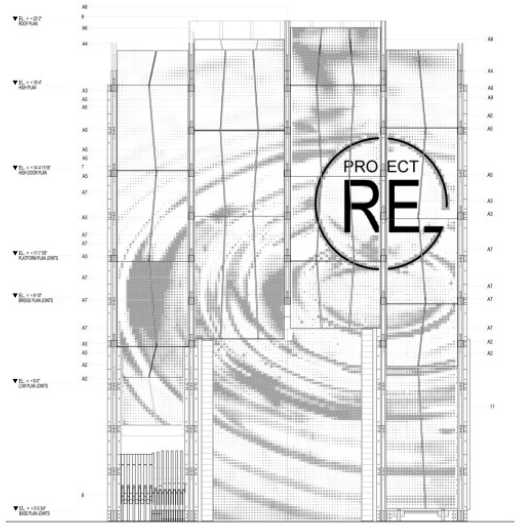

Assembling canopy frame


Preparing canopy panels


Parametric modeling interface used to generate and etch entry graphic


Exploded perspective

"Edge effect" graphic



Entry front elevation

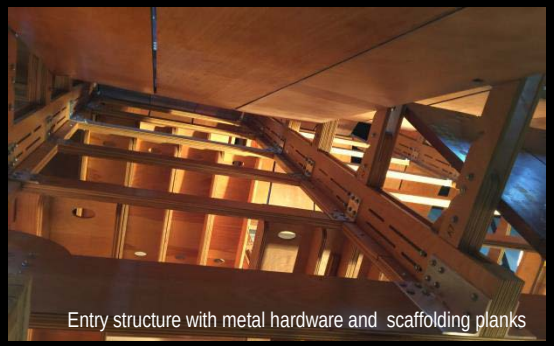
## ENTRY + CANOPY

The process for etching salvaged hollow-core door panels was refined for use during CNC technology tutorials. The self-scaffolding entry frame was digitally designed and fabricated. Hand craft was essential to produce metal hardware and the canopy frame; and shape ergonomic features of the ladder and chair. High technology research was completed by students and low technology processes were executed through job training.

# LIGHTING DESIGN

Essential lighting for evening events was designed in partnership with graduate drama students.

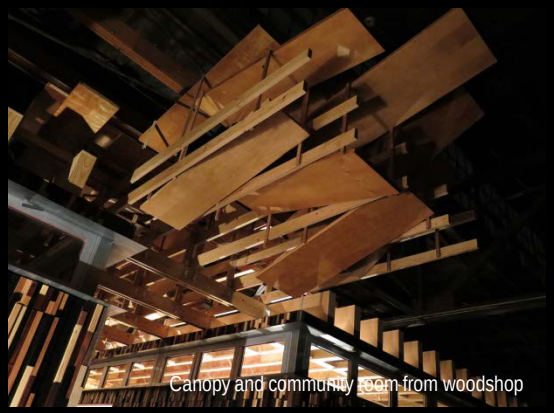
Project RE_ entry is lit for evening events.



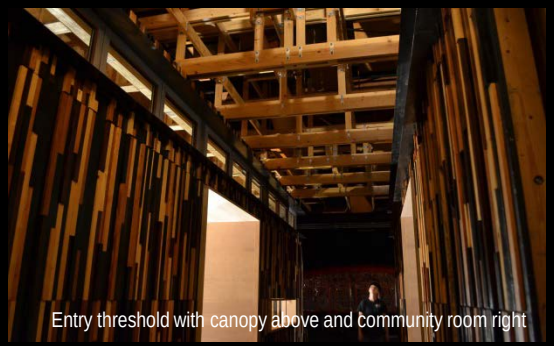
Entry structure with metal hardware and scaffolding planks

Ergonomic church pew chair

Ergonomic ladder



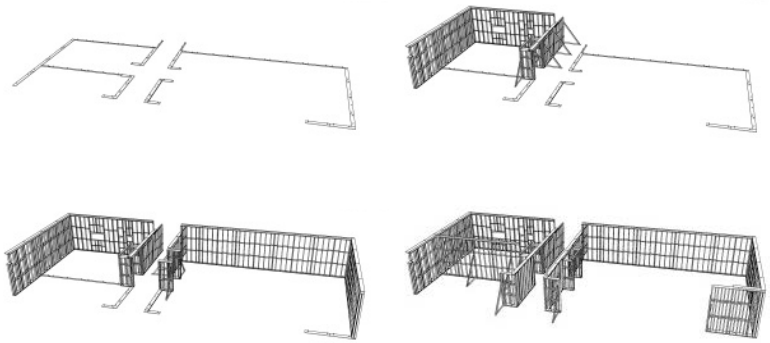
Canopy and community room from woodshop



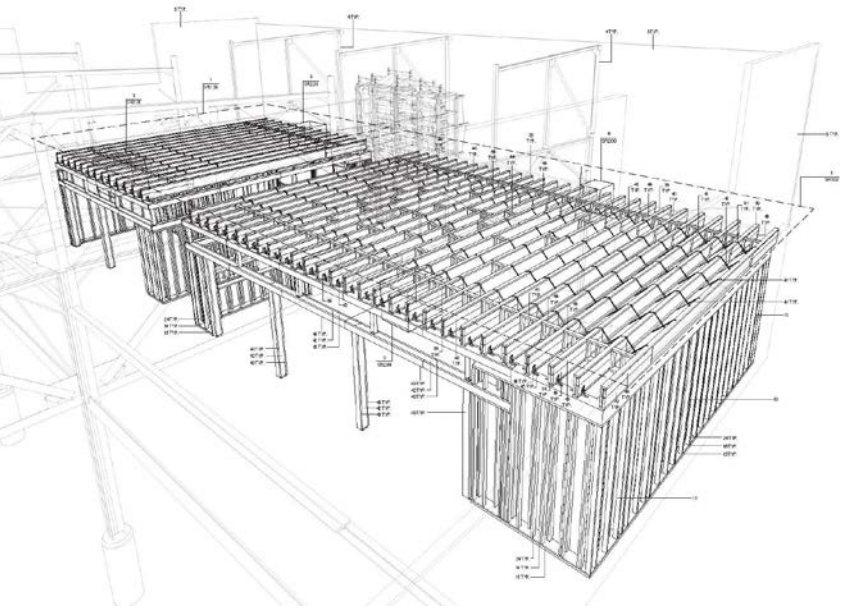
Entry threshold with canopy above and community room right

# DESIGN FOR DECONSTRUCTION

Modular, panelized construction allows the project to be rearranged or disassembled for reuse to reduce waste. Framing commenced with a public build event where clients, community members and apprentices-in-training assisted with construction.



Panel framing assembly sequence



Structural perspective

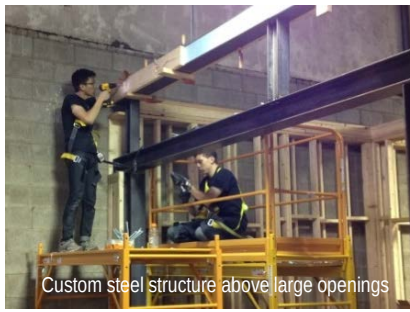
Blitz build event

Team consults local carpenter at blitz build

Panelized frames with mechanical fasteners

Framing progress

I-joist roof structure installation

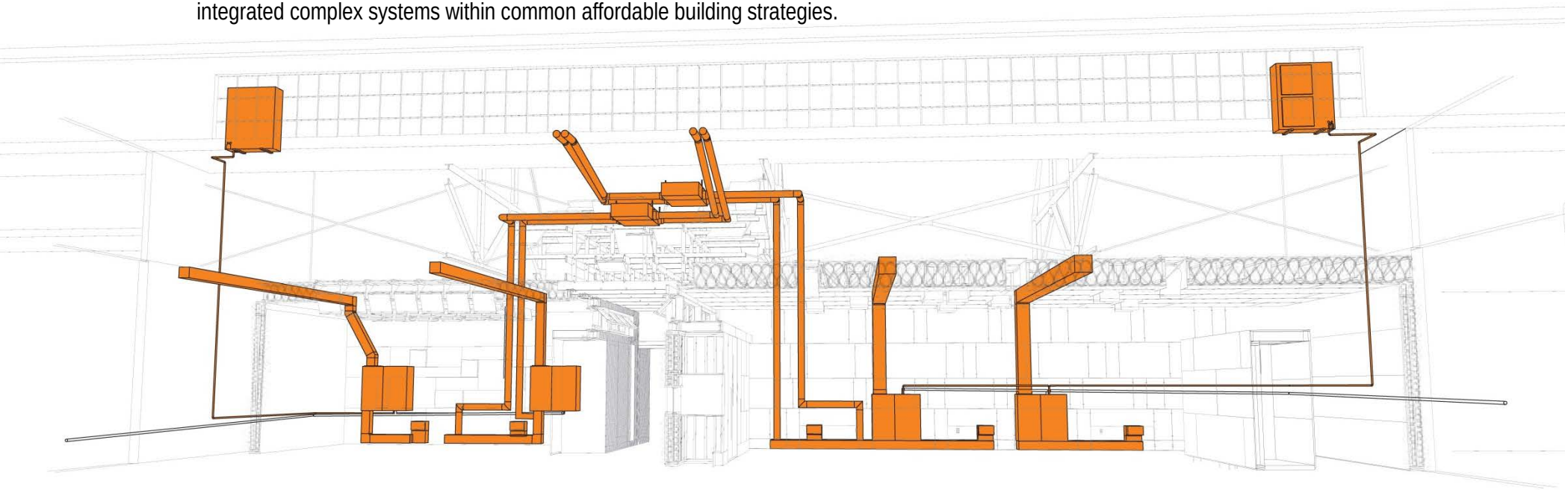


Custom steel structure above large openings

Apprentice training students assist with construction

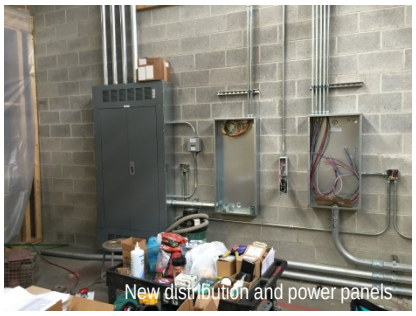
# SYSTEMS

Mechanical, electrical, and fire suppression systems were integrated into the ceiling planes and canopy by consultants as per student drawings. Design integrated complex systems within common affordable building strategies.



Mechanical systems sectional perspective

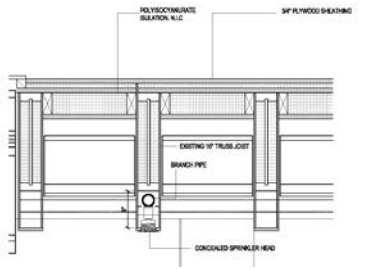
Electrical installation



New distribution and power panels

Mechanical subcontractor coordination

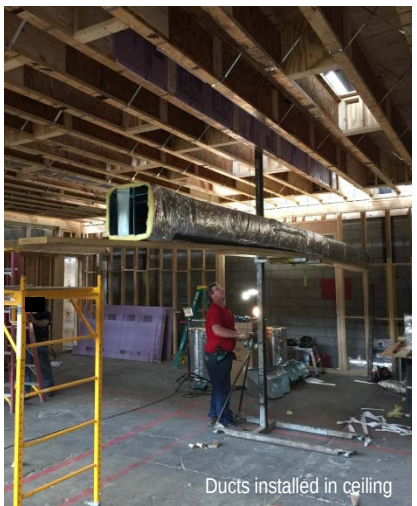
Heat recovery ventilator by city inspector




Fire suppression section detail

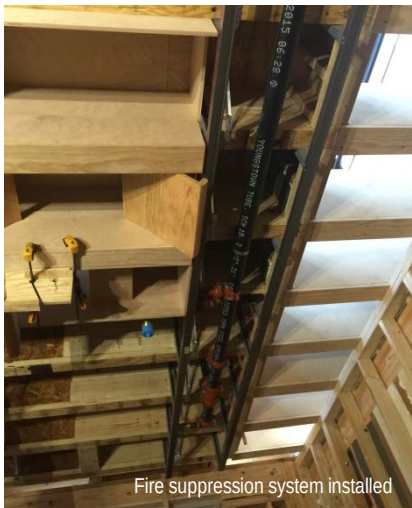
New outlets for woodshop tools

New transformer and switches



Ducts installed in ceiling

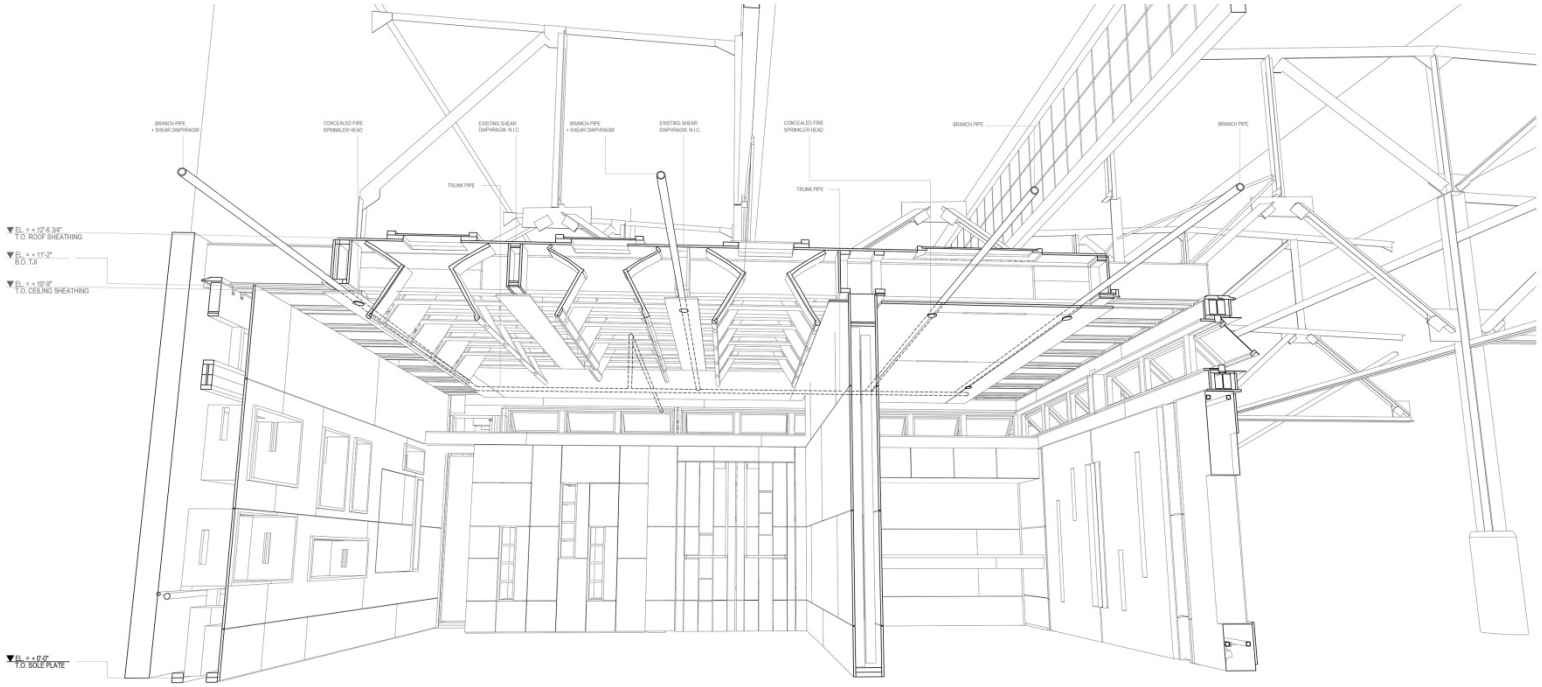
Mechanical installation



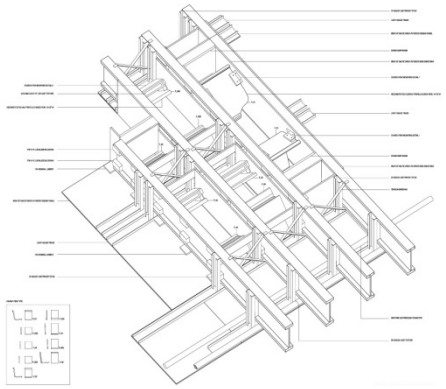
Fire suppression system installed

# CEILING MODULATES LIGHT

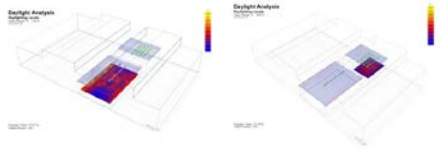
Pews from deconstructed churches are reused as diffusers for light and mechanical ventilation. Pew processing was completed by students and apprentices in training. Light fixtures were salvaged or donations from a professional consultant.



Transverse sectional perspective cut through gallery and studio



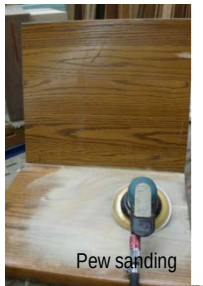
Ceiling axonometric



Digital lighting simulation

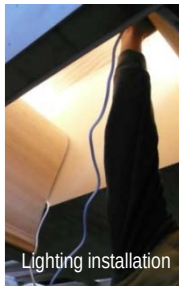
Community room interior

Jig used to align diffuser during installation



Pew sanding

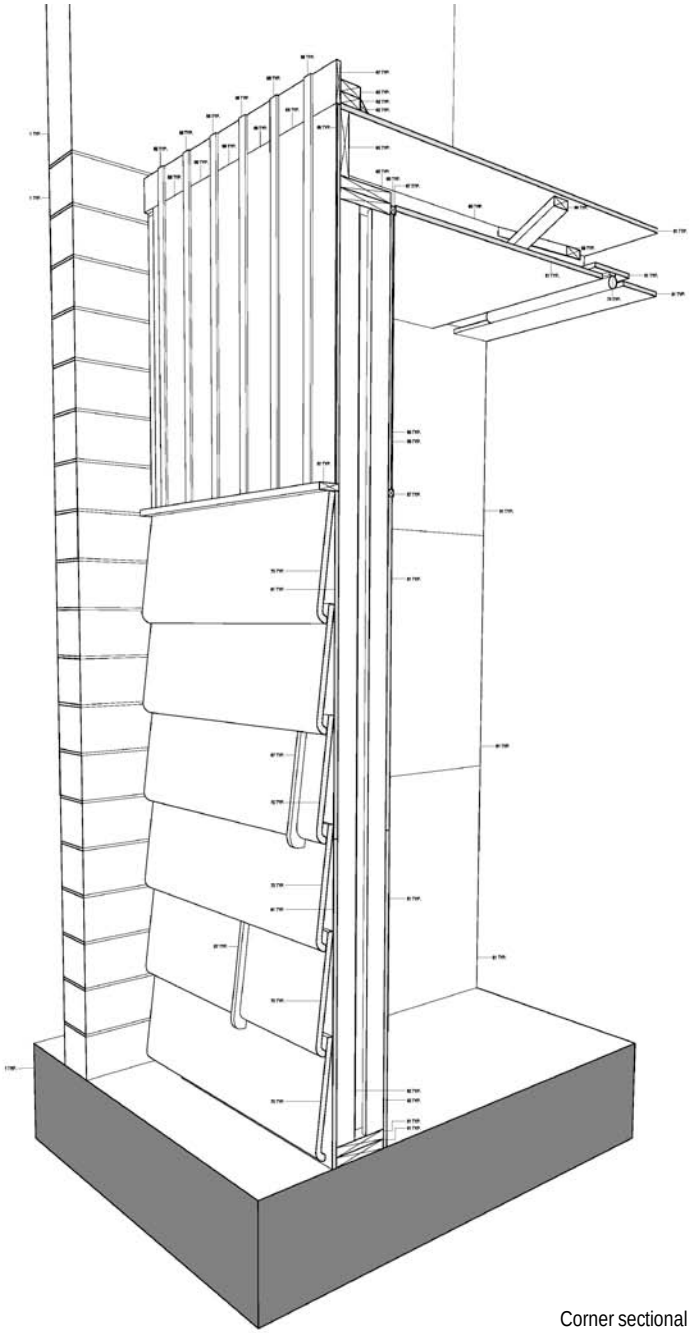
Pew waxing



Lighting installation

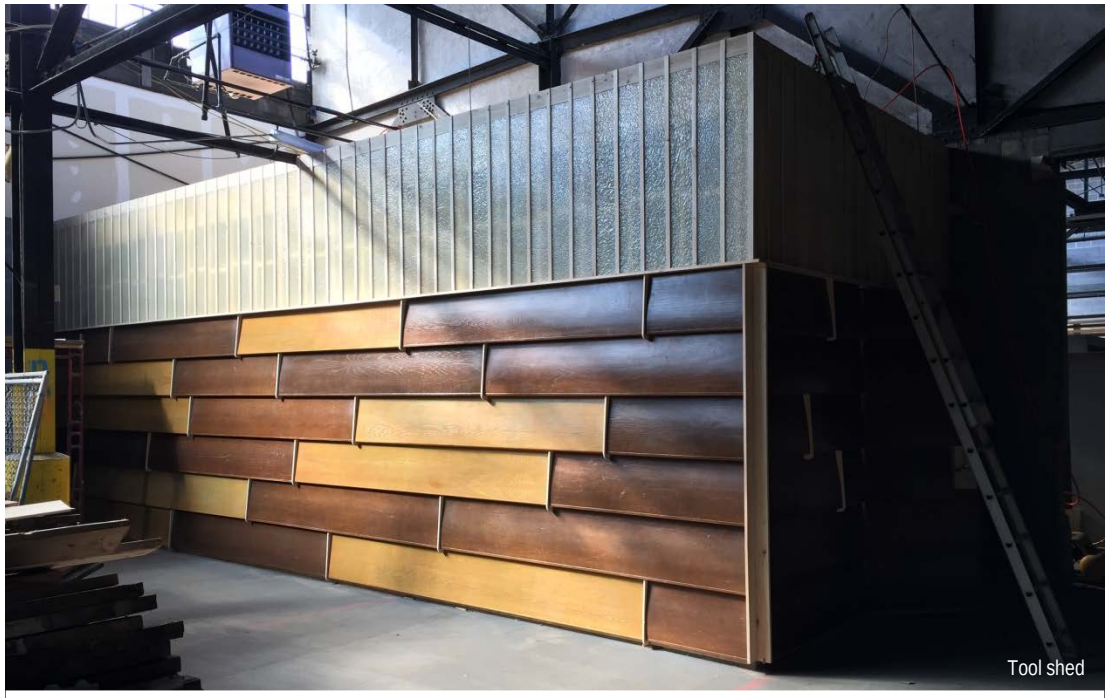
Ceiling light diffuser

# TOOL SHED



Corner sectional perspective

The tool shed and spray booth are clad with reused fiberglass and church pew seats.



Tool shed

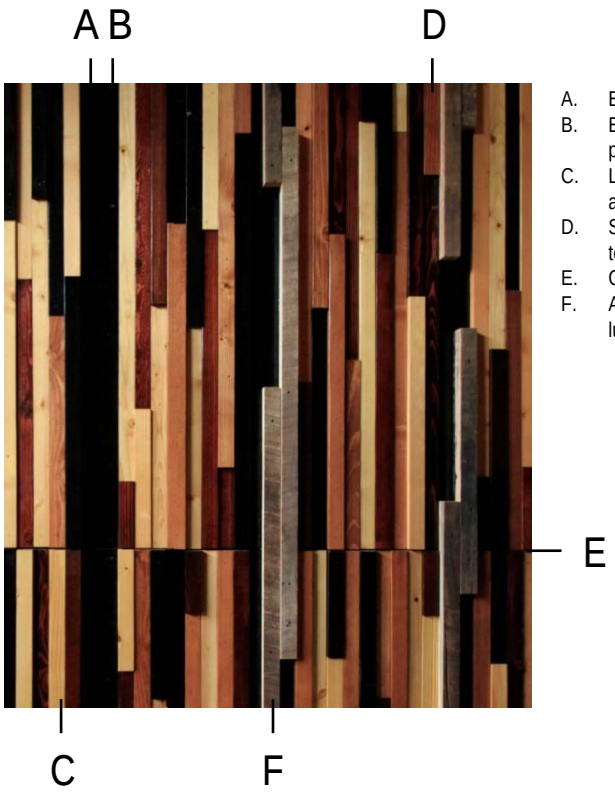
Church pew cladding detail

Interior view of reused fiberglass transom light

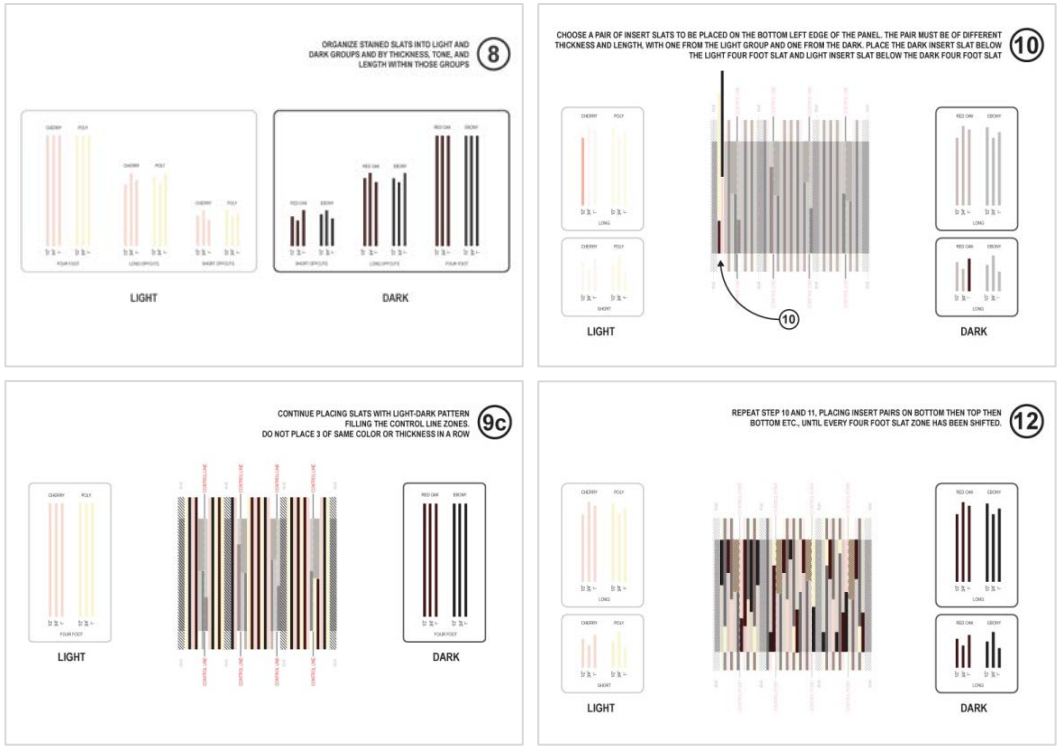
Tool shed construction

# EXTERIOR CLADDING

Prefabricated panels transform scrap lumber waste from construction sites and reclaimed lumber deconstructed from a warehouse into a viable building product. Project construction was used to test the prefabrication process for assembly by apprentice-level workers.




A. Ebony stained plywood backing panel
B. Empty space for screwing cladding panel to studs at 16" OC.
C. Long pieces arranged to alternate light and dark stains
D. Shorter pieces of various lengths added to vary pattern vertically
E. Cladding panel edge
F. After panel installation, reclaimed lumber pieces screwed to fill space B

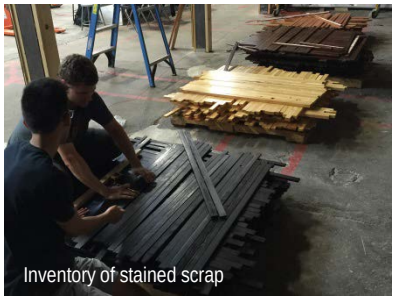



Diagrams developed by students for explaining cladding layout to apprentices


Removing nails from deconstructed lumber


Deconstructed lumber after ripping to size


Staining scrap lumber four shades


Inventory of stained scrap

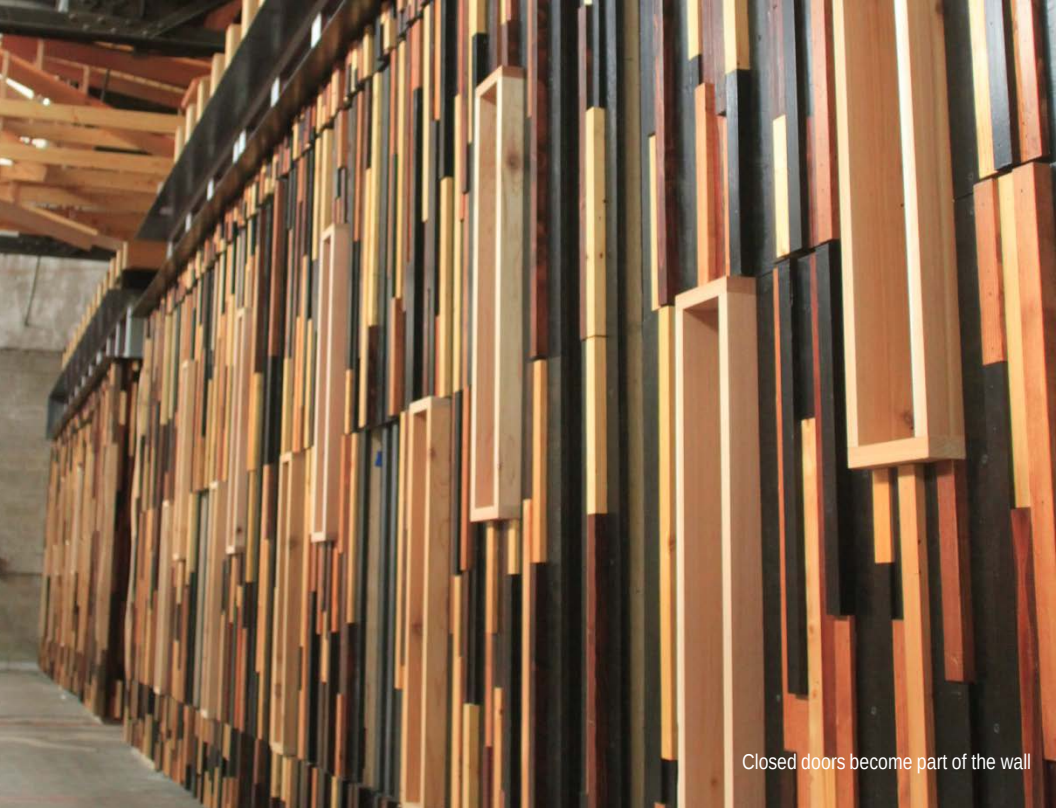

Corners designed to elicit tactile response encourage ergonomic engagement


Layout pattern for panel

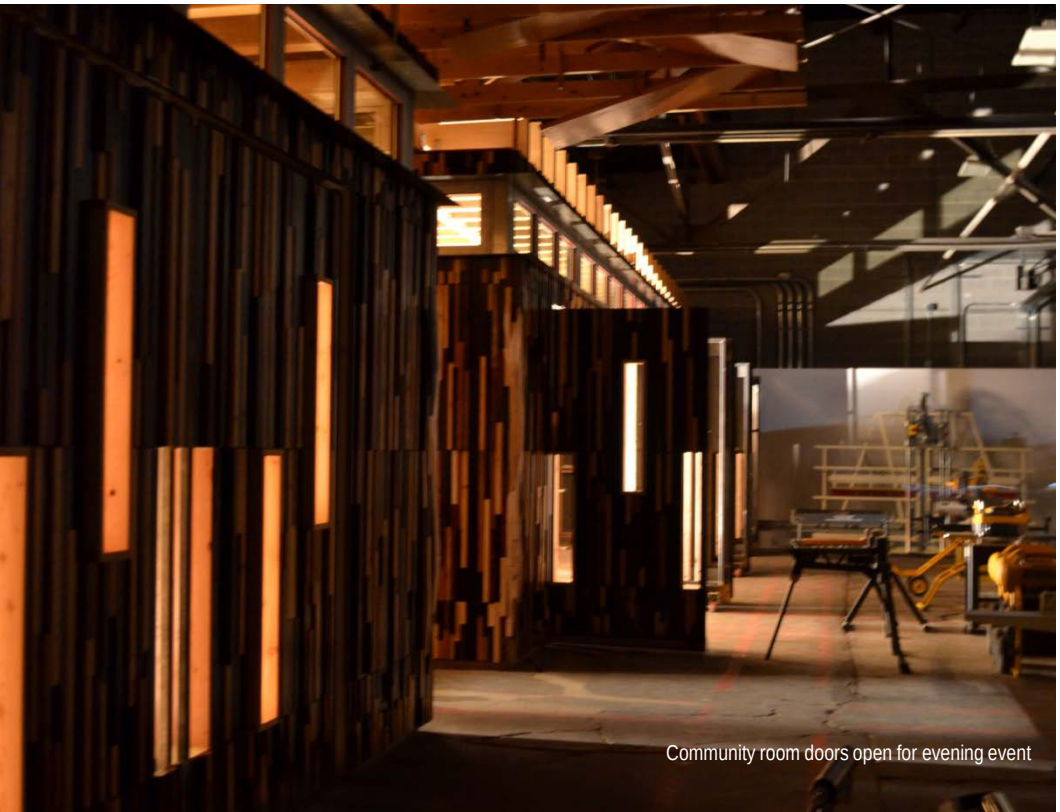

Attaching scrap to plywood panel backing


Prefabricated panels


Panel installation



Closed doors become part of the wall

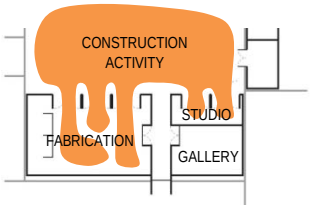


Community room doors open for evening event

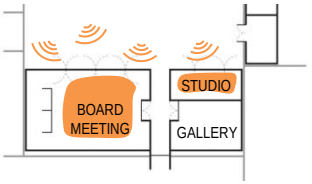
# DOOR FLEXIBILITY

Large doors swing open to offer flexibility in use. They can be opened when community events or construction activities require more space or become part of the wall when closed, providing thermal and acoustic separation.

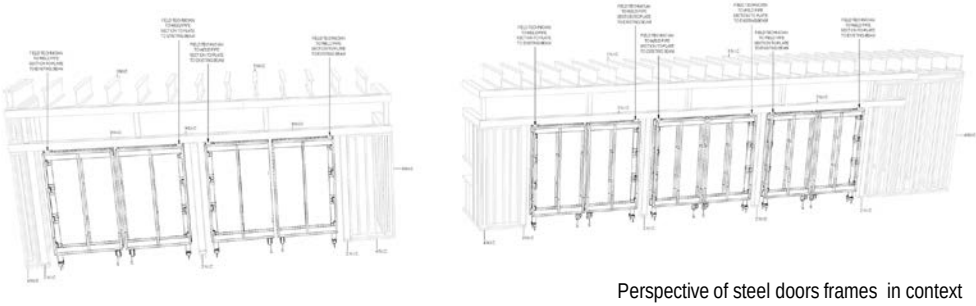

Doors open out to woodshop




Doors open in toward rooms




Doors closed diagram



Perspective of steel doors frames in context

Steel frame delivery

Custom casters

Hinges and column plates

Column installation

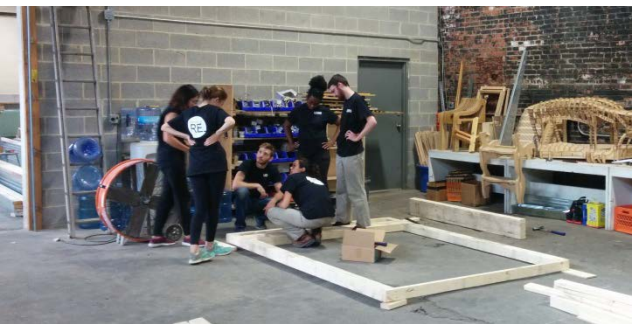
Site welding

Prepare for cladding

# COMMUNITY OUTREACH

PROJECT RE_ is being utilized to design new projects. Prototyping is underway for two garden sheds for a community nursery and community events will be held in the coming months.

Studio, canopy, and community room from the woodshop. Scrap and reclaimed lumber exterior cladding. Transom hopper windows deconstructed from a high school. Hollow core door canopy panels diverted from a landfill. LED work lighting in woodshop.



Garden shed prototyping in woodshop and prefabrication area