



BUILDING DECONSTRUCTION & SALVAGE TOOLKIT

This toolkit will assist you in planning, preparing, and financing deconstruction and salvage projects in Minnesota. It includes the need-to-knows of deconstruction and recommendations for community-based salvage initiatives.



Photo Credit: Hennepin County



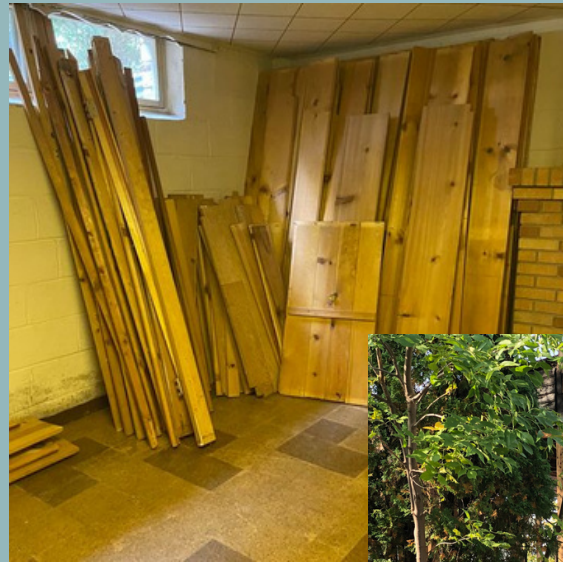


Photo Credit:
Petrina Rhines



Photo Credit:
Better Futures
MN



Photo Credit: Emily Barker

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Introduction to deconstruction and salvage

Terms:

- **Deconstruction** is the disassembly of a building so the materials, structural and non-structural, can be reused.
- **Salvage** is the reclaiming of high-value materials like appliances, cabinetry, doors, windows, and lighting fixtures.
- **Structural deconstruction** the disassembly of the building including framing lumber, hardwood floors, trim, and bricks.
- **Construction and demolition (C&D) waste** is generated from demolition, renovation, and repair.
- Better Futures Minnesota estimates that up to 90% of materials from deconstruction projects can be reused or recycled, effectively diverting vast amounts of materials out of the waste stream. See the report [here](#).
- Deconstruction is good for economic and environmental health of a community and keeps its history and culture in tact.



Photo Credit: Joshua Hauf

Why are buildings taken down?

Demolition

Remodel/renovation

Deconstruction & Salvage

- Redevelopment
- Aging components/structural issues
- Natural disaster
- Building is abandoned
- Tax forfeiture

- Redevelopment
- Adaptive reuse
- Aging components

- Change in use
- Removal or replacement of outdated materials
- Hazard abatement
- Cosmetic and design updates

Sustainability

The amount of C & D waste produced annually is equivalent to 150 miles of waste stacked on top of a football field!



Statistic from: Larry LaMotte, ReCapturit

- In 2018, the United States produced 600 million tons of C&D waste, more than double the municipal solid waste stream. See the 2018 Facts Sheet [here](#).
- Reusable, durable, and historically unique building materials are filling up our finite landfills in Minnesota.
- Deconstruction and salvage reduces demand for new materials and negates risk of air, soil, and water pollution from resource extraction and material production.
- Salvage keeps materials [local](#).

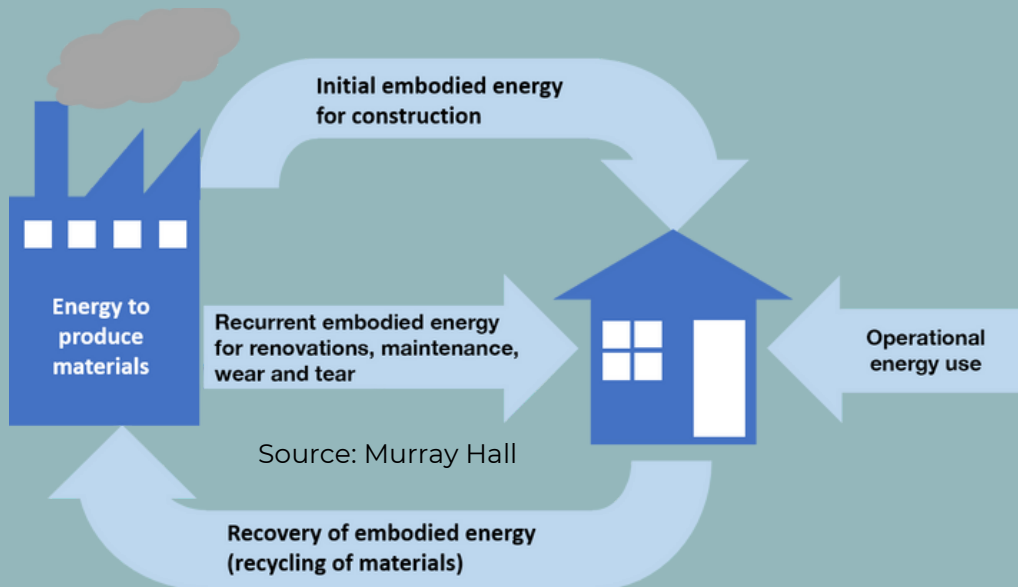
Embodied energy



is the total expenditure of energy involved in the creation of a building and its constituent materials. Demolition wastes the embodied energy of a building. Learn more about embodied carbon at [Architecture 2030](#).



Photo Credit: MPCA



Source: Murray Hall

Like any waste, C&D materials produce GHG emissions when discarded. Deconstruction and salvage is climate action.

Benefits of deconstruction and salvage

Economic

- Creates jobs and fosters a reuse economy
- Supports local reuse and recycling businesses
- Reclaims value of local materials

Environmental

- Reduces need for new materials
- Retains embodied energy
- Less waste for landfill or incineration
- Less dust created on job site

Social

- Job and skill training
- Workforce development
- Preserves historic building stock and preserves building materials
- Provides affordable building materials

Grants

Four counties in Minnesota currently offer grants for deconstruction and salvage projects:

- Hennepin
- Ramsey
- Washington



Photo Credit: Dave Bennink

Finances

Deconstruction efforts can be costly. Luckily there are some resources available to offset costs that may be burdensome.

- [Hennepin County Building Reuse Grants](#)
- [Ramsey and Washington Building Reuse Grants](#)
- [Tax Deductions for Building Materials](#)

Things to Consider:

- Demolition and dumping fees are expensive.
 - Salvaging materials saves money.
- There is value in workforce development and training.
- Sweat equity goes a long way.
- Time and labor add to the increased cost of deconstruction, but the costs go into labor instead of fees and demolition equipment.

Regulations

Deconstruction and demolition regulations vary by county. Always check your local and state government's resources to determine how building material management is regulated.



You are responsible for:

- Following local and state guidelines for deconstruction and demolition including permits, fees, and processes
- Proper disposal of all household hazardous waste (see pg. 13)
- Ensuring there is no lead, asbestos, or other hazardous materials on the inventory to be salvaged
- Coordination for the recycling of materials that cannot be salvaged for reuse and coordinating with waste haulers for materials that cannot be recycled

Deconstruction and salvage timeline

Site assessment and materials audit

Budget and bidding

Detailed project plan

Remember to start planning early!

*This process is recommended by *Introduction to Deconstruction: A Comprehensive Training Textbook, Oregon State Edition*

Introduction to Deconstruction:
A Comprehensive Training Textbook
Oregon State Edition




Click here
to get a
copy

Close-out
(And celebrate successes!)

Implementation

1. Site assessment & materials audit

- Identify project scope, goals, and schedule
- Determine reuse and recycling opportunities and values and quantify salvage volumes
- Plan for the proper deconstruction methods, schedule of operations and interactions with onsite activities
- Assess building for hazards and restrictions
- Consider egress routes, storage and staging areas, logistics, etc

Tools to value materials

Salvage potential is the likelihood a material can be salvaged quickly and efficiently with little damage or need for repair. Use the salvage potential and expected market value to determine what materials should be prioritized for salvage and reuse.

- TC Habitat ReStore [guide](#) to valuing donations
- Green Donation Consultants [website](#)
- [EPA Building Material Estimating Tool](#)



Photo Credit: MPCA

Donations and deductions

You can divert demolition waste and save money on dumping fees by donating deconstructed materials to a tax-exempt organization.

After an accredited appraisal, you will work with the nonprofit to receive the information you will need to complete your tax deduction.

*For donations exceeding \$5,000 in value, the materials must be appraised by an accredited IRS appraiser.

The [Green Mission](#) has a lot of information and expertise in this area of planning.



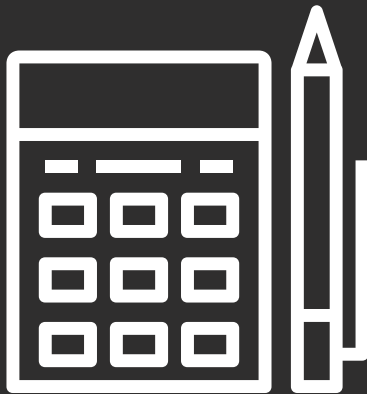
Tax tip

To receive the tax deduction, donations must be itemized and you will be required to fill out a 1040 Schedule A form. The IRS has a non-profit search [tool](#) to help connect you with organizations accepting reusable building material donations.

Remember to use salvage potential and salvage value to shape decision-making for project budget.

If project time or funds are limited: stick to the salvage basics:

- Cabinets
- Doors
- Windows
- Materials with high salvage value:
 - Wood beams, hardwood flooring, metals (wiring, copper pipe)



2. Budget and bidding

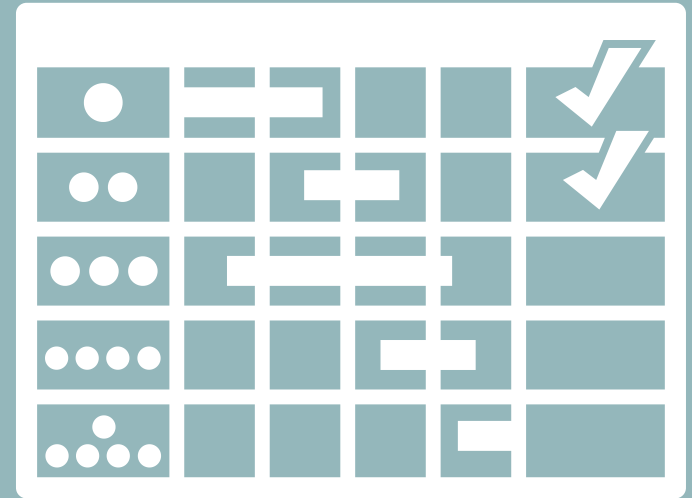
- Determine the scope: full or partial deconstruction
- Familiarize yourself with the site layout and characteristics
- Estimate cost for the required labor and equipment
- Timeline/schedule



Photo Credit: Emily Barker

3. Detailed project plan

- Obtain all the necessary permits
- Think about the building during the deconstruction process:
 - Disconnect water, power, gas, sewer, etc
 - Perform a pre-demolition inspection and coordinate the removal of hazards
 - Coordinate temporary power, potable water, and restrooms
- Create work plan with specific tasks and procedures, personnel assignments, and required equipment



Additional planning

- Schedule with milestones in mind
- Materials management plan-how they will be reused, recycled, or discarded after salvage
- Plan for storage, transportation, loading
- Safety plan

Pre-demolition inspection

*Always check with the city, county, and state regulations for pre-demolition requirements to ensure proper compliance.

Removal of hazardous materials is required for all demolition and deconstruction efforts.

1. Bring household hazardous waste (paint, fluorescent bulbs, mercury thermostats, etc) to a designated drop-off facility.
2. Complete an asbestos survey and identify lead containing materials.
 - a. Asbestos must be professionally abated.
 - b. Click [here](#) to read about lead paint disposal.
3. Schedule and carry out a county inspection (if applicable).



Hazardous materials include:

- Aerosols, compressed gas cylinders, fire extinguishers
 - Appliances
 - Asbestos-containing materials
 - CFC-containing items (fire extinguishers, refrigerators, freezers)
 - Electronics
 - Flammable liquids, pesticides, herbicides, solvents, cleaners, paints, adhesives, acid, and caustics
 - PCB-containing items (lead paint unattached to substrate, lead-acid batteries)
 - Material trapped in sumps and traps
 - Mercury-containing items (batteries from smoke detectors, fluorescent lights, thermostats)
 - Oils including used oil
-
- [Minnesota pre-demolition rules](#)
 - [Recycling, salvage, and disposal vendors](#)

4. Implementation

- Secure equipment and needed resources
- Prepare the job site
- Follow the detailed project work plan
- Follow through with the appropriate materials management plan
- Issue identification and troubleshooting (ongoing)
- Tracking progress and record-keeping



Photo Credit: Better Futures MN



Photo Credit: MPCA

5. Close-out

- Project completion and verification with building owner
- Reporting and completion paperwork
- Budget close-out, invoicing, budget reconciliation



Photo Credit: Dave Bennink

Track and report your success

- Document your process taking note of key metrics such as pounds of material salvaged, recycled, and discarded.
- Reflect on successes, challenges, and any unexpected changes that shaped the project.
- Share your success and lessons learned with various networks, including organizations with a focus in sustainability and the built environment.

Tools

When it comes to using tools for deconstruction, always think about safety first. Having the proper tools for salvaging materials is essential to ensure safety and maintain the quality of the salvaged materials.

Personal protective equipment (PPE): everybody on-site salvaging materials should be equipped with **gloves, a respirator, and safety glasses.**

The right tools will vary based on what you are salvaging. Some recommended tools are:

- Cutting tools (utility knife, 5-in-1 tool)
- Saws (handsaws, hacksaw, reciprocating, circular, chainsaw)
- Mini-router and Oscillating Multi-tool)
- Prying tools (flatbars, crowbars, Cat's paw type prybars, roofing shovel)
- Various wedges and chisels
- Nail nippers, Nail Jack®, and NailKicker®
- Common tools (hammers, screwdrivers, pliers, wrenches, drills)
- Extension cord, portable generator

De-nailers are a game changer for reusing wood!



Photo credit: Upwood Tools

Minnesota Tool Library

has a wide variety of tools that can be rented to individuals with memberships. Check them out for the tools you need for your salvage project.

If you are tasked with moving the salvaged materials, make sure you have the necessary tools to efficiently transport the materials:

- Sawhorses
- Banding tools
- Ratchet straps and rope
- Shrink wrap
- Pallets
- Carts/pallet jack/forklifts

Safety tip!

Dust, especially at job sites with toxic materials, is best managed with water and HEPA vacuums and air filters. Having the proper equipment for cleanup is essential at any jobsite.



Photo Credit: Dave Bennink

Volunteer coordination and mobilization

For community-based initiatives, utilize your network to find and engage volunteers to help with planning, project management, and salvaging. Some engagement strategies are:

- Allowing volunteers to take salvaged materials
- Targeting mission-driven individuals/groups
 - Historic preservation, environmental, vintage and antique collectors
- Focus on why the work matters

Volunteer resources:

- [VolunteerMatch](#)
- [HandsOn Twin Cities](#)
- [Twin Cities Habitat for Humanity](#)
- [Corporate Volunteering and Sponsorships](#)





All for Reuse Map

Interactive map of the United States representing different reuse organizations, businesses, and resources.

Rethos Deconstruction Map

Interactive map featuring deconstruction info, resources, contacts, and stories throughout Minnesota.

Sustainable Built Environment Newsletter

Sign up to hear about plans, policies, and stay up to date on deconstruction and building reuse in Minnesota!

Twin Cities salvage market

The best way to support deconstruction and salvage is to buy second-hand. Here are some great places to support the Twin Cities circular economy.

- [Minnesota Materials Exchange](#)
- [Better Futures Minnesota](#)
- [Bauer Brothers Salvage](#)
- [Scrapbox Salvage Co.](#)
- [Architectural Antiques](#)
- [Twin Cities Habitat ReStore](#)
- [Guided Salvage Antiques](#)
- [City Salvage](#) & many more

Case Study: Great River Children's Museum

Located in downtown St. Cloud, this old bank was deconstructed and is being repurposed to be a children's museum in central Minnesota.

The deconstruction initiative was volunteered with David Mohs as the primary coordinator. The salvage project was a result of the effort to reduce building material waste from the remodel.

The Great River Children's Museum will feature eight core exhibits and utilize "large-scale, physical settings that engage children and adults in interactive, self-directed, shared learning experiences."

To learn more, stay updated, and support visit the GRCM's [website](#).



Photo Credit: Ann Marie Johnson



Case Study: Great River Children's Museum



The Process:

1. Turned off unnecessary utilities to save of monthly cost during the deconstruction.
2. Creation of an inventory of all the materials available to be salvaged.
3. Hazardous waste inspection/removal prior to opening the salvage projects to the public
4. Incremental invites to salvagers in the community. Individuals/groups salvaging were responsible for on-site deconstruction of selected items and were required to sign a liability waiver.
5. Removed electrical and other building components before remaining demolition
6. Demolition permits and demolition for what couldn't be repurposed.

The deconstruction project was the culmination of collaborations with museum consultants, designers, and architects.

The initiative occurred during the COVID-19 pandemic, presenting a few barriers such as delays, miscommunication, and general weariness of the concept of reuse. Despite the challengers, the effort successfully diverted **36,258.8 pounds** of material from the waste stream. All the materials were available for free, with some exceptions of some valuable metals. All types of salvagers were involved and helped make this deconstruction and reuse project so successful.

Case Study: Great River Children's Museum

Key Takeaways:

- The construction field needs more education regarding sustainable materials management.
- Building material reuse is somewhat difficult in rural and central Minnesota.
- Deconstruction saved money by requiring less demolition permits, demolition labor, and dumping.
 - It also engaged the community and mobilized volunteers!
- Resources are important, but skills and persistence pushed this project past the finish line.
- It's good to have someone familiar with construction and the built environment on board.



Photo Credit: Ann Marie Johnson



Additional resources

- [U.S. EPA- Sustainable Management of Construction and Demolition Materials](#)
- [EPA Construction and Demolition Materials Best Practices](#)
- [Rethos-Deconstruction Masterclass Series](#)
- Twin Cities Deconstruction Organizations:
 - [Better Futures Minnesota](#)
 - [Birch Group](#)
- [Exploring Alternatives Youtube video](#)
- [Delta Institute Tool for Governments and Economic Practitioners](#)
- [The Craftsman Blog](#)
- [ReCapturit](#)
- [Building Deconstruction Request for Funding Proposal \(Example\)](#)