FERNDALE C&D ORDINANCE

Catalyst Leadership Circle Fellowship

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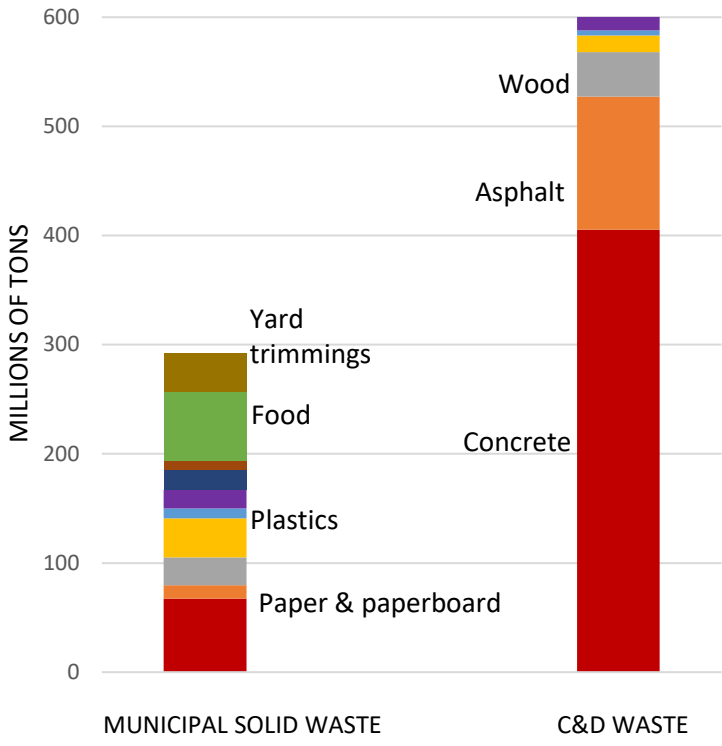
Introduction

The largest single waste source is not single-use plastics, or cardboard, or food. In fact, if you were to aggregate all the waste generated in homes and businesses that comprise the municipal solid waste stream, you would only reach about half of the amount generated by the largest waste source. This largest waste source is construction and demolition debris. This construction & demolition (C&D) waste includes concrete, asphalt, metal, wood, and other waste (Figure 1).[1] Depending on the regional market, 75% to 90% of these materials are completely recyclable, and some industry experts estimate that 99% of any demolished building can be diverted from the landfill.[2]

The City of Ferndale's City Manager's Office is working to increase the landfill diversion rate for major waste sources. As a Catalyst Leadership Circle community, Ferndale worked with a graduate student fellow in summer 2022 to create a Construction & Demolition (C&D) ordinance that aligns with Michigan landfill diversion goal, Part 115 (Solid Waste Management) of the Michigan Natural Resources and Environmental Protection Act, and the City of Ferndale Downtown Waste Reduction and Recycling Plan. Ferndale's Downtown Waste Reduction and Recycling plan includes the specific recommendation to "increase data availability and tracking of construction and demolition (C&D) debris as a precursor to establishment of requirements for diversion of C&D materials." These state and local goals guided the creation of the draft C&D ordinance. The ordinance and corresponding fellowship deliverables aim to increase the diversion of currently landfilled C&D waste through recycle and reuse mechanisms during construction and demolition.

The long-term goal of the C&D ordinance is to mandate deconstruction practices in lieu of demolition. Demolitions involve disconnecting utilities, leveling a building using mechanical excavators, and off hauling the aggregated waste. Conversely, deconstruction involves the disassembly of building components piece-by-piece to preserve materials for reuse and to sort the materials that cannot be reused for easier recycling. 90% of C&D waste is generated through demolitions, and numerous environmental and public health concerns are also associated with demolition practices. The primary benefit of pursuing deconstruction instead of demolition is the limited landfill waste generation, but there are numerous environmental and public health and safety concerns associated with demolition as well. This report will include a financial analysis comparing demolition and

Figure 1 – Waste Generated in US in 2018, US EPA



[1] "Advancing Sustainable Materials Management - US EPA," December 2020.

[2] Conversations with industry experts: Ted Reiff, Christopher Rutherford, Maybo AuYeung

deconstruction. This report recognizes that there are numerous financial costs associated with environmental degradation, and as such, environmental costs are included in the financial analysis section.

A draft C&D ordinance is included along with possible incentives to aid in compliance. A next steps section discusses the ongoing and recommended local and state action to support C&D waste reduction not only in Ferndale but across Michigan. Lastly, guides and tools for property managers and contractors working in Ferndale to assist with ordinance compliance. Robust stakeholder engagement through focus groups, outreach events, surveys, and other communications are recommended to ensure effective implementation of the C&D ordinance.

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Research Approach

To create an impactful C&D ordinance that enhances partnerships, incentivizes property owners & contractors, and encourages development of recycle, reuse, and workforce markets, local and national research was conducted. The fellow researched existing deconstruction ordinances and programs; identified their mode of operation & enforcement; and – when possible – gathered detail on their effectiveness.

Meetings and Interviews

The fellow also had phone calls or video meetings with industry experts, local stakeholders, and potential partners. Notes for all the nineteen below meetings are privately accessible to the Ferndale City Manager's office.

Cities with Mandated Deconstruction:

- City of Portland
- City of Palo Alto
- Zanker C&D Recycling MRF
- Palo Alto's C&D Waste Hauler

Industry Experts:

- Rex Lamore, MSU Domicology
- Jennifer Petoskey, City of Ann Arbor
- 4 deconstruction contractors

Stakeholders:

- Scott Worthington, Ferndale Building Department
- 3 local demolition contractors

Potential Partners:

- Architectural Salvage Warehouse (job training and salvage)
- Green Halo (waste tracking software)
- Kamps Pallets (wood recycling)
- Re-Trac (waste tracking software)
- ReUse Consulting (job training)
- ReUse People (job training)
- Unlimited Recycling (recycling consultant)
- Urban Ashes (wood reuse consultant)
- Woodward Throwbacks (wood salvage)

Below are summaries of the important takeaways from each group of interviewees.

Cities with Mandated Deconstruction:

Relying on state regulations that mandate landfill diversion is a strong way to ensure that a deconstruction ordinance or a landfill diversion ordinance is effective. Altering the state or local code to allow for salvage materials to be used in new construction will address the demand that is necessary for these materials to be salvaged in demolition/deconstruction projects. Incentivizing demolition or deconstruction permit holder donations to non-profit salvage partners will help increase the landfill diversion of materials.

Industry Experts

A successful C&D ordinance would also include reuse/recycle requirements for new constructions. Heavy enforcement of a new C&D waste ordinance is not great practice and including the option to administratively alter enforcement mechanisms allows enforcement procedures to evolve as the ordinance is adopted. A primary challenge of any deconstruction ordinance is the availability of contractors willing and able to deconstruct a building. Beginning with a government-funded project as a pilot may allow for stronger stakeholder engagement. Implementing ordinance phases based on build years will influence the type and quality of building materials that are salvaged; responding to market demand in this way will make a deconstruction ordinance more effective.

Stakeholders

Instituting a requirement to deconstruct buildings instead of demolition would not likely result in demolition contractors changing their methods. Rather, demolition contractors would no longer accept work in Ferndale. Instead of a shifting workforce, the emergence of a new deconstruction workforce would occur. The stakeholders that would remain, however, include the general contractors for the new buildings constructed on site of any demolished/deconstructed building. Therefore, clear communication with general building contractors of the new requirements is essential. Furthermore, both demolition and construction contractors are already recycling and salvaging some material, but there is no existing mechanism to report this diversion rate. As such, collecting data will be a critical first step in any C&D ordinance to understand the existing C&D waste ecosystem.

Potential Partners

Comingled C&D waste is hardly, if at all, being recycled in Michigan. Most of this waste is being sent to the landfill. However, there are many recycling facilities and salvage companies operating in the region, eager for new source material. Each facility has their own unique set of requirements to accept material for recycle or reuse. As such, on-site separation of material is the first best practice to increase the landfill diversion rate. Secondary requirements, determined by the material type, will also contribute to the landfill diversion rate. For example, most salvage wood partners require denailing, and almost all recycling facilities cannot accept loads that are mixed with any other materials. On-site waste separation practices must be adjusted, as many construction employees are accustomed to depositing of everything in comingled debris boxes.

Organizations that offer deconstruction services and deconstruction training are available both locally and across the United States. Detroit-based Architectural Salvage Warehouse and California-based The ReUse People are very promising partners. The ReUse People has a Michigan Regional Manager and has received EGLE-grant-funding for deconstruction trainings of for-profit contractors. Furthermore, EGLE grants have supported the expansion of C&D specific recycling operations in Michigan. Ferndale can support the development of a local deconstruction workforce by marketing training and certification opportunities; contributing to grant applications; and coordinating with nearby municipalities looking to expand the deconstruction network.

Model Ordinances and Programs

Portland

- Deconstruction ordinance passed in 2016, first major city in US to adopt
- Phased approach of ordinance adoption based on build year, single-family and duplexes only
- $3,000 incentives offered for pilot projects, prior to requirements
- Contractor training with Build Reuse prior to ordinance
- Continued workforce development after ordinance adoption
- Primary diverted material: lumber
- Partners: Build Reuse, Certified Deconstruction Contractors, new retail

Palo Alto

- Benefited from pre-existing robust recycling procedures for C&D waste, including state-led markets[3]
- 95% diversion by 2030 goal
- Debris box limitations imposed, requiring all dumpsters to be ordered from single hauler: GreenWaste
- Began July 1, 2020; surveys required in 2016
- No pilot or incentives offered
- Applies to residential and commercial projects
- Salvage survey required along with permit application
- No workforce training program to ensure deconstruction trade skills
- On-site sorting required: salvageables + source separation of recyclables
- Additional materials sorting conducted at Zanker Recycling contributes to high diversion rates[4]

Atlanta

- $50,000 EPA Grant to fund deconstruction pilot with Build Reuse
- Directly working with Materials Reuse Center (Lifecycle Building Center)
- C&D waste not managed by City. Contractors and property owners responsible for disposal coordination
- Program specifics very vague

Boise

- Ordinance: Moving, Deconstruction or Demolition of Buildings code[5]
- Contractors/site managers required to send photos of salvageable material to Reuse facilities and coordinate pickup (list provided by City)
- Waste Management Plan required after project completion along with diversion data
- No required audits, and unclear enforcement procedures

Milwaukee

- Effective 2018, applies to structures built before 1930 and historic districts
- Requires use of “Certified deconstruction contractor”, but no workforce training program to ensure deconstruction trade skills

[3] California, State of. “Caltrans Specifications for Aggregate Base and Subbase.” CalRecycle Home Page. Accessed July 18, 2022. https://calrecycle.ca.gov/condemo/specs/caltransagg/.

[4] “Diversion Rates.” Zanker Recycling - Recycling, Debris Diversion, Composting. Accessed July 18, 2022. https://www.zankerrecycling.com/zanker-recycling/how-we-recycle/diversion-rates/.

[5] “Demolition/Deconstruction.” City of Boise. Accessed July 18, 2022. https://www.cityofboise.org/departments/ planning-and-development-services/building/demolitiondeconstruction/.

- Rigorous employment requirement has contributed to program floundering: contractors are required to comply with the Residents Preference Program (RPP), where 40% of work hours must be completed by unemployed or underemployed city residents
- Multiple suspensions of program

Pittsburgh

- Effective 2021, applies only to condemned city-owned properties. Concurrent goal of reducing blight
- Zero Waste by 2030 goal
- Materials assessments, waste management plans, and project reports required
- Unclear who is conducting deconstruction work; no training program implemented[6]
- Benefit from existing C&D Recycling Facility and reuse partnerships[7]

Austin

- Landfill diversion goals, not deconstruction
- Goal of 95% landfill diversion by 2030
- Introduced in phases, beginning with large commercial demolitions and remodels
- Three years between phases 1 and 2
- Benefits from existing C&D waste processing facility, authorized processor list
- Contractors just report landfill, recycling, and reuse weight tags
- Unclear enforcement mechanisms
- No site survey required to determine materials present prior to demolition

Cook County, IL

- Recycle/reuse requirements, not deconstruction
- Garages and sheds are exempt
- 5% reuse requirement, 70% total landfill diversion requirement, accessed by weights
- Benefits from existing C&D recycling facilities[8]

Fitchburg, WI

- Similar population size to Ferndale
- Recycling lumped with reuse; no reuse-only requirements
- Pre-work survey/report and post-work report required
- Reuse recommendations carry little power
- Benefits from C&D waste processing facilities list provided by state
- No updates since 2013, unclear program success

Lansing, MI

- Drafting C&D ordinance that aims to divert 65% of waste from the landfill
- Ordinance not yet passed by City Council

Muskegon, MI

- No C&D ordinance yet implemented to divert C&D waste from landfill
- Certified deconstruction contractors operating in the area
- Working to develop deconstruction workforce in the area, including through an EGLE-funded deconstruction training hosted by The ReUse People

[6] "A(n Internal) Framework to Advance Deconstruction Policies in Pittsburgh, PA." Pittsburgh, PA Government website. Accessed July 18, 2022.

[7] "Roadmap to Zero Waste - Pittsburgh, PA." Pittsburgh, PA Government website. Accessed July 18, 2022.

[8] "Construction & Demolition Debris Recyclers in the Chicagoland Area," August 2009. https://www.chicago.gov/content/dam/city/depts/doe/general/RecyclingAndWasteMgmt_PDFs/CandDrecycling/ConstBestMgmtPractices2.pdf.

Financial Analysis

Below is a comparison of the financial differences between demolition and deconstruction for the average single-family housing unit. While the operations cost of deconstruction is significantly higher than demolition, in most cases, the resale value of the salvaged materials and/or the federal tax incentive for any donated salvaged materials offsets this cost differential. Furthermore, the environmental costs of demolition can translate to broad economic costs. Deconstruction has a substantially lower environmental cost seen through both carbon benefit and waste production. Furthermore, since demolition activities contribute little to a circular economy, when we factor in the impacts of constructing a new home from raw materials compared to salvaged materials (available through deconstruction), the carbon impacts amplify.

Table 1 – Financials of Deconstruction versus Demolition		
	Demolition	**Deconstruction**
Average cost for single-family house[9]	$10,000	$20,000
Average number of workers[10]	2-3	6
Average resale value of salvaged materials[11]	$0	$25,000
Cash value of donated materials claimed through itemized federal tax credit at ~30% tax bracket[12]	$0	$35,000
Total Global Warming Potential[13]	-6,170 kg CO_2	-13,849 kg CO_2
Waste sent to landfill[14]	48 tons	8 tons
New construction	**Raw Materials**	**Recycled Materials**
Average carbon emissions for single-family home	80 tons[15]	46.4 tons[16]

[9] Jordan, Wendy A. "Deconstruction Can Be a Tax-Savvy Alternative to Demolition." The Washington Post. WP Company, August 25, 2016. https://www.washingtonpost.com/realestate/deconstruction-can-provide-huge-tax-benefits-for-property-owners/2016/08/24/8f6c5270-62fb-11e6-96c0-37533479f3f5_story.html.

[10] Conversations with multiple demolition contractors and deconstruction contractors operating in Ferndale

[11] Conversations with nonprofit salvage companies operating in Michigan

[12] Gonzalez, Julio. "Don't Trash the Interior-Donate It to Charity for a Substantial Tax Break." Engineered Tax Services, August 17, 2021. https://engineeredtaxservices.com/when-gutting-dont-trash-the-interior-donate-it-to-charity-for-a-substantial-tax-break/.

[13] Nunes, Andey and Simon Love. March 1, 2019. *Deconstruction vs. Demolition: An Evaluation of Carbon and Energy Impacts from deconstructed homes in the City of Portland.*

[14] "Fact Sheet: Save with Deconstruction - TRPA." Accessed July 18, 2022. https://www.trpa.gov/wp-content/uploads/documents/archive/Deconstruction_Fact_Sheet.pdf.

[15] Berners-Lee. October 14, 2020. "What's the carbon footprint of building a new house?" *The Guardian.* https://www.theguardian.com/environment/green-living-blog/2010/oct/14/carbon-footprint-house

[16] Cowin, Laurie. November 29, 2017. "Building with recycled materials could reduce carbon footprint." *Construction Dive*. https://www.constructiondive.com/news/building-with-recycled-materials-could-reduce-carbon-footprint/511878/

About Ferndale

Ferndale is an inner-ring suburb of Detroit, Michigan. According to data from the City's most recent Master Plan, Ferndale's population is around 20,000. Like other cities in the region, the population is slowly declining. However, the number of households in Ferndale, the average household income, and the employed population working in Ferndale are all growing. Approximately 83% of Ferndale residents are White. Roughly half of Ferndale's population is 20 to 39 years old, contributing to the vibrant commercial core and culture of the City.

Landfill Capacity

Like many regions around the world, southeast Michigan is grappling with shrinking landfill capacity (Table 2). Identifying solutions to traditional waste disposal methods if a primary step in addressing this environmental, economic, and public health crisis. Action from both government agencies and private organizations is critical to minimize the volume of waste being sent to the landfill. Since C&D waste is the single largest waste contributor, regulations on C&D waste are sure to have a substantial impact on our waste facilities.

Table 2: Landfill Capacity near Ferndale

Facility Name	Remaining Capacity	Capacity Used in FY 2021	Projected Years of Remaining Capacity	Calculated Years of Remaining Capacity
ADVANCED DISPOSAL SERVICES ARBOR HILLS LANDFILL, INC.	14,741,000	1,009,000	12	15
CARLETON FARMS LANDFILL	46,526,320	2,302,281	20	20
EAGLE VALLEY RECYCLE & DISPOSAL FACILITY	7,976,101	694,019	17	11
OAKLAND HEIGHTS DEVELOPMENT, INC.	732,190	245,893	2	3
PINE TREE ACRES INC	36,088,629	3,258,655	18	11
WOODLAND MEADOWS RDF-VAN BUREN	51,434,000	2,541,000	20	20

Demolition Landscape

Currently, C&D waste data is not collected in Ferndale. Conversations with demolition contractors reveals that demolitions are conducted using small crews over one to three days, and they rely heavily on mechanical excavators. Items with market value that can be conveniently salvaged or recycled are diverted from the landfill. However, no waste management plans or data tracking ae used, leading to uncertainty of the current landfill diversion rate. General contractors typical employ demolition contractors who off haul the C&D waste in their own trucks. Some companies occasionally utilize debris boxes to collect and dispose of waste. Little to no waste sorting is occurring. The City of Ferndale does not have a list of approved general contractors, demolition contractors, or waste disposal/hauling companies. Demolition contractors rarely give the building department more than one day's notice of

upcoming demolition activities. A five-year assessment of demolition permits, provided by the Ferndale Building Department, is included on Table 3. The data alludes to an average of twelve demolition projects per year. Most of the demolitions are conducted in order to make room for new construction at the site.

Table 3: Ferndale Demolitions: 5/23/17 – 5/23/22	
Permits issued	84
Projects finaled	60
Projects pending	4
Commercial demo projects total (including pending)	19
Full building	10
Interior demos	8
Residential demo projects total (including pending)	45
House	23
Garage	31
Pool	1
**No interior residential demos noted*	
Built before 1978 (lead)	98.3%
Built before 1989 (asbestos)	100%

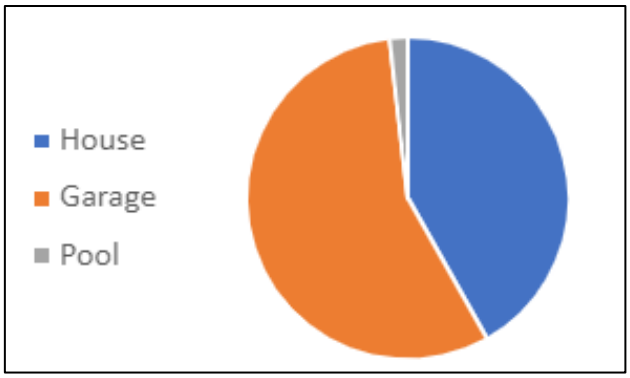

Figure 2 – Residential Demolitions 5/2017 – 5/2022

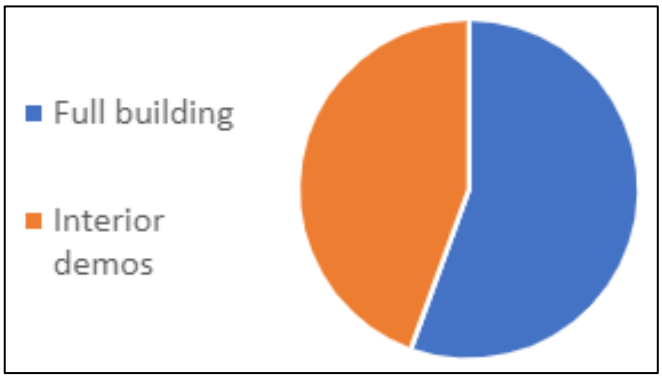

Figure 3 – Commercial Demolitions 5/2017 – 5/2022

Remodels/Renovations

Research of the deconstruction process as well as conversations with industry professionals and Ferndale deconstruction stakeholders illuminated the impact of requirements for remodels and renovations. Remodels and renovations inherently include some form of deconstruction, as excavators are rarely, if ever, being used for these types of projects. To preserve the structural or other components that are not being replaced, material-preserving practices are implemented to some extent. Therefore, remodels and renovations pose great potential to both build out the deconstruction workforce and support the culture of reuse. However, as Table 2 illustrates, residential permits for interior demolitions are rarely pulled. This would make any enforcement of deconstruction requirements very challenging.

Ferndale C&D Ecosystem Map

The following guide indicates the players and stakeholders that comprise the C&D ecosystem in Ferndale. As additional partnerships and players are uncovered and developed, this map can be expanded.

Ferndale C&D Ecosystem Map	
Reuse: Suppliers of salvaged, used, or refabricated building materials	
Urban Ashes	Consultant to facilitate lumber/wood salvage
Architectural Salvage Warehouse	Warehouse, accepting finishes and building materials
Woodward Throwbacks	Salvage repurposes, accept variety of products
Rochester Salvage & Supply	Reclaimed lumber retailer
Reclaimed Michigan – reclaimed lumber retailer	Reclaimed lumber retailer
Hauling/Warehousing: Entities supporting the logistics of moving and storing products	
Car Trucking	Current contracted waste hauler for residential waste in Ferndale
Government/Public Agency: Examples of jurisdictions with policies or enabling infrastructure in place	
City of Ferndale	Solid Waste Management Plan, identifying C&D waste reduction as primary goal
SOCRRA	Municipal corporation of 12 member municipalities
Oakland County	Solid Waste Plan, currently undergoing update
EGLE	Offering funding and regulatory assistance
Network/Resources: National member organizations, digital platforms, and materials databases	
Green Halo	Waste disposal data tracking
Michigan Recycled Materials Market Directory	Database of some market players, run by EGLE
Construction & Demolition Recycling Association	Database of some market players
Remanufacturing/Recycling: Manufacturer take-back programs, fabricators, and targeted recycling	
Unlimited Recycling	Recycles some source separated C&D
Building Product Ecosystems	Mixed C&D, including drywall
Mid-Michigan Recycling	Recycles source separated wood
Novi Crushed Concrete	Recycles source separated concrete
Mound Road	Concrete, Brick, and Block Recycling
Kamps Pallets	Recycles source separated wood from deconstruction projects, no demolitions.
Vinyl Siding Institute	Recycles vinyl siding
American Classic Roofing and Building Supply	MI roofing contractor working to expand asphalt-shingle recycling drop-off sites state-wide
Training/Education: Workforce development in the field and programs in academic institutions	
ReUse Consulting	Deconstruction training program for contractors, based in Pacific NW
ReUse People	Deconstruction training program for contractors + crews, based in Oakland CA
MSU Domicology	Technical training for city deconstruction leaders
Local community colleges	Potential for additional deconstruction training
Consulting/Research: Resource experts specializing in material reuse or circular economy	
MSU Domicology	Research hub
Resource Recycling Systems	Diversion verification and consulting
Green Task Force C&D Subcommittee	Industry working group

Draft Ordinance

Definitions:
"Approved deconstruction contractor" means a contractor that has successfully completed an approved deconstruction training program either conducted by or pre-approved by the Department of Community and Economic Development, and where the contractor appears on a list of approved deconstruction contractors maintained by the Department and posted on, or accessible from, the Department's website. A firm shall be considered approved if at least one person currently employed by the firm is approved.

"Beneficial Use" means productive use of materials reclaimed through separation, processing, deconstruction, or other means, and made available for recycling, reprocessing, or reuse, but does not include placement in a disposal facility, used as daily cover in a disposal facility, or used for energy recovery.

"Construction" means the building of any facility or structure.

"Construction and Demolition Waste" means commonly discarded materials removed from premises of a project - construction, remodeling, repair, demolition, deconstruction, renovation, etc. Examples of such materials include gravel, bricks, wallboard, cardboard, roofing material, carpeting, or wood. "Deconstruction" means the safe and systematic dismantling of a structure, or portion thereof, or extracting reusable materials to maximize the salvage of materials for reuse, in preference over salvaging materials for energy recovery or sending the materials to the landfill.

"Demolition" means the process of dismantling or destroying of a structure after its life of serviceability by pre-planned and controlled methods.

"Diversion Rate" Rate means the percentage by weight or volume (or specified calculation by local government or waste processor) of the materials generated by a C&D project that is diverted from disposal in a landfill, to be used in a beneficial manner.

"Landfill" means a disposal site where solid waste, such as paper, glass, and metal, is buried between layers of dirt and other materials in such a way as to reduce contamination of the surrounding land.

"Management Plan" means a document submitted by a building, construction, or demolition permit holder that outlines recycling/reuse objectives, estimates, and other specified information, depending on individual administration rules.

"Recycle" means to process waste materials into new products or material feed stock for products. Materials that can be recycled include, but are not limited to, concrete, metal piping, and asphalt roofing shingles.

"Reuse" means the use of a product or material that was previously installed for the same or similar function to extend its life cycle. Materials salvageable for reuse include but are not limited to cabinets, doors, windows, hardware, fixtures, flooring, siding, and framing lumber.

"Salvage" means the controlled removal of construction or demolition debris/ material from a building, construction, or demolition site for the purpose of on or offsite reuse, or storage for later reuse. Examples include but are not limited to air conditioning and heating systems, columns, balustrades, fountains, gazebos, molding, mantels, pavers, planters, quoins, stair treads, trim, wall caps, bath tubs, bricks, cabinetry, carpet, doors, ceiling fans, lighting fixtures, electrical panel boxes, fencing, fireplaces, flooring materials of wood, marble, stone or tile, furnaces, plate glass, wall mirrors, door knobs, door brackets, door hinges, marble, iron work, metal balconies, structural steel, plumbing fixtures, refrigerators, rock, roofing materials, siding materials, sinks, stairs, stone, stoves, toilets, windows, wood fencing, lumber and plywood.

Ordinance Requirements:

PHASE I – Effective July 1, 2023: materials tracking for all demolitions.
Requirement: All permit holders for a commercial or residential demolition projects are required to report construction & demolition waste disposal methods and weights through a Waste Management Plan & Report. Using Green Halo [or equivalent software], permit holders are required to upload copies of all weight tags, recycling reports, and salvage reports from current demolition contractors.

a. For landfilled materials, weights of the disposed materials will be reported.
b. For recycled materials, weights of the disposed materials will be reported. Third party verified diversion rates will be used to calculate landfill diversion rate and rate of beneficial use.
c. For reused materials, conversion charts will be used to calculate the weight of materials.

PHASE II – Landfill diversion for buildings older than 1931.
Requirement: All permit holders for commercial or residential demolition projects are required to divert materials from the landfill at the rates indicated below (by weight).

a. Stage 1, effective July 1, 2024: 25% diversion from landfill
b. Stage 2, effective July 1, 2025: 50% diversion from landfill
c. Stage 3, effective July 1, 2026: 75% diversion from landfill

Waste Management Plan & Report will now indicate landfill diversion goal and results.

PHASE III – Landfill diversion for buildings constructed during and after 1931.
Requirement: All permit holders for commercial or residential demolition projects are required to divert materials from the landfill at the rates indicated below (by weight).

a. Stage 1, effective July 1, 2025: 25% diversion from landfill
b. Stage 2, effective July 1, 2026: 50% diversion from landfill
c. Stage 3, effective July 1, 2027: 75% diversion from landfill

PHASE IV – Effective July 1, 2028, full-building deconstruction requirements.
Requirement: No full building demolitions permitted. No mechanical excavators may be used.

a. Pre-deconstruction meeting with City staff, general contractor, property owner, and other relevant parties to develop individual project plan that aligns with deconstruction and waste diversion requirements.
b. General contractors must employ an approved deconstruction contractor or crew.
c. A pre-deconstruction survey conducted by the Building Department will identify the reusability and recyclability of building materials. Reuse is the most preferred waste disposal goal.
d. The Waste Management Plan will include a report from the pre-deconstruction survey.

Violation may be subject to penalty.

Exemptions available if the house is structurally unsafe or hazardous to human life.

*Note: Enforcement mechanisms to be determined by City, in alignment with Building Department enforcement procedures.

Possible Compliance and Participation Incentives

Gradual Incentive: Gradual increase of permitting costs for demolition projects while the permitting costs for deconstruction remain lower.

Middle Stage Incentive: City of Ferndale encourages and helps in the marketing of paid deconstruction certification training, funded through partner organizations, grants, etc.

Ongoing Incentive: Federal tax incentives of donated reusable building materials can offset increased deconstruction costs. For sold items, retail value can help offset increased deconstruction costs. For folks in

Later Stage Incentive: Salvaged materials donated to reuse partners count 1.5x toward diversion rate. A recommended list of reuse vendors included. Option to donate to another reuse vendor, but reporting would be required for Ferndale to verify that they are a legitimate reuse player.

Potential Incentive: Minor variances (built-to requirement, floor area ratio, etc.) available for new builds that hosted a voluntary deconstruction project on site.

Next Steps

The recommended timeline involves each phase and stage being implemented 1 year apart, beginning with Phase 1 in July 2023 and full-building deconstruction requirements implemented in 2028. The data collected in Phase 1 will help inform how near or far Ferndale is to the diversion targets outlined in Phases 2 and 3. If the collected data reveals that a longer timeline is needed in order for the landfill diversion targets to be feasibly met, then the timeline can be adapted. Phase 1 will also more vividly reveal the specific recycle and reuse markets that require further development to reach higher landfill diversion of C&D waste.

To complement the recommended timeline, we suggest beginning formal ordinance development in Fall 2022. To support the recycle and reuse market development, Ferndale Zero Waste Program Coordinator Claire Dion is communicating with NextCycle MI, the organization that supports the City's Compost Pilot, to support a Michigan convening of communities wishing to pursue similar C&D waste requirements. Ferndale can also begin right now to support and encourage deconstruction contractor training.

Municipalities in the region, including Detroit[17] and Pontiac[18], have conducted government-funded deconstruction training and projects. These projects were largely completed to address blight and offer workforce development to low-income community members. There are certainly operational lessons to be learned from these organizations. However, government-funded deconstruction that addresses blight is quite different from a government regulation that impacts for-profit contractors who are demolishing structures to build new ones.

Michigan does not currently include construction and demolition waste as part of its reporting and landfill diversion goals. EGLE can include C&D waste in their next gap analysis to further understand what state action can support cities like Ferndale that are interested in pursuing C&D regulations. Furthermore, Part 115 (Solid Waste Management) of the Michigan Natural Resources and Environmental Protection Act that limits the disposal options for comingled waste loads can be amended to include exemptions for C&D waste; this way, waste haulers operating in counties with few or no options for mixed C&D recycling can take advantage of neighboring counties with more robust mixed C&D recycling options.

SEMCOG publishes information on residential building permit information for all the Southeast Michigan communities it serves, but demolition data is currently limited to just the total units demolished since 2018(16,013).[19] To help communities understand the scope of C&D waste in their community, SEMCOG might consider adding more demolition detail.

An updated state-wide recycle market directory or C&D ecosystem map can assist in the creation of a culture of C&D recycling, reuse, and deconstruction across Michigan.

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[17] Nesterowich, C. (2019, November 19). “Deconstructing Detroit.” *Hour Detroit Magazine*. https://www.hourdetroit.com/community/deconstructing-detroit/

[18] Podell, L. (2016, June 27). “'Revive Pontiac' battles blight, creates jobs.” *WDIV*. https://www.clickondetroit.com/news/2016/06/27/revive-pontiac-battles-blight-creates-jobs/

[19] Community profiles. (n.d.). Retrieved July 27, 2022, from https://www.semcog.org/data-and-maps/community-profiles#Housing

Stakeholder Guides

To help stakeholders both learn and adjust to new C&D guidelines, the following editable guides and templates have been created.

- Shifts and Lifts: This guide indicates the changes (shifts) that deconstruction stakeholders must make to comply with the new ordinance. The government action (lifts) that are needed to support the stakeholders comply with the ordinance are also indicated.
- Waste Reduction Guide for New Builds/Remodels: This guide includes detailed how-to steps that can be taken to both support and emulate new deconstruction requirements including expanding the salvaged materials market and minimizing waste.
- Demolition Garage Sale: This one-pager is intended for property owners and general contractors preparing seeking to divert C&D waste through salvage resale prior to demolition. A Garage Sale can be employed to:
    - support deconstruction actions instead of demolition
    - increase the financial benefit through salvage material resale
    - encourage a culture of reuse and deconstruction throughout the community
- Waste Management Plan: template to be used for Phase II ordinance compliance
- Waste Management Report: template to be used for Phase II ordinance compliance

Shifts and Lifts

Shifts:

- General contractors:
  - Track all waste using Green Halo [or equivalent software]
  - Instead of sending most C&D material to landfill, send material to approved recycling and reuse facilities/organizations, in alignment with required diversion rates
  - Host voluntary "garage sale" to sell salvaged materials prior to any demolition/ deconstruction
  - Phase IV: employ crew for (or themselves do) deconstruction in lieu of demolition contractor
  - Phase IV: participate in pre-deconstruction meeting with stakeholders
- Property owner:
  - Ensure waste disposal is being conducted in approved manner and is tracked
  - Host voluntary "garage sale" to sell salvaged materials prior to any demolition/ deconstruction
  - Connect with salvage/reuse partners to donate or sell materials fit for reuse
  - Phase IV: participate in pre-deconstruction meeting with stakeholders
  - Phase IV: hire only approved deconstruction contractor for building removal
- Waste hauler
  - Collect weight tags from each disposal site
  - Collect quantity data for donated or sold materials fit for reuse
  - Only dispose of waste after materials removed for salvage/reuse
  - Only deliver waste to approved facility, indicated in Green Halo

Lifts:

- City begins service agreement with Green Halo [or equivalent waste tracking software]
- Phase IV: participate in pre-deconstruction meeting with stakeholders
- City building or zero waste staff member conducts on-site survey prior to demolition
- City generates list of approved deconstruction contractors
- City generates list of third party verified disposal facilities through Green Halo

Waste Reduction Guide for New Construction/Remodels

What	Why
Create a materials management plan	Establishing expected quantities of reusables & recyclables and tracking the actual disposal helps ensure ordinance compliance.
Schedule demolition during rainy days	Wetting down buildings during demolition minimizes particulate air pollution.
Separate your non-reused waste by type	Source separation of materials increases the recycling rate and reduces the likelihood of a load getting rejected at a recycling facility.
Pursue deconstruction instead of demolition	Deconstruction practices make waste sorting much easier and increases the reusability of the building materials.
Source recycled or salvaged building materials	The costs of many raw building materials, such as concrete, metals, and some wood products, can be reduced by sourcing recycled options. For furnishings such as cabinetry, countertops, fixtures, and doors, salvaged options can be an earth-friendly, affordable alternative to new furnishings.
Dispose of material that cannot be recycled or salvaged at an appropriate landfill waste facility	Ensuring that waste not fit for reuse or recycling is disposed of in a certified landfill facility reduces pollution associated with some waste materials, particularly in older building materials.
Track all generated waste	Recording the volume of waste generated during the construction process can offer insight to limiting wastefulness of future projects.
Limit over-ordering	Over-ordering often leads to unnecessary waste.
Preserve and correctly dispose of all recyclable packaging material	If recyclable packaging material is expected, create a plan to separate this waste from the other landfilled material can increase the landfill diversion rate for your project.

Material-specific guidance to waste reduction

Lumber/wood

- Adhere your building design to standard lumber sizing can reduce the volume of cut-offs. Alternatively, order your framing components cut to your design-specific sizing.
- Use prefabricated framing components.
- Protect lumber stored on site from the weather and elements to prevent warping and twisting.
- For non-structural wood features, consider sourcing reused materials.

Masonry

- Stack and store masonry elements in protective manner.

Gypsum/Wallboard

- Adhere your building design to standard wallboard dimensions. Alternatively, order your wallboard cut to size.
- Use lightweight varieties which use less material.

Unused materials

- Many unused materials, from wood stains to insulation, can be donated to one of Ferndale's many salvage partners. Consult the Construction Ecosystem Map for guidance.

Demolition Garage Sale

What is it?

If you are demolishing a garage or other structure, you're likely preparing to haul a lot of waste to the dump. Before demolition, consider hosting a literal Garage Sale to sell the deconstructed building components for reuse.

What are the benefits?

- Limit material going into the landfill
- Decrease waste disposal fees
- Help salvageable material get a new life
- Support local craftspeople, artisans, builders, nonprofits, and the economy!

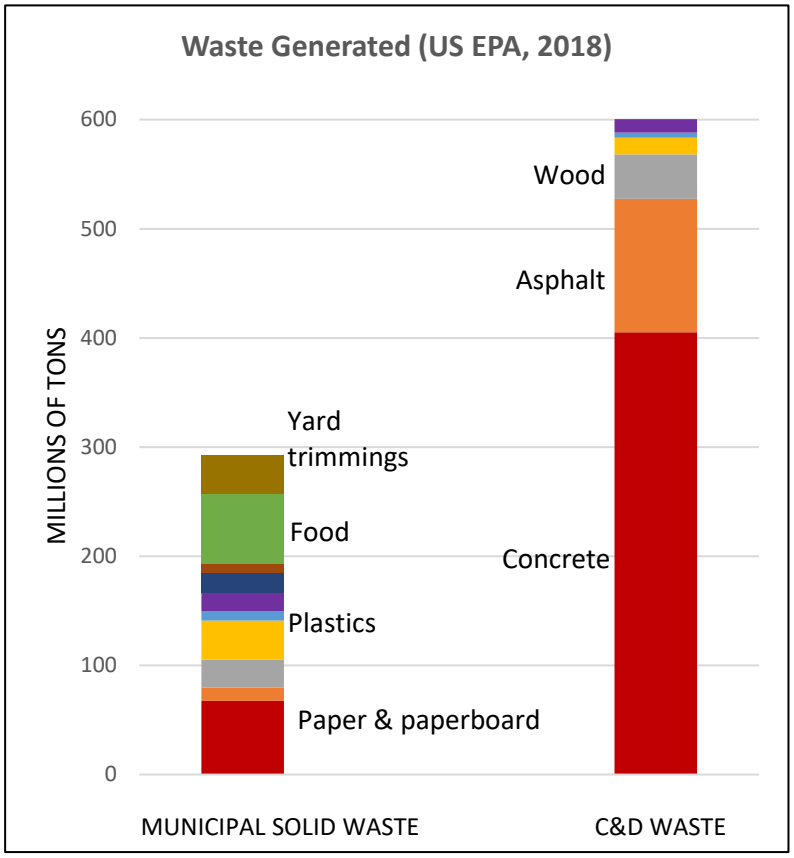
What kind of material can I sell?

Any salvageable building component that can be removed without excavation equipment is fit for a Garage Sale. Materials may include:

- Shelving
- Doors
- Windows
- Flooring
- Lumber
- Siding
- Shingles
- Hardware

How do I do it?

- Apply and receive your demolition permit: www.ferndalemi.gov/permits-licenses
- Homeowners are entitled to one garage sale every 6 months. No permit is required.
- Each garage sale can last up to 3 days.
- Wait until open Garage Sale ends to disassemble structural building materials.
- Ensure any salvaged material sold is dissembled safely by the property owner or a contractor.
- Estimate salvage rates using the EPA materials conversion chart and input into Green Halo project



Waste Management Plan – Ferndale Demolition & Construction

Company overseeing full project:
Project address:
Demolition/deconstruction subcontractor:

Waste Management Goals:

This project will recycle or salvage for reuse ___% by weight of the waste generated on site.

Communication Plan:

- Pre-demolition:

_____

- Post-demolition:

_____

- Pre-construction:

_____

- Post-construction:

_____

Expected Waste, Disposal, and Handling:

The following charts identify waste materials expected to be generated on this project, their disposal method, and handling procedures. *Add rows where necessary.*

Demolition / Deconstruction Phase

Material	Quantity	Disposal Facility/Site	Handling Procedure

Construction Phase

Material	Quantity	Disposal Facility/Site	Handling Procedure

Waste Management Report – Ferndale Demolition & Construction

Material Category	**Disposed of in Municipal Solid Waste Landfill** (weight)	**Disposed of at Recycling Facility** (weight)	**Disposed of through reuse or salvage** (weight)
Asphalt			
Concrete			
Porcelain Fixtures			
Ferrous Metals			
Non-Ferrous Metals			
Wood			
Glass			
Clay Bricks			
Paper			
Plastic			
Gypsum			
Paint			
Insulation			
Other (insert description)			
Other (insert description)			
Other (insert description)			
Total (weight):			
	Total of diverted waste:		
	Percentage of diverted waste:		

To estimate weights, use US EPA volume-to-weight conversion chart.[20]

[20] "Volume-to-Weight Conversion Factors, April 2016 - US EPA." Accessed July 18, 2022. https://www.epa.gov/sites/production/files/2016-04/documents/volume_to_weight_conversion_factors_memorandum_04192016_508fnl.pdf.