BRICK BY BRICK: ADVANCING ITHACA'S GREEN NEW DEAL THROUGH DECONSTRUCTION

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by

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ABSTRACT

This professional report explores how the Town of Ithaca can advance its Green New Deal goals through the implementation of a deconstruction program. Framed within the broader transition from a linear to a circular economy, it examines the environmental, economic, and social impacts of demolition versus deconstruction. Using a mixed-methods approach, including demolition permit analysis, an assessment of related businesses, and case studies, the report identifies both opportunities and barriers to policy adoption. It highlights the Town's potential to lead regionally in circular construction practices by leveraging local reuse organizations, such as Finger Lakes ReUse, and by adopting a phased approach to deconstruction implementation. The report serves as a strategic tool for the Town of Ithaca as it seeks to advance environmental sustainability, economic equity, and community resilience.

BIOGRAPHICAL SKETCH

Daniel Winters is a Master in Regional Planning student with a long-standing interest in deconstruction and circular cities. This interest was generated from his experience living in and around Rust Belt cities, which, as a result of years of disinvestment throughout the region, have many vacant buildings with high levels of demolition. While at Cornell University, he worked within the Town of Ithaca's Planning Department, assisting with their historic resources and sustainability goals. After graduation, Daniel plans to continue his work in planning for circularity.

ACKNOWLEDGMENTS

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CHAPTER 1: INTRODUCTION

The Town of Ithaca, henceforth known as the Town or TOI, is the second largest municipality in Tompkins County and is located on the southern end of Cayuga Lake in the Finger Lakes region of New York State. Although the TOI might be known primarily as an educational hub given that it is home to three higher academic institutions, it also boasts natural beauty and cultural vibrancy. It is a partner with the surrounding municipalities, most notably (for the purposes of this report) for initiatives connected to climate change adaptation, safeguarding green spaces, and preserving heritage sites. However, balancing the Town's environmental and sustainability goals with economic ones is challenging.

As a municipality in an ever-changing environment, the Town has become a magnet for growth and opportunity. However, like almost every other municipality in the United States, past economic recessions, a public health pandemic (COVID-19), and pressures to halt climate change have intensified pre-existing challenges, including housing affordability.

With a limited housing supply, it is difficult to align families and individuals with housing they can afford. In addition to these challenges, the COVID-19 pandemic brought widespread economic hardship, with which residents are still grappling. The problems municipalities face today are multifaceted and difficult to fully address. Just as these compounding crises are working together, going forward, collaboration will be needed to create policies that both mitigate these challenges and advance a different economic model. The Town must be strategic in its relationships with surrounding municipalities, communities, and fiscal resources to drive progress through policies that meet the needs of its residents and visitors. This will not happen with a passive attitude but with one of action and accountability.

Through the use of innovative solutions, the Town can lay down a positive foundation for change that will bring both sustainable and economic prosperity. To introduce one such

solution, this report outlines the environmental and economic costs of demolition as well as the potential impacts of adopting a deconstruction program. This professional report proposes strategic next steps for the Town of Ithaca to implement a deconstruction program.

Embarking on a path towards deconstruction constitutes a shift from a linear economy model to a circular economy model. Transitioning from a linear economy (one in which materials are extracted, manufactured, used, and discarded) to a circular economy (one in which materials are used for as long as possible through reducing virgin materials usage, reuse, and recycling) will allow the Town to leverage existing assets to meet its stated Green New Deal goals. These goals include carbon neutrality, equity, and climate resiliency. The adoption of a deconstruction program, starting with a resolution followed by an ordinance, would be a significant step in this transition. As this report illustrates, initiating and scaling a deconstruction program has the potential to create positive environmental and economic outcomes for the Town and its neighboring municipalities, businesses, and residents. By taking action using this new understanding, the Town of Ithaca can progress towards its vision to be "a desirable place where any person can live, work, learn, and play, offering a vibrant mix of rural, suburban, and urban features, including treasured natural resources."[i]

This report fulfills a core requirement for the Master of Regional Planning (MRP) degree in the Department of City and Regional Planning within the College of Architecture, Art, and Planning at Cornell University. It also serves as a practical initiative to support the Town of Ithaca in advancing its Green New Deal goals. As outlined by the MRP program, a professional report reflects a student's efforts to address a real-world planning challenge, often developed in collaboration with a client. In this case, the client is the Town of Ithaca and this report builds upon work initiated during the author's Summer 2024 internship with the Town. The report goes beyond analyzing and proposing solutions to a specific planning issue by incorporating a comprehensive background review, a detailed description of the methodology

employed, relevant case studies, and an application of these insights into the Town of Ithaca's context. This thorough approach ensures that the report not only meets the program's academic standards but also delivers valuable, actionable recommendations to the Town.

The first section examines the primary goals of deconstruction, which are promoting a circular economy and reducing environmental impacts. The second section explores case studies showing pathways to foster deconstruction. The third section examines the context of the Town of Ithaca and identifies key developmental processes for a deconstruction program. The final section considers potential implications of a deconstruction program and identifies ways in which the Town of Ithaca can support a deconstruction marketplace and workforce.

CHAPTER 2: KEY CONCEPTS FOR BUILDING A CIRCULAR ECONOMY

The transition from a linear economy to a circular economy is becoming increasingly necessary as the environmental, economic, and social costs of waste and resource depletion continue to rise. Historically, civilizations practiced sustainable building methods by repurposing materials. Modern construction practices, however, have shifted toward a linear model that prioritizes convenience and speed over sustainability. This shift has led to a culture of single-use materials, contributing to climate change, environmental degradation, and public health concerns. A circular economy presents a promising alternative by emphasizing the reuse, repurposing, and recycling of building materials to minimize waste and maximize resource efficiency. This chapter explores the key benefits of a circular economy with a particular focus on deconstruction practices.

New building techniques and materials developed by innovators in building design and construction have caused a shift in building practices. Historically, it was common to construct buildings that could be easily disassembled and relocated. This approach was especially practical in eras or cultures where mobility was essential, such as among nomadic communities, or in regions frequently impacted by natural disasters where rebuilding quickly and efficiently was a necessity.[ii] As described in the report *Waste Not*, Romans recycled building materials by reusing their rubble to make concrete.[iii] They also used abandoned buildings as quarries for materials intended for construction or ornamentation. Bricks were cleaned, wood was recut, and stone was chiseled to new sizes so it could all be reused. Many building materials were designed to be adaptable to the climate, reused, and repaired throughout the structure's lifecycle.

This is no longer the case. The Industrial Revolution, followed by the creation of new materials and an increase in population, resulted in a desire for quick and simple structures used for a limited amount of time. These new technologies in creating, transporting, and

designing have fueled the current economic engine in which structures are discarded when their use is no longer required. The single-use building materials, along with those that could otherwise be reused, are then tossed into a landfill or are incinerated because they are considered trash. Over time, the cultural norm of single-use has contributed to environmental degradation, public health concerns, and climate change.

This norm is representative of a linear economy. According to *The Circular Economy in the Built Environment* report by Arup, a linear economy takes an approach where materials are sourced, used, and finally disposed of as waste.[iv] More simply, it is a take-make-use-dispose model which produces adverse side effects, such as rising carbon emissions, increased pressures on landfills (e.g. Seneca Meadows, New York's largest landfill), unsustainable levels of water extraction, and widespread ecosystem pollution.

These side effects reach many areas of society, including the economic, environmental, and health sectors. *The Constructing a Circular Economy in New York State: Deconstruction and Building Material Reuse* white paper, recently released by the Cornell Circular Construction Lab, the Just Places Lab, and local organizations associated with CR0WD, details these effects within each sector.[v] The destruction of valuable material and significant structures, the hindering of a material reuse market, and the burden of managing waste all fall under the category of negative economic impacts. The white paper emphasizes the production of carbon emissions, limited capacity of landfills, and loss of natural environments for harvesting materials as environmental impacts. Lastly, this report touches on the health consequences of a linear economy. These include toxic dust created when a building is demolished, disproportionate impacts on vulnerable populations, and regulatory violations of those managing landfills. The linear economy relies on an abundance of cheap natural resources, which has enabled it to endure despite its harmful impacts.[vi]

There is another way forward, however, that can be accomplished by adopting a circular economy. A circular economy "uses a systems-focused approach and involves industrial processes and economic activities that are restorative or regenerative by design, enables resources used in such processes and activities to maintain their highest value for as long as possible, and aims for the elimination of waste through the superior design of materials, products, and systems (including business models)."[vii]

A circular economy aims to decouple economic growth from finite resource consumption, reduce environmental impacts, and create economic opportunities by fostering innovation and sustainable practices. Its goal is to minimize waste and make the most of our precious resources, promoting a closed-loop system where waste is minimized and materials are continuously cycled back into the economy.[viii]

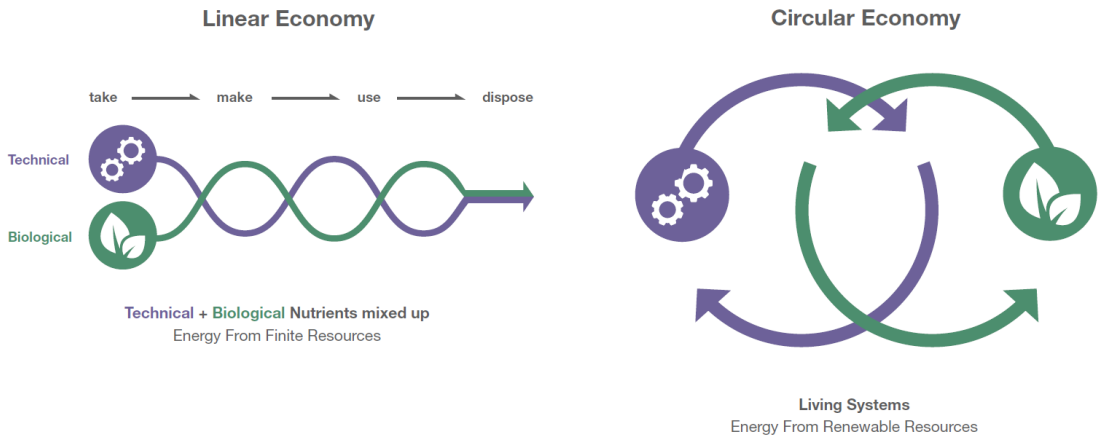

Figure 1: Ellen MacArthur Foundation - a linear economy vs. a circular economy

Unlike a linear economy, a circular economy focuses on keeping products, materials, and resources in use for as long as possible. (See Figure 1.) This can be achieved through many different tactics.[ix] The first is to design for longevity by manufacturing materials that are

durable, repairable, and upgradable. The second is to extend the life of materials by reusing and repurposing them. The third is to create a model where materials have a passport that allows for the most optimal utilization through sharing and leasing.[x] The fourth comes after you have reused and repurposed to their maximum capacity. At this point, material recovery is through recycling.

A circular economy is an economic development model that minimizes waste and is regenerative by design. This approach aligns well with the Town's diverse economic landscape, which includes sectors well-positioned to engage in alternative business models, evolving consumer behavior, and renewable practices.

Within this framework, the construction industry emerges as a particularly impactful area for transformation. The practices outlined above illustrate the broader shift from a linear to a circular construction economy where material reuse, deconstruction, and sustainable building methods become integral. In this context, changes in how buildings are deconstructed in the Town reflect a growing alignment with circular economy principles, signaling a transformation in long-standing practices.

Benefits of Deconstruction

The *Constructing a Circular Economy in New York State: Deconstruction and Building Material Reuse* white paper defines deconstruction as "the careful and systematic dismantling of a building or structure, either as a whole or in part, to maximize the recovery of valuable materials and architectural components for reuse, resale, and recycling."[xi] At its core, building deconstruction is the selective dismantling of a structure to recover the maximum amount of reusable and recyclable materials in a cost-effective and organized manner.[xii]

In considering a circular economy, deconstruction provides unique benefits to address the negative environmental, economic, and health impacts of a linear economy. On a fundamental level, deconstruction creates new construction practices that value the Earth's resources and materials made by humans. By reusing materials, there is also a reduction of waste headed to landfills, a reduction in environmental loss due to the need for fewer raw materials, and a lower carbon footprint as carbon is not being released through the extraction or production of new materials.[xiii]

There are also social benefits to deconstruction, as it creates safer and healthier communities. The environmental and social benefits can be felt almost immediately; the economic benefits occur over the long term. Economic benefits include the sale and reuse of materials, the elimination of hidden environmental costs, and the potential to generate green jobs with skill-building opportunities.[xiv]

Collectively, these factors contribute to a more sustainable and circular built environment, which in turn builds the resilient communities necessary to endure the intensifying impacts of climate change. In the next three sections, we will further explore the economic, environmental, and social/health benefits of deconstruction.

Economic

The primary economic benefit of deconstruction comes from the uncaptured economic value of reusable materials. The NYS Department of Environmental Conservation (NYSDEC) estimates that at least 80% of material currently sent to landfills or combustion facilities has monetary value that is uncaptured.[xv] These materials, which would have been thrown away in a linear economic model, have value and can provide a rich supply for designers, builders, and craftspeople. Recognizing this rediscovered economic value creates a compounding economic engine around it, or a marketplace. This marketplace consists of private businesses

but can be supported by the new policies created by the Town of Ithaca. Currently, the Town's largely linear waste policies do not capitalize on the potential demand and economic benefits of salvage and reuse.

The marketplace consists of suppliers, sellers, and builders, each generating new jobs to handle the influx of reused materials. And as income inequality rises throughout the United States,[xvi] it is imperative that municipalities have avenues for the creation of new jobs and not succumb to the stagnation of bygone industries. Over the last several generations, there has been a significant erosion of trade skills in the workforce, contributing to critical labor shortages in fields like construction, electrical work, and plumbing.[xvii] To address this, initiatives such as deconstructing buildings by hand and processing salvaged materials can serve a dual purpose: build essential, in-demand trade competencies and create accessible pathways into specialized green jobs.[xviii] These hands-on roles are increasingly vital to the economy, particularly as they are among the least susceptible to automation and most crucial for sustainable infrastructure. As *The Rising Storm* notes, reversing the decline in skilled trades participation is not only necessary but urgent for a resilient and future-ready labor force.[xix]

Deconstruction work, while often entry-level and physically demanding, can serve as a stepping stone toward more specialized and higher-paying roles within the reuse economy. A potential job ladder might begin with positions such as deconstruction technician, which typically require minimal formal training but offer hands-on experience in building disassembly and material handling. With time and skill development, workers can move into mid-level roles like materials handler or site lead, which involve logistics coordination, safety oversight, and team supervision. At the advanced level, roles such as reuse materials appraiser, inventory manager, or licensed contractor offer significantly higher wages and require deeper knowledge of building codes, structural assessment, and resale market trends. Jobs related to

deconstruction and reuse can also present a low-barrier-to-entry opportunity, specifically for those who face challenges gaining employment.[xx] Examples include those with "criminal records or gaps in experience, presenting the opportunity to integrate people back into the workforce."[xxi] However, more research is needed to quantify the wage trajectory and long-term career outcomes in the deconstruction sector.

To further illustrate the economic value of deconstruction, it is more labor-intensive compared to demolition. In a typical demolition, there are one or two individuals operating machinery (a wrecking ball, for instance). Dumpsters are then filled and transported to a landfill. The total number of jobs is limited in this scenario. Deconstruction, on the other hand, requires a team of individuals.[xxii] This team has specialized expertise in how to remove and store salvageable materials.[xxiii]

The Town of Ithaca is situated within a network of existing and potential reuse businesses, creating a context in which the economic benefits of deconstruction are already becoming visible. While these activities are generating value locally, they currently operate without direct involvement from the Town. A broader move toward deconstruction practices, rather than traditional demolition, would reflect the Town's increasing proximity to and alignment with this emerging sector.

Environmental

Demolitions pose many environmental concerns. Structures my not be thoroughly examined for potential hazards prior to demolition, for example. This causes hazardous materials to be disposed of improperly in landfills or into the environment.[xxiv] Other concerns include improper landfill management, transportation emissions, the need for virgin materials, and resource extraction.

Through the systematic disassembly of buildings and removal of materials, deconstruction mitigates many of the environmental concerns surrounding demolitions.[xxv] Having a deconstruction program would therefore help the Town manifest its lofty goal of "achieve[ing] an equitable transition to carbon-neutrality town-wide by 2030."[xxvi] Compared to demolition, deconstruction has the potential to divert more than 85% of waste generated by a residential demolition alone from landfills, and the reuse of these materials can often reduce as much as 75% of the carbon emissions.[xxvii] This reduction in the waste stream also extends a landfill's potential service life, or the period of time that it can continue to operate and accept waste before it becomes full or reaches its capacity.[xxviii] This process closes the loop in the construction material cycle, keeping construction materials in circulation as long as possible.[xxix] Furthermore, it lessens the pollution associated with, and the need for the extraction and processing of virgin materials. Wood is a great example because of its ease of removal. "Reusing wood eliminates the harvesting, transporting, processing, and other energy-intensive steps that would be needed to produce new dimensional lumber."[xxx] Wood is versatile, and since most older homes (considered those built before the 1950s) typically contain high-quality wood that is often stronger and more durable than modern lumber, it makes an excellent candidate for reclamation.

Deconstruction is a huge step toward not only carbon neutrality but sustainability more broadly. The Brundtland Commission defined sustainability as a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[xxxi] Deconstruction promotes sustainability by reducing waste, conserving resources, and saving energy while keeping materials in circulation and reducing the overall environmental impact of new construction. "On average, the vast majority (50% to 85%) of embodied emissions occur during the extraction of raw materials and their manufacturing."[xxxii] Overall, reusing building materials conserves their "embodied carbon" in

the products, meaning it conserves the energy originally used in the extraction, manufacturing, and transportation of these materials as well as the building lifecycle.[xxxiii]

There are additional, significant environmental benefits of repurposing building material rather than choosing complete demolition and new construction. A 2016 study used the Athena EcoCalculator tool (a free tool providing instant life cycle assessment results for over 400 common building assemblies) and found that repurposed materials recovered from deconstruction showed a potential reduction in six out of seven environmental impact categories.[xxxiv] The authors found that the eutrophication potential (nitrogen in the water) was reduced by 41%. Smog potential showed a 37% reduction while global warming potential, or C02 emissions, had a 33% reduction. Fossil fuel consumption had a 34% reduction, and acidification potential (high concentrations of NOx and SO2) had a 29% reduction. Lastly, they found that the number of particulates in the air, which is a human health criterion, had a 20% reduction.[xxxv]

Other environmental benefits not yet discussed include decreased disturbance to the site, the avoidance of the development of new land, and destruction of natural habitats.[xxxvi] The labor-intensive nature of deconstruction with minimal use of heavy equipment leads to less disturbance to the soil and surrounding vegetation.[xxxvii]

While environmental benefits can be challenging to quantify, they are a critical component of comprehensive cost accounting in the building and construction sectors. Considering the volume of usable materials that can be recovered and diverted from landfills, deconstruction presents a viable approach that aligns with established environmental goals and waste reduction strategies. As awareness of resource limitations and climate impacts grows, such practices are becoming increasingly relevant within sustainable development frameworks.

Health/Social

Deconstruction offers a multifaceted approach to dismantling buildings that extends beyond environmental and economic advantages, encompassing significant health and social benefits for communities. Unlike the abrupt disruption caused by demolition, deconstruction offers a slower, more deliberate process that fosters a sense of control and continuity for community members. This method reduces noise pollution, dust, and airborne contaminants, contributing to improved air quality and minimizing health risks, particularly for vulnerable populations such as children and seniors. It also preserves a community's architectural heritage, fostering pride and connection to the past. Ultimately, this strengthens social cohesion and resilience.

A major benefit of deconstruction over demolition is the reduction of hazardous pollutants that get released into the environment, including asbestos and lead. This is because, as previously mentioned, deconstruction necessitates an inspection of hazardous materials. Deconstruction workers go through formal training regarding hazardous materials, which is an essential job safety measure due to the potentially high levels of exposure workers may experience on deconstruction projects. Raising worker awareness of proper handling techniques for both demolition and deconstruction greatly diminishes the potential for exposure and related problems.[xxxviii] The Environmental Protection Agency and several other organizations have published deconstruction manuals and guides which detail hazardous material handling training for crews.[xxxix]

Once identified, these materials are systematically removed and properly handled, reducing the risk and exposure of airborne contaminants common in mechanical demolitions.[xl] Because of the need to use heavy machinery in demolition, the action of smashing and snapping materials creates fine dust that can be toxic. This dust has been shown to contain hazardous materials such as asbestos, arsenic, cadmium, chromium, and lead.[xli] A recent analysis performed by *The Oregonian* newspaper estimated between 80% and 90% of homes being

demolished in Portland contain asbestos. Between 2011 and 2014, only 33% had asbestos properly removed.[xlii] In contrast, because building components remain largely intact through the deconstruction process, on-site release is greatly limited. This mitigates the escape of toxic dust and water and better protects the health of workers and community members.[xliii]

Deconstruction also prevents contaminated materials from being mixed with other debris. This is more likely to happen during traditional demolition in which materials are crushed together, stored together and dumped in a landfill with other materials. Therefore, deconstruction reduces the risk of environmental contamination.

When it comes to the social benefits, deconstruction can also benefit historic preservation efforts. By reclaiming building materials from buildings that have reached the end of their life and that would otherwise be thrown away, deconstruction can preserve a sense of place and community in existing neighborhoods. The reuse of materials grants older and historic buildings and sites usable material to maintain their character. Deconstruction projects are often witnessed by community members over a longer stretch of time, giving them a sense of connection and even participation, as opposed to the sudden and violent nature of demolition.[xliv]

Design for Deconstruction

Similar to other interventions in a circular economy, like repairing and reusing items, for deconstruction to be effective it needs skilled workers and detailed plans. According to *Supporting circularity in construction with performance-based deconstruction*, written by Amr S. Allam and Mazdak Nik-Bakht, there are two distinct areas of focus which make deconstruction work. The first is Design for Deconstruction (DfD). Design for Deconstruction focuses on designing buildings so they can be deconstructed at the end of their lifecycle.[xlv]

The second is disassembly planning, which focuses on the end-of-life phase of existing structures by planning for the operations of its disassembly.[xlvi]

Design for Deconstruction is a strategic approach in building design that focuses on the ability to disassemble buildings at the end of their lifecycle in order to facilitate the recovery and reuse of materials and components. Key principles of DfD include the use of prefabricated assemblies, demountable connections, durable materials, and avoiding toxic substances. This approach ensures building elements can be easily separated and reused or recycled, thereby reducing the volume of waste sent to landfills and preserving the embodied energy of materials.[xlvii]

The term end-of-life refers to the point at which a building or its components have reached the end of their initial service life and are no longer functional or needed in their current form.[xlviii] During this stage, the materials can be deconstructed and potentially reused in new constructions as part of the DfD approach.

After a structure has been built, whether it was designed for deconstruction or not, it could benefit from a disassembly plan.[xlix,l] The objective of this plan is to minimize any environmental impacts and improve costs by planning for the recovery of materials. One who is looking to implement a disassembly plan could follow the plan laid out in *Waste minimization through deconstruction: A BIM based Deconstructability Assessment Score (BIM-DAS)*, which discusses the necessary steps to take in creating one. The first step is to identify and catalog all materials used in the structure. This catalog should identify the types, properties, and potential for reuse or recycling of the materials. Once all the materials are identified, one should then evaluate the types of connections used in the assembly of materials. In any structure there will be mechanical connections (e.g., bolts, screws) and non-mechanical connections (e.g., adhesives, welds). Mechanical connections are the preferred method in a DfD approach because of the ease of disassembly.[li]

Next, a step-by-step plan for disassembling the structure should be developed. This plan should minimize damage to components and ensure safety during the disassembly process.[lii] Through the development of the plan, the tools and equipment required for disassembly will be presented and should be acquired. During this step, one should also address any safety concerns and environmental impacts that have been identified with disassembly. It is important at this stage to develop a plan to handle hazardous materials, ensure worker safety, and minimize environmental pollution. Also, through the plan an estimation of the labor and time needed for disassembly should be computed. This data will help when planning resources and scheduling the disassembly.

Throughout the DfD process one should document the disassembly plan, as the appropriate documentation ensures disassembly can be replicated in the future. Next steps include providing necessary training for individuals involved in the disassembly process and then executing the disassembly plan. During the disassembly, monitoring the process to ensure it is completed as planned will be imperative. Lastly, adjustments will need to be considered to address unforeseen problems.

By following these steps, the deconstruction process will be efficient, safe, and environmentally friendly, ultimately contributing to sustainable construction practices.[liii] These two concepts of DfD and disassembly planning serve different functions but ultimately are synergistic, enhancing the sustainability of the building elements and giving them a second life.[liv]

There are other research and approaches beyond the scope of this report that could be considered. Benjamin Sanchez and Carl Haas propose using a semi-automated selective deconstruction programming for adaptive reuse of buildings to improve deconstruction planning.[lv,lvi] This aims to enhance project performance by improving the efficiency and effectiveness of the deconstruction planning process, making it more objective and data-

driven. *In Advancing Deconstruction and Materials Reuse in the Built Environment: A Multidisciplinary Approach to Sustainability,* the authors express the role new technologies like robotics could have on the efficiency and safety of deconstruction activities. Felix Heisel's ScanR tool also provides a useful way to identify materials.[lvii]

When looking at the documentation of materials, the use of a Building Information Modelling (BIM) system could create a significant advantage. Defined in Arup's *The Circular Economy in the Built Environment* as "an open-source digital 3D modelling tool that communicates information relating to all phases of an asset's lifecycle," BIM is useful for many stakeholders in the deconstruction process because it involves creating and managing a comprehensive model about the building's physical and functional characteristics, which can be used throughout its entire lifecycle — from design and construction to operation, maintenance and end-of-life.[lviii] BIM works well for what we would expect when seeking a circular economy.

CHAPTER 3: METHODOLOGY

This study employs a mixed-methods approach to analyze the feasibility of implementing a phased deconstruction program in the Town of Ithaca. The methodology includes a quantitative analysis of demolition permit data, an analysis of deconstruction and reuse related businesses using industry classification data, and a qualitative assessment through case study research and interviews. These methods provide a comprehensive understanding of the potential impacts of a deconstruction program on workforce development, sustainability goals, public health, and municipal operations.

Permit Data Analysis

This study analyzed building permit data obtained from the Town of Ithaca's OpenGov database to assess demolition activity and potential deconstruction opportunities. The dataset included all building permits issued between January 10, 2022, and January 17, 2025, resulting in a total of 654 records. These records covered a range of structures, including residential homes, garages, sheds, office buildings, warehouses, and other commercial or institutional facilities.

To isolate permits relevant to demolition, the dataset was filtered using a set of keywords commonly associated with demolition-related activity. These keywords included demolition, removal, renovation, alteration, remodel, dispose, convert, replace, and gut. This filtering process identified a subset of 104 records that appeared to involve demolition or removal activities.

The filtered records were then further examined to determine the nature and scope of demolition activity. Specifically, the study analyzed the "Permit Type" and "Type of Work" fields to identify permits explicitly labeled as "Demolition." A total of 25 such permits were found. However, recognizing that not all demolition-related activities are labeled consistently,

a classification framework was developed to better categorize the type and extent of demolition work. Each permit was assigned to one of four categories based on the type of building (residential or commercial) and whether the work was done to the whole or partial structure. These categories were Whole Residential Demolition (WRD), Whole Commercial Demolition (WCD), Partial Residential Demolition (PRD), and Partial Commercial Demolition (PCD). Classifications were informed by permit descriptions and notes from Town of Ithaca staff when available.

In addition to categorizing the permits, the study compared the prevalence of demolition work across the different construction categories to assess patterns and trends (Figure 2). This involved analyzing the frequency of demolition-labeled permits within each category and calculating their proportion relative to the total number of permits in that category.

Lastly, each permit description was reviewed to assess whether there was any mention of deconstruction practices, such as material salvage or reuse. No records explicitly referenced "deconstruction," "selective demo," or "salvage," and only one permit (Record #BLD-23-170) made a reference to material reuse, highlighting the limited reporting of sustainable demolition practices in the dataset.

Construction Category	Total Permit Count	Demolition Permit Count
PRD (Partial Residential Demolitions)	57	4
WRD (Whole Residential Demolitions)	25	18
PCD (Partial Commercial Demolitions)	19	1
WCD (Whole Commercial Demolitions)	3	2

Figure 2: Summary of permits and official demolition permits

Analysis of Deconstruction and Reuse Related Businesses

To assess the existing infrastructure for a deconstruction marketplace, this study utilized business data aggregated by the Just Places Lab[lix] and filtered using the North American Industry Classification System (NAICS).[lx] Eighteen industry categories relevant to deconstruction were examined, including recycling wholesalers, material recovery facilities, site preparation contractors, hazardous waste treatment providers, and architectural services.

For the purposes of this study, deconstruction and reuse-related business data were filtered by geographic location to include only businesses within Ithaca's zip codes (14850, 14851, and 14852). The filtered dataset revealed active businesses in 14 of the 18 categories, with the highest representation in the following sectors: New Single-Family Housing Construction, All Other Specialty Trade Contractors, Residential Remodelers, Architectural Services, and Site Preparation Contractors.

Data analysis was conducted using Microsoft Excel to calculate the proportion of businesses in each category relative to the statewide total and to identify business concentrations by municipality. ArcGIS was used to geocode and visualize the spatial distribution of deconstruction-related businesses across Ithaca. In addition to geographic and categorical analysis, the dataset was further examined for three key business indicators: Location Employee Size Range, Credit Score Alpha, and Location Sales Volume Range. These metrics were used to assess the scale, financial health, and economic contribution of each business.

Employee size data helped to determine the scale of local operations, revealing a predominantly small-business ecosystem with most companies employing fewer than 10 people. Credit score data was used to gauge financial stability and creditworthiness, while sales volume figures provided insight into business revenue levels and overall market activity.

These quantitative indicators added depth to the business profile, highlighting the capacity and resilience of the local business community.

This deconstruction and reuse-related business analysis provides insight into both existing industry strengths and potential gaps in Ithaca's deconstruction ecosystem. However, several limitations should be noted: the analysis excludes businesses located outside the defined zip codes, and the activity status of each business was not independently verified. Moreover, the data does not confirm whether deconstruction and reuse-related businesses currently engage in, or are open to adopting, deconstruction practices. Future research could involve direct engagement with businesses via interviews, surveys, or focus groups to verify their interest in participating in a deconstruction marketplace and assess their potential roles within such a system.

Case Study Analysis

To contextualize Ithaca's deconstruction potential, this study incorporated case study research and qualitative interviews with key stakeholders. Case studies were selected based on their relevance to municipal deconstruction policy, regional context, and applicability to Ithaca's conditions. The case study selection included:

- City of Boulder, Colorado: Chosen to address a gap in case studies identified in the CR0WD Local Government Guide.[lxi] Despite differences in municipal context, Boulder's deconstruction experience provides valuable insights.

- City of Auburn, New York: Examined for its ongoing efforts in implementing a deconstruction resolution and building reuse infrastructure.

- Town of Dryden, New York: Included due to its proximity to Ithaca and its recent adoption of a deconstruction resolution.

- Finger Lakes ReUse (FLR): While not a municipality, this nonprofit plays a crucial role in the deconstruction infrastructure and materials reuse marketplace in the region.

Interviews were conducted in person and via Zoom using an open-ended format. The primary questions posed to municipal representatives were: What is your involvement with deconstruction? How has your municipality approached policy implementation? For FLR, the discussion also explored how a deconstruction program in the Town of Ithaca could support their existing efforts.

This qualitative approach allowed for an in-depth understanding of the opportunities and challenges associated with deconstruction implementation. Limitations include potential bias in self-reported information and the lack of broader municipal comparisons. Future research could expand case study selection and include quantitative assessments of program outcomes in other municipalities.

By integrating permit data analysis, stakeholder mapping, and case study research, this methodology provides a multi-faceted approach to evaluating deconstruction feasibility in the Town of Ithaca. The combination of quantitative and qualitative methods ensures a robust assessment of existing conditions, potential benefits, and implementation challenges. Future research could enhance this analysis through expanded carbon impact assessments, direct engagement with stakeholders, and longitudinal studies of deconstruction program outcomes in other municipalities.

CHAPTER 4: CASE STUDIES

This chapter presents case studies from the City of Boulder, Colorado; the City of Auburn, New York; the Town of Dryden, New York; and Finger Lakes ReUse in Ithaca, New York, each offering unique approaches to integrating deconstruction into local planning and waste management systems. These case studies illustrate a range of models—from ordinance-driven initiatives in Boulder to grassroots-led efforts in Auburn and nonprofit-supported infrastructure in Ithaca—highlighting the environmental, economic, and social benefits of material reuse. By examining these real-world examples, the chapter offers valuable insights into the opportunities, challenges, and key considerations for municipalities like the Town of Ithaca, which are exploring or advancing their own deconstruction policies.

City of Boulder, Colorado

The City of Boulder is located at the foothills of the Rocky Mountains and sits 30 miles northwest of Denver, the largest city in Colorado. Boulder has a population of around 100,000 and prides itself on the high number of residents with a college degree, along with the numerous outdoor activities available to its residents. To maintain this vibrant atmosphere, the City of Boulder passed a new Energy Conservation Code in 2020. Part of this code aims to promote sustainable building practices throughout the lifecycle of the building process.[lxii]

In combination with the Energy Conservation Code, Boulder also passed Ordinance 8366 to encourage deconstruction practices. For Boulder, sustainable deconstruction is described as "the careful dismantling of a structure, typically in the opposite order it was constructed, to salvage building materials for reuse or recycling."[lxiii] Projects that must be sustainably deconstructed are all full removal or major remodeling projects. There are four main requirements throughout the deconstruction process. The first is the need to create a sustainable deconstruction plan prior to applying for a demolition permit. The second is the

requirement to divert 75% of materials from residential and commercial deconstruction projects from landfills through recycling or reuse.[lxiv] That percentage is by weight and requires at least three different material types. The next two requirements are the need to submit a deposit of one dollar per square foot of the building being deconstructed, with a minimum of $1,500. This deposit is refundable, but there is also a non-refundable administrative fee of $219.

Workflow

Boulder's government website provides applicants with a deconstruction workflow to follow. The applicant starts the process by completing the aforementioned Sustainable Deconstruction Plan. This plan helps the applicant identify their deconstruction waste recycling manager, estimate the diversion rate by indicating material types, and estimate the weights of building materials that will be reused or recycled. This plan can be created with a deconstruction professional or independently, and then must be submitted to the City of Boulder Customer Self-Service Portal.

After submission, the plan is reviewed during the Completeness Check of the permit application process. If more documentation is needed, completeness comments are issued. Once all required materials, signatures, and plans are provided, the case will be approved and an invoice issued. The applicant will then pay the non-refundable administrative fee along with the refundable Deconstruction Deposit, after which the permit will be issued.

During the project, it is crucial for the applicant to track all diversion activities and keep weight tickets for each category: landfill, recycling, and reuse donations. They also need to enter all weights into the Construction & Demolition Waste Diversion Tracking Form. If unexpected materials are encountered, the applicant will need to contact city staff to get guidance on the management of those materials. If weight tickets are not available, the

applicant must provide pictures, approximate volume, intended use, and details of transportation.

Finally, upon completion of a deconstruction project, waste tracking documentation is required within 60 days. To see the return of the deconstruction deposit, the applicant must request a Deconstruction Deposit Recovery. This is essentially an inspection during which City staff will review the diversion, calculate, and process the refund.

Implementation and Impact

The ordinance has led to several successful deconstruction projects, including the Boulder Community Hospital. The hospital was a city-owned property and was roughly 250,000 square feet. The sustainably deconstructed hospital had a goal of 90% waste diversion. When it was finished, it achieved 93.5% of materials diverted from landfills. Structural steel from the hospital was stockpiled and reused in the construction of Boulder's new Fire Station 3 and is understood to be the first major commercial building to be entirely deconstructed in the city. The Boulder Community Hospital deconstruction saved 167,338 kgCO2eq in embodied carbon emissions, with 36,344 kgCO2eq specific to FS3. This amount is similar to the emissions from 37 gasoline-powered vehicles driven for one year.[lxv]

This reuse prevented significant emissions and embodied carbon associated with manufacturing new materials and illustrated that deconstruction and reuse are both possible and financially feasible. Boulder's deconstruction ordinance serves as a model for sustainable building practices, demonstrating the environmental and economic benefits of prioritizing material reuse and recycling. The success of projects like the Boulder Community Hospital highlights the potential for similar policies to be adopted in other municipalities, contributing to broader sustainability goals. Since implementation, Boulder's enforcement of its deconstruction ordinance has resulted in 76% landfill diversion of all projects.

One issue that led Boulder to create the deconstruction ordinance was the demolition of usable buildings to build large luxury apartments. Boulder's City Council has shifted culturally to prioritize and progress toward building a circular economy. They have created two positions to invest in this work: Policy Advisor - Circular Economy and Circular Economy Senior Program Manager. The City of Boulder's deconstruction program oversees approximately 60-70 deconstructions per year. Out of those, it takes only five commercial projects to equal half of all the recovered materials. Because of this, Boulder recommends that any municipality considering a deconstruction approach start with a large-scale commercial pilot project.

In an interview, members of the Circular Economy team described challenges with their current ordinance. One of the main challenges is the administrative burden on City staff and applicants. For staff, the tracking of permits, proof of reporting, and managing the deposit system seem to be pain points. To help mitigate these challenges, Boulder recommends using a tracking software called Green Halo[lxvi] (software), which they recently adopted (previously, they had been tracking everything in Excel). For the applicants, the challenges are related to identifying reusable and recyclable building materials and estimating diversion rates. Perhaps technology like the Cornell Circular Construction Lab's ScanR could help mitigate these challenges.[lxvii]

Additionally, there is often limited physical space at deconstruction sites for sorting materials, creating more difficulty in identifying them. This causes applicants to take pictures of their loads instead of providing specific weight tickets. This is insufficient because materials are often mixed and contain pockets of voided space, which are not easily detectable. With the ordinance based on weights, most applicants will reclaim heavier materials until they meet the required 75% and discard the rest. With limited sorting space, the difficulty of identifying salvageable materials, and an incentive to reclaim heavier materials for recycling, the City of Boulder is considering revising its ordinance, developing end markets, and revising building

codes to create a system that directs applicants to reclaim more materials for reuse. Another matter to consider is load capacity regulations for roads. For larger projects, hauling building materials to recycling or reuse centers could go beyond these limits.

Finally, it is worth noting that there is no enforcement of the deconstruction ordinance. Instead, Boulder uses a deposit approach. Every applicant must pay the refundable deposit of one dollar per square foot of the building being deconstructed, with a minimum of $1,500. If the applicant does not meet the goal of diverting 75% of building materials, the deposit is not refunded. If the applicant chooses, they can pay the deposit cost and still not save any reusable materials. The current ordinance does not consider who is the best fit for deconstruction. Instead, it applies a blanket approach requiring all renovations or demolitions to pay the deconstruction deposit. This can make it difficult for smaller home renovations to get their deposit back. This is another aspect the City is looking to revise in the ordinance and is considering changing it to only require large-scale renovations and/or full structures to use the deconstruction approach.

In conclusion, while Boulder's deconstruction ordinance offers a compelling model for promoting material reuse and advancing circular economy goals, its implementation reflects the unique context of a larger, densely built municipality with access to regional infrastructure and specialized staff. In contrast, the Town of Ithaca faces a different set of conditions—smaller-scale development, fewer resources, and more limited access to end markets for salvaged materials. Boulder's approach demonstrates the potential of starting with large-scale commercial projects and investing in systems like tracking software and staff roles dedicated to circular economy work. However, for the Town of Ithaca, a more targeted and flexible ordinance may be more appropriate—one that considers project scale, regional constraints, and the administrative capacity of both the Town and its applicants. Adapting Boulder's

lessons with local nuance will be essential for Ithaca to create an effective and sustainable deconstruction program.

City of Auburn, New York

This section examines the role of Dominic Gambaiani, the Chair of the Auburn Beautification Commission and a key advocate for deconstruction in Auburn, New York, in promoting deconstruction initiatives. By analyzing Auburn's pilot projects, policy developments, and infrastructure challenges, this case study provides insights into the opportunities and obstacles municipalities face when integrating deconstruction into their waste management strategies.

Dominic is involved in both Cayuga Climate Action and the Auburn Beautification Commission. Cayuga Climate Action is a grassroots organization dedicated to addressing climate change through education, advocacy, and action. Its mission includes restoring biodiversity, transitioning to 100% renewable energy, and promoting sustainable waste management practices, including deconstruction. The organization's work aligns with broader regional sustainability efforts and provides an environmental framework for deconstruction advocacy.[lxviii] The Auburn Beautification Commission is a 501(c)(3) non-profit organization that aims to improve the City of Auburn through beautification projects, community engagement, and sustainability initiatives. The commission relies on grants, sponsorships, and community donations to fund projects that enhance Auburn's public spaces.[lxix]

Dominic has been instrumental in introducing deconstruction practices to the City of Auburn. He has coordinated with the Circularity, Reuse, and Zero Waste Development (CR0WD) throughout this advocacy. Recognizing the economic and environmental benefits of material reuse, he has led efforts to salvage materials from buildings slated for demolition. His advocacy has contributed to the City of Auburn adopting a deconstruction resolution in May 2024[lxx] and influenced Cayuga County's Local Solid Waste Management Plan[lxxi], which now

explicitly encourages municipalities to develop deconstruction legislation. The Just Places Lab, a CR0WD partner, led the effort to create a local government guide and tip sheet used in crafting the deconstruction resolution.[lxxii]

One of Auburn's earliest deconstruction projects involved the closure of a chain restaurant, Denny's. Typically, when chain restaurants close, perishable items are discarded while the remaining furniture, fixtures, and appliances are abandoned. Without intervention, the building would have remained vacant, contributing to urban blight. To mitigate waste, Dominic obtained permission to conduct a soft strip of the property. Soft stripping refers to the selective removal of reusable materials before demolition. The project salvaged chairs, tables, countertops, kitchen appliances, and other furnishings. Despite limited time and logistical challenges, the effort successfully recovered close to 65% of the building's reusable materials, diverting them from the landfill and redistributing them within the local community. The project resulted in tens of thousands of dollars in cost savings for local businesses, which received salvaged materials.

The success of the Denny's project demonstrated the feasibility of community-led deconstruction efforts. However, the initiative also highlighted significant gaps in municipal support and infrastructure. This case study revealed the critical role of facilitators—individuals with expertise in material reuse, disassembly techniques, and community needs—in maximizing the benefits of deconstruction.

Following the success of the Denny's project, City of Auburn officials expressed interest in formalizing deconstruction practices. Initially, concerns were raised regarding regulatory challenges, economic development impacts, and feasibility. However, through collaboration with CR0WD, the city of Auburn adopted a deconstruction resolution in May 2024. At the county level, deconstruction was incorporated into Cayuga County's Local Solid Waste Management Plan, approved in January 2025. The document mentions deconstruction 23

times, indicating a strategic commitment to waste reduction through material reuse. The plan explicitly states that the county will:

> *Assist municipalities within the Planning Unit in establishing deconstruction legislation with the aim of encouraging the salvation and redistribution of used materials from buildings and structures slated to be demolished*[lxxiii]

Following Auburn's increased attention on deconstruction, Dominic was approached by a contractor managing an Auburn Hilton Hotel renovation. Hilton Hotels undergo renovations approximately every ten years, often resulting in the disposal of furniture, fixtures, and appliances. Rather than incurring landfill fees, the contractor sought an alternative disposal strategy. Dominic facilitated the redistribution of these materials, ensuring that valuable furniture and appliances were reused within the community. This case demonstrated that deconstruction can align with corporate interests by reducing disposal costs while benefiting residents.

Despite Auburn's progress, significant challenges remain in implementing a full-scale deconstruction ordinance. These challenges include limited infrastructure in combination with the rural geography of the area. Auburn lacks a dedicated reuse center and has no formal material redistribution network. With the surrounding region being largely rural, this complicates the logistics and material transportation of reused materials.

To address these challenges, Dominic and others have proposed repurposing Auburn's unused waste transfer station as a deconstruction materials hub. The facility could reopen bays for material collection and storage, designate public access days for material pickup, encourage donations to offset operational costs, and employ staff for material sorting and management. Even if materials are distributed at no cost, the reuse process adds economic value by reducing waste, lowering disposal fees, and providing affordable building materials.

To further strengthen deconstruction efforts, the City of Auburn, Cayuga Climate Action, and CR0WD are coordinating with neighboring municipalities to establish a regional deconstruction network. A regional approach could increase efficiency, reduce costs, and expand deconstruction opportunities across multiple jurisdictions. This is accomplished by sharing expertise and best practices, developing material exchange systems, advocating for state-level policy changes, and collaborating on infrastructure development. Auburn's experience highlights the importance of municipal involvement in deconstruction.

The Town of Ithaca has the opportunity, in combination with its robust local reuse network, to support community education on deconstruction benefits and develop policies that incentivize material reuse, invest in deconstruction infrastructure, and foster partnerships between government agencies, businesses, and nonprofit organizations. By proactively integrating deconstruction into policy and planning, the Town of Ithaca can ensure material reuse is efficient, scalable, and widely adopted.

Auburn's journey toward deconstruction policy adoption offers valuable insights into the challenges and opportunities of material reuse initiatives. While community-driven efforts played a crucial role in demonstrating feasibility, long-term success depends on municipal support, infrastructure investment, and regional collaboration. By learning from Auburn's experience, other municipalities, including the Town of Ithaca, can develop more effective and sustainable deconstruction programs.

Town of Dryden, New York

In January 2025, the Town of Dryden, New York, unanimously passed a resolution[lxxiv] supporting deconstruction and the reuse of building materials, aligning with the circular economy objectives of the Tompkins County Solid Waste Management Plan. In the weeks prior, Town of Dryden staff had reached out to members of CR0WD to ask for support for a

deconstruction ordinance. The Town of Dryden used Auburn's resolution and the *Toward Building Sustainable Communities and Circular Economies: A Local Government Policy Guide to Alternatives to Demolition through Deconstruction and Building Material Reuse* to craft the draft resolution.

During the meeting, the Town of Dryden posed three main questions to Andrew Boghossian of Finger Lakes Reuse, Christine O'Mally of Historic Ithaca, and Jennifer Minner, Associate Professor in City and Regional Planning at Cornell University, all partners in CR0WD, as they presented on the benefits of deconstruction and adopting a resolution. What is the cost comparison of demolition vs. deconstruction? Will a deconstruction ordinance negatively impact the housing supply? And finally, what incentives can the Town of Dryden provide to streamline deconstruction?

These questions are not so different from those received by the Town of Ithaca or any other municipality looking to adopt a deconstruction ordinance. By adopting the strategies outlined in this report and the resources provided, municipalities like Dryden can promote deconstruction practices that align with environmental objectives without adversely affecting housing availability or affordability.

Finger Lakes Reuse, Ithaca, New York

The Founding of Finger Lakes ReUse

In Ithaca, New York, Finger Lakes ReUse (FLR) has played a pivotal role in pioneering deconstruction efforts. This nonprofit organization has worked for over a decade to salvage and redistribute building materials, diverting waste from landfills. This case study explores the benefits of having FLR as a central collaborator in the Town of Ithaca's deconstruction

program and how the Town can support and scale the organization's efforts to foster a circular economy in construction.

The roots of FLR can be traced back to the early 2000s when Tompkins County sought to establish a reuse center as part of its broader waste reduction strategy. Diane Cohen, a central figure in FLR's founding, had been managing Significant Elements, an architectural salvage operation run by Historic Ithaca. She became deeply engaged with deconstruction and material reuse, recognizing both its economic and environmental benefits.

Working with Tompkins County, Diane helped design an organization that could fully embrace reuse and deconstruction beyond historic buildings. After three years of research and planning, Finger Lakes ReUse officially launched in 2008 with an initial focus on furniture and household goods, computers and electronics, and building materials.

From the beginning, Diane saw deconstruction as a cornerstone of FLR's programs. The organization received a $150,000 grant from the Appalachian Regional Commission to kickstart a deconstruction program. This funding allowed FLR to purchase tools and train a team in deconstruction techniques.

FLR's first deconstruction project took place in 2009 when the organization dismantled a garage in Fall Creek, Ithaca. The project was driven by health concerns—the homeowner was pregnant and wanted to ensure a lead-free environment, and deconstruction provided a safer alternative to demolition. This marked the beginning of a decade-long deconstruction initiative.

Between 2009 and 2018, FLR successfully dismantled multiple structures per year, primarily within Tompkins County but occasionally extending into neighboring areas like Tioga

County. After 2018, FLR suspended the deconstruction program due to rising material donations from the public and storage and processing capacity limitations.

Challenges in Deconstruction Growth

FLR scaled back its direct deconstruction efforts but continued material salvage efforts through partnerships. This transition led to the eventual hiring of Andrew Boghossian, a key player in FLR's evolving role in material recovery and a Cornell alum of the BArch program and a former researcher in the Circular Construction Lab. In the last year, Andrew has been instrumental in revitalizing FLR's deconstruction and material recovery efforts. As FLR's deconstruction coordinator, he has focused on fostering relationships with contractors to encourage material reuse and deconstruction services and expanding market-based solutions, such as selling materials directly from job sites and working with developers on long-term material planning.

One of Andrew's major initiatives has been connecting salvaged materials with end users in real-time by collecting material requests, reducing the need for long-term storage. For instance, in a Cortland, NY project, Habitat for Humanity purchased flooring salvaged from a deconstructed home, allowing for immediate reuse after expressing interest a few weeks earlier. His work has helped ensure FLR remains a key player in the region's deconstruction ecosystem despite the organization stepping back from internally operating full-scale dismantling.

Finger Lakes ReUse Today

In more recent years, FLR has played a role in advocating for deconstruction-friendly policies at the municipal level. The organization, alongside CR0WD, has worked with local

governments to explore ordinances that incentivize material salvage and create fairer conditions for deconstruction over demolition.

Beyond deconstruction, Finger Lakes ReUse has expanded its role as a central hub for material reuse and workforce development. The material redistribution efforts of FLR are no small feat. They receive an average of 200 donations per day as they ensure salvaged materials remain in circulation. FLR is also positioning itself as a bridge between the reuse economy and workforce development, ensuring deconstruction supports both sustainability and economic inclusion. As a demonstration of its commitment to workforce development, FLR has designed a job training program that provides hands-on experience in material processing and retail operations. The program targets individuals facing employment barriers, helping them transition into skilled trades and reuse industries.

Under the leadership of Diane Cohen and through the efforts of Andrew Boghossian and all the FLR staff, Finger Lake ReUse has evolved from a small reuse initiative into a regional leader in sustainability. Most importantly, they have demonstrated that deconstruction is a viable, environmentally responsible, and economically beneficial alternative to demolition. As FLR looks to the future, scaling these efforts will require municipal support through infrastructure investment, policy changes, and stakeholder engagement.

As the Town of Ithaca seeks to fulfill its ambitious Green New Deal goals, Finger Lakes ReUse stands as a vital partner in actualizing a circular economy rooted in local values and regional sustainability. FLR's decade-long commitment to material reuse, environmental stewardship, and workforce development directly aligns with the Town's priorities of carbon neutrality, economic inclusion, and resource conservation. By leveraging FLR's infrastructure, community relationships, and expertise, the Town has a unique opportunity to build a deconstruction program that is both impactful and grounded in place. In doing so, Ithaca can demonstrate how local governments can catalyze system-level change by investing

in and collaborating with the community-based organizations already laying the groundwork for a more regenerative future.

CHAPTER 5: THE TOWN OF ITHACA BUILDING PERMIT AND ANALYSIS

The Town of Ithaca building permit analysis examined building permit data from the Town's OpenGov database to evaluate demolition activity and identify opportunities for deconstruction. During the study period of January 10th, 2022, through January 17th, 2025, a total of 25 demolition permits were issued within the Town of Ithaca. The majority of these involved whole residential demolitions (WRD, N=18) followed by partial residential demolitions (PRD, N=4). As illustrated in Figure 3, these residential demolitions are geographically dispersed across the Town, reflecting a widespread pattern of redevelopment. Commercial demolition activity was significantly lower, consisting of only two whole commercial demolitions (WCD) and one partial commercial demolition (PCD) (Figure 3). These demolitions, like their residential counterparts, were scattered across different areas of the Town.

Beyond explicitly assigned demolition permits, the permit data reveals a substantial number of projects that fall under what can be considered demolitions. A total of 57 permits were identified as partial residential demolitions (PRD) (Figure 4), primarily involving renovations or alterations to existing single- and two-family homes. These projects, though not labeled as demolitions, involve the removal or replacement of structural components and present a valuable opportunity for material recovery. Clusters of this activity are visible around State Route 79, the Northeast Ithaca neighborhood, and near Ithaca College. With a deconstruction lens, these demolition sites offer a rich potential source of reusable materials that could be diverted from the waste stream and reintegrated into new construction or community projects, advancing the Town's commitment to circular economy principles (Figure 5).

Commercial deconstruction opportunities, while fewer in number, are nonetheless significant. The data identifies 19 permits associated with partial commercial demolitions (PCD) and three whole commercial demolitions (WCD) (Figure 6). These projects are generally located along

major commercial corridors and could contribute meaningfully to material reuse efforts, especially given the often durable and high-quality materials found in commercial buildings.

Establishing a formal deconstruction program would allow the Town to proactively capture the value embedded in both residential and commercial projects. By encouraging selective dismantling over conventional demolition, such a program could reduce landfill waste, lower greenhouse gas emissions, and support local reuse enterprises. Towns like Auburn, NY, have demonstrated how structured deconstruction initiatives can spur economic development through the creation of reuse businesses and job training opportunities.

In sum, the data highlights a strong foundation for advancing deconstruction in Ithaca—not only as a strategy for sustainable waste management but as a tool for building a resilient, circular local economy. While the permit data provides valuable insights into the types and locations of demolition and potential deconstruction activity, it lacks information about the volume or type of materials involved in each project. This absence represents a significant data gap, limiting the Town's ability to quantify potential material recovery and fully assess the environmental and economic benefits of deconstruction. To address this, the Town should begin collecting detailed information on material quantities and types (e.g. labeling projects as whole or partial residential or commercial demolitions) as part of its permitting process. Incorporating such data collection early on would not only improve future planning and resource allocation but also strengthen efforts to track progress toward sustainability goals and support the development of a robust local reuse market.

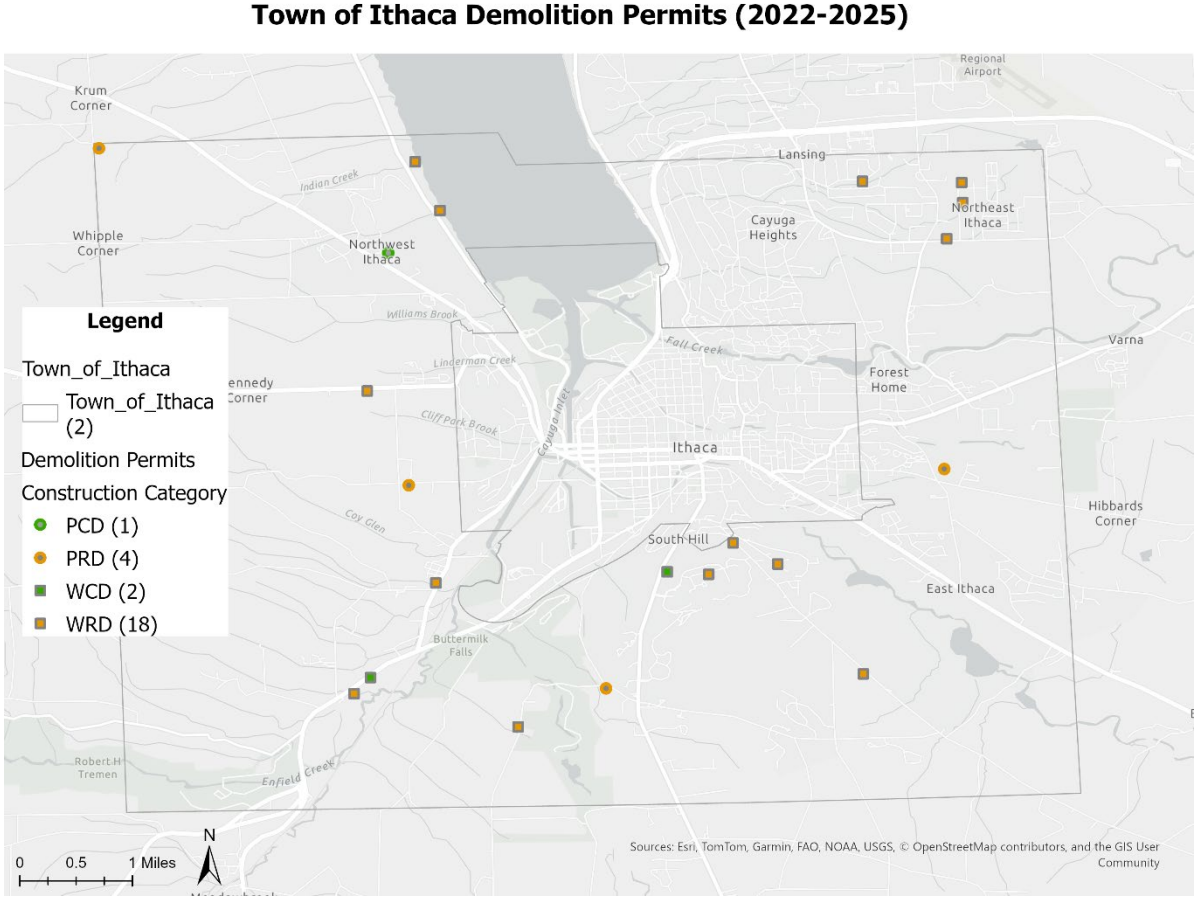

Figure 3: Demolition Permits

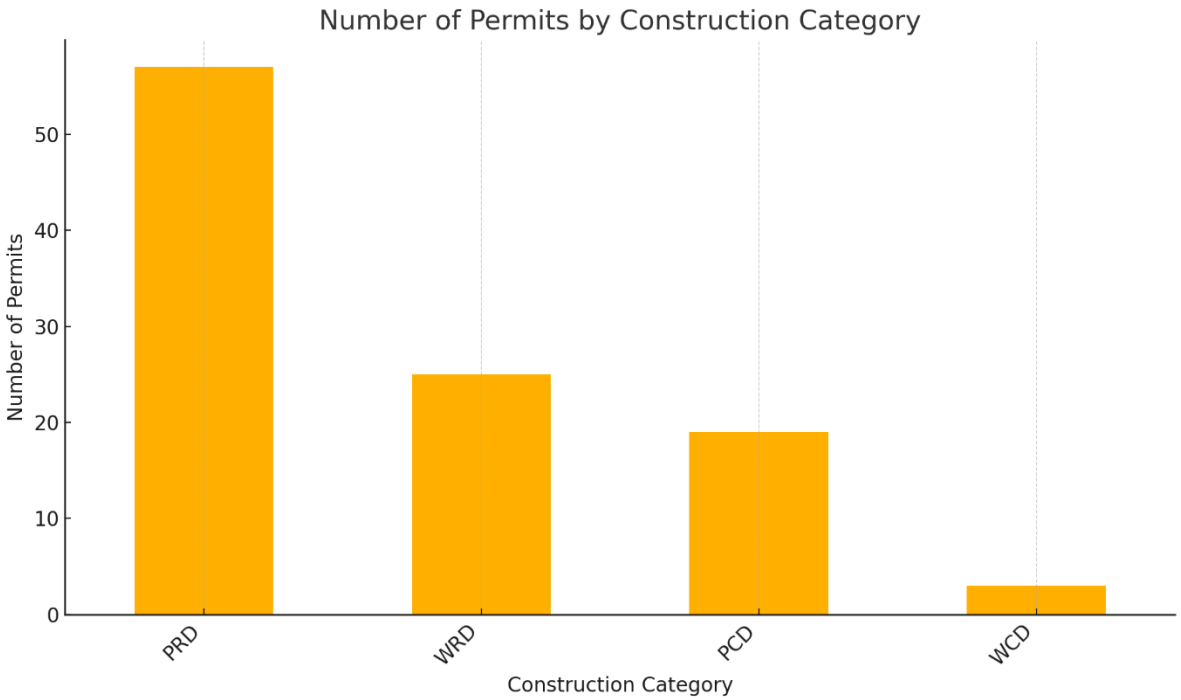

Figure 4: Permit distribution by construction category

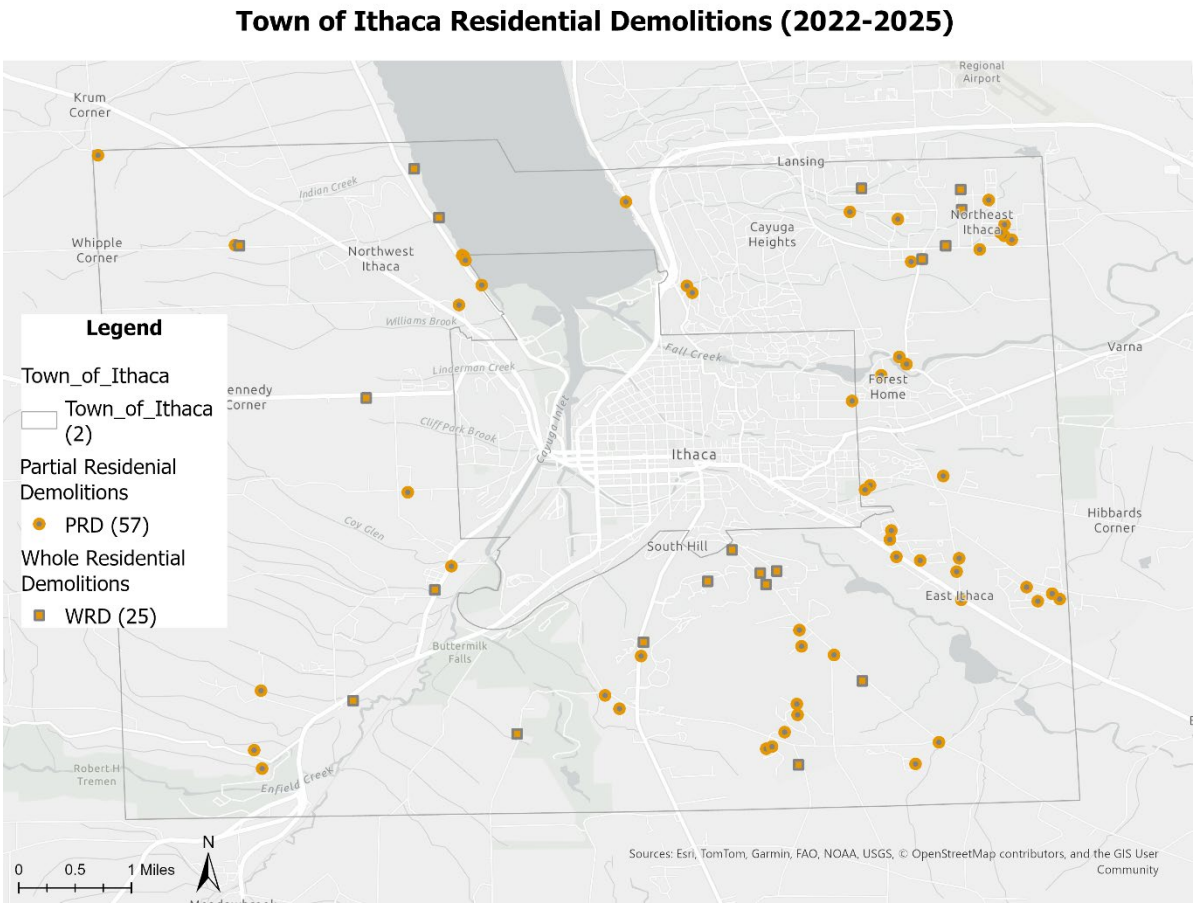

Figure 5: Town partial and whole residential demolitions

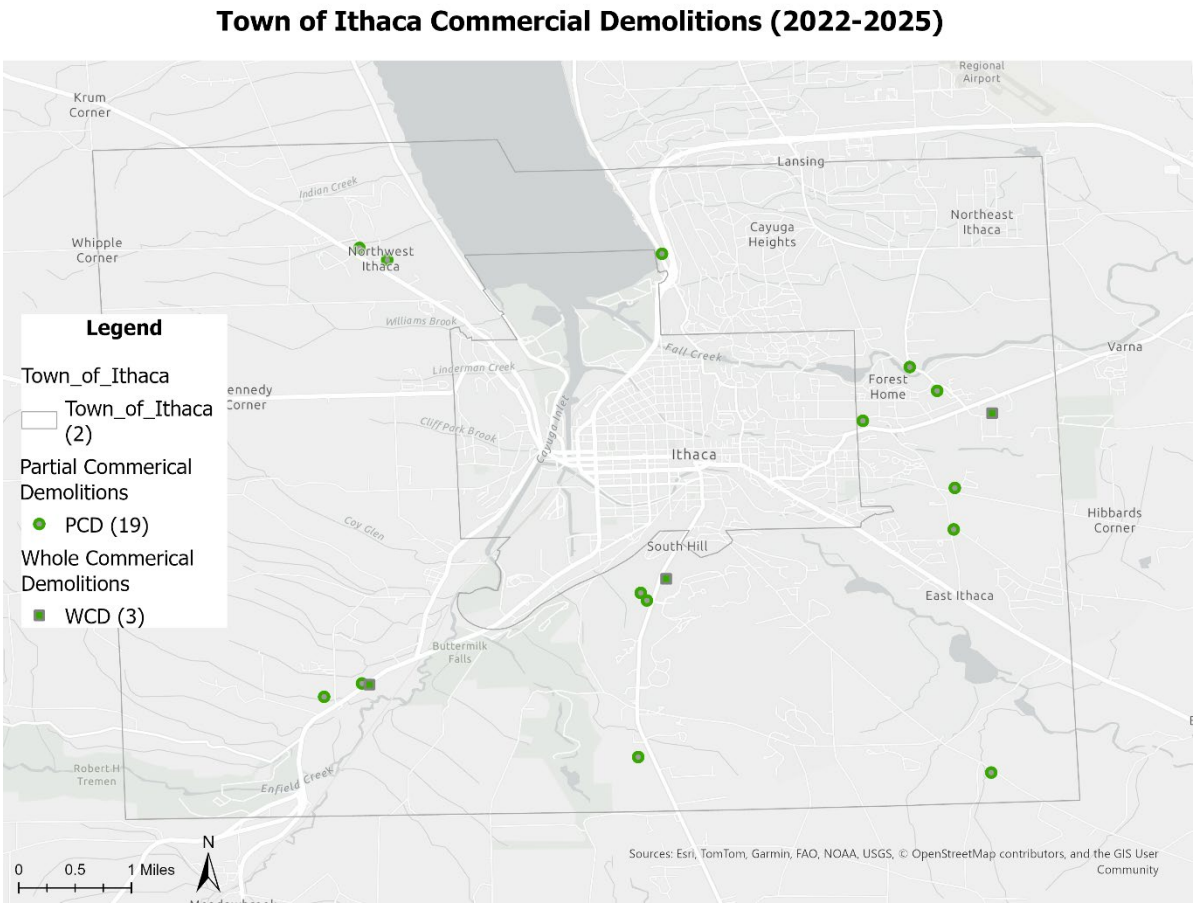

Figure 6: Town partial and whole commercial demolitions

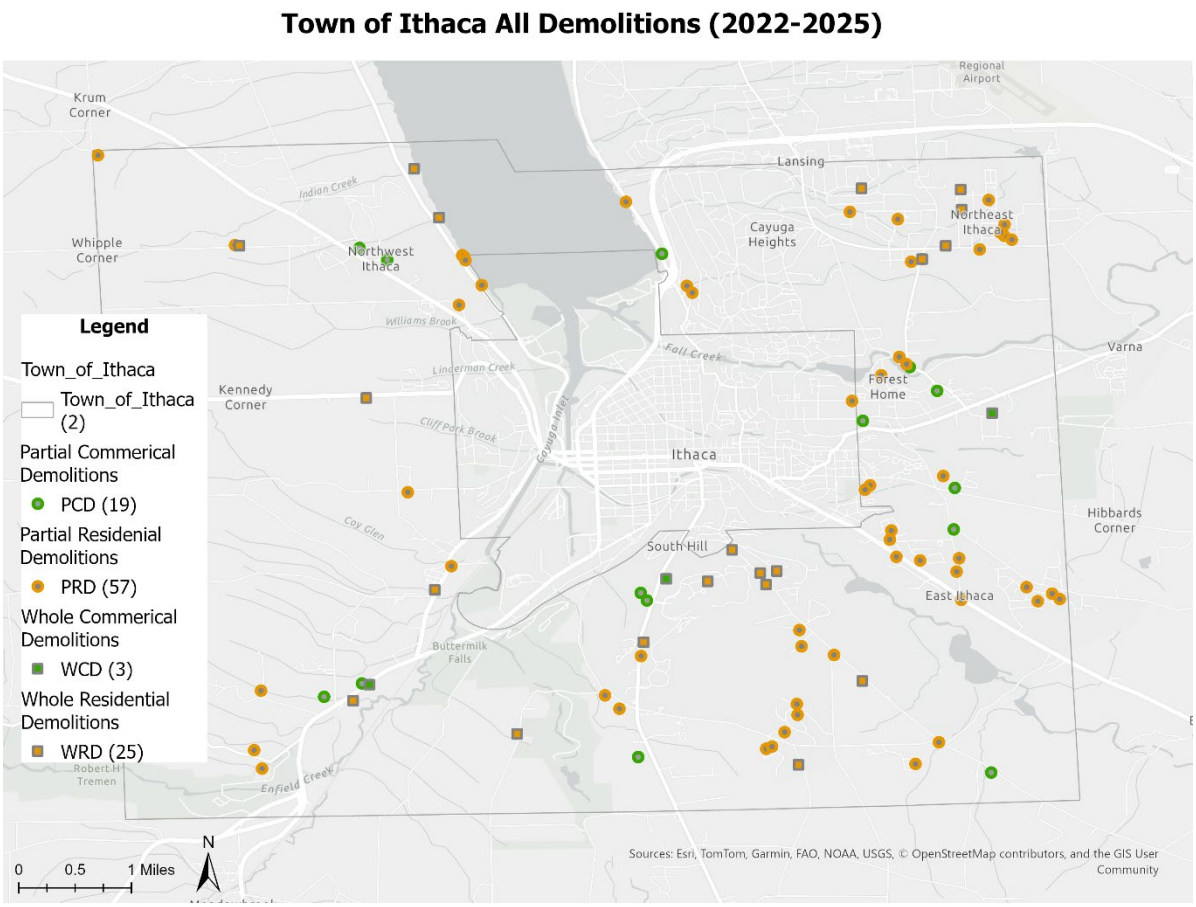

Figure 7: Both whole and partial residential and commercial demolitions

CHAPTER 6: ANALYSIS OF DECONSTRUCTION AND REUSE RELATED BUSINESSES

A robust and viable marketplace is crucial for the success of a deconstruction program. The Town of Ithaca boasts a variety of deconstruction and reuse-related businesses located within a relatively small area, all of which can benefit from and contribute to the long-term sustainability of a deconstruction initiative. From the analysis of deconstruction and reuse-related businesses discussed in this component of the research, it is clear that Ithaca is home to numerous businesses that present opportunities for partnership development.

The analysis presented in this chapter was conducted using business data sourced and aggregated by the Just Places Lab, filtered using the North American Industry Classification System (NAICS) codes relevant to deconstruction industries. The geographic focus was limited to businesses located within the zip codes 14850, 14851, and 14852, providing a snapshot of the current deconstruction and reuse-related business landscape in Ithaca. Spatial mapping and proportional comparisons were conducted using Microsoft Excel and ArcGIS. However, certain limitations should be considered: the analysis excluded businesses located outside the defined area, and no verification was conducted to confirm the current activity status or specific engagement with deconstruction practices. As such, while the data offers a valuable baseline, future research involving direct outreach and interviews with businesses would be essential to better understand their willingness and capacity to participate in a deconstruction marketplace.

The largest groups of businesses within the zip code of 14850 were in New Single-Family Housing Construction (N=33) and All Other Specialty Trade Contractors (N=26), as highlighted in Table 2. The All Other Specialty Trade Contractors category encompasses businesses engaging in a range of activities, including additions, alterations, maintenance, and repairs. Notable examples of this include cleaning building interiors during or immediately

after construction, erecting and dismantling scaffolds, and paving or sealing driveways.[lxxv] These businesses play a crucial role in supporting the deconstruction process by providing the necessary expertise and services.

Map 6 illustrates the concentration of these deconstruction and reuse-related businesses within the 14850 zip code, showing a clear trend of residential construction-related industries. As observed, New Single-Family Housing Construction and All Other Specialty Trade Contractors remain the two largest business categories in this region. This observation aligns with the permit analysis, where the majority of permits issued were for residential projects. Additionally, the Residential Remodelers category ranks as the third largest, signifying a strong focus on home renovations and repairs, which could contribute significantly to a deconstruction program aimed at reusing building materials.

The area also has a considerable presence of Architectural Services (N=21), which could be instrumental in designing deconstruction plans and incorporating reusable materials into construction projects. Furthermore, the number of Site Preparation Contractors provides an indication of opportunities to train local employers and their workers in deconstruction surveys and assessments of reusable materials, further enhancing the program's reach and impact.

While the total number of businesses in each category may not appear especially significant when compared to the state as a whole, the proportion of businesses in the 14850 zip code stands out when compared to other cities. The greater Ithaca region contains 4.43% of the state's architectural service businesses, which is noteworthy, and 2.93% of New Single-Family Housing Construction businesses. Other categories of interest include All Other Specialty Trade Contractors at 2.82%, as well as Engineering Services and Residential Remodelers, each at 2.53%. These concentrations further underscore Ithaca's potential to

foster a successful deconstruction program, with an abundance of relevant businesses in close proximity.

Other information to note, which will help provide key insights into the composition and financial characteristics of businesses, is based on three important indicators: Location Employee Size Range, Credit Score Alpha, and Location Sales Volume Range. These metrics collectively paint a detailed picture of the business ecosystem, revealing workforce size, financial stability, and revenue generation. The data points to a predominantly small-business environment, with most businesses operating with limited staff and modest annual sales volumes. Additionally, credit score distributions indicate a relatively stable financial foundation across the business group, further emphasizing the resilience and responsibility of these local enterprises. Together, these findings offer a valuable perspective on the scale, creditworthiness, and economic impact of the businesses under review.

The Location Employee Size Range (Figure 8) reveals that the vast majority of deconstruction and reuse-related businesses operate with a very small workforce, with 1 to 4 employees being the most common category by a large margin (N=91). This is followed by a moderate number of businesses in the 5 to 9 (N=38) and 10 to 19 employee (N=25) brackets, indicating a presence of slightly larger but still small-scale operations. The number of businesses with 20 or more employees drops significantly (N=20), and only four of those report 100 to 249 employees. This underscores the limited presence of mid-sized enterprises. Overall, this trend highlights a predominantly small-business ecosystem.

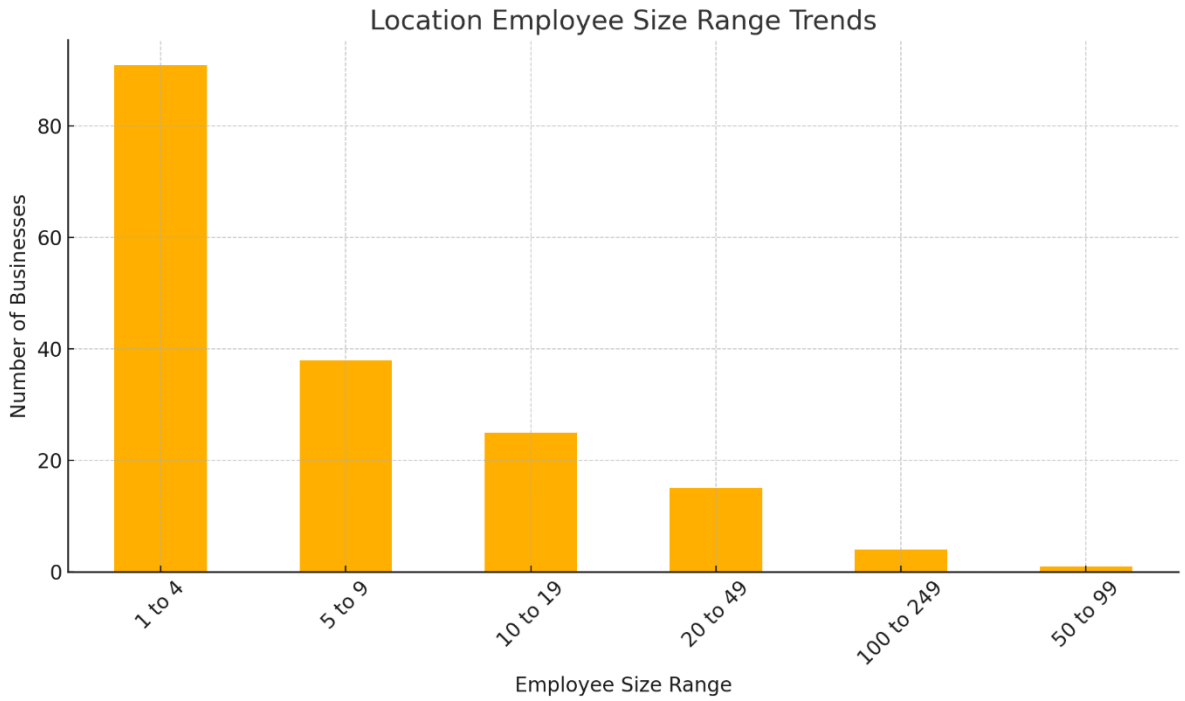

Figure 8: Employee size range for businesses within 14850

The analysis of the Credit Score Alpha data (Figure 9) reveals that most deconstruction and reuse-related businesses maintain moderate to strong credit profiles, with the highest concentration in the B category (N=42) followed closely by A (N=39) and B+ (N=36) scores. These findings suggest a generally stable financial standing across the majority of businesses, likely reflecting responsible credit behavior and moderate risk levels. As the scores descend into C+ and C categories (N=49), the number of businesses decreases, indicating fewer entities with potentially higher credit risk. Overall, this distribution highlights a relatively healthy credit landscape among businesses, with most companies positioned in favorable credit tiers.

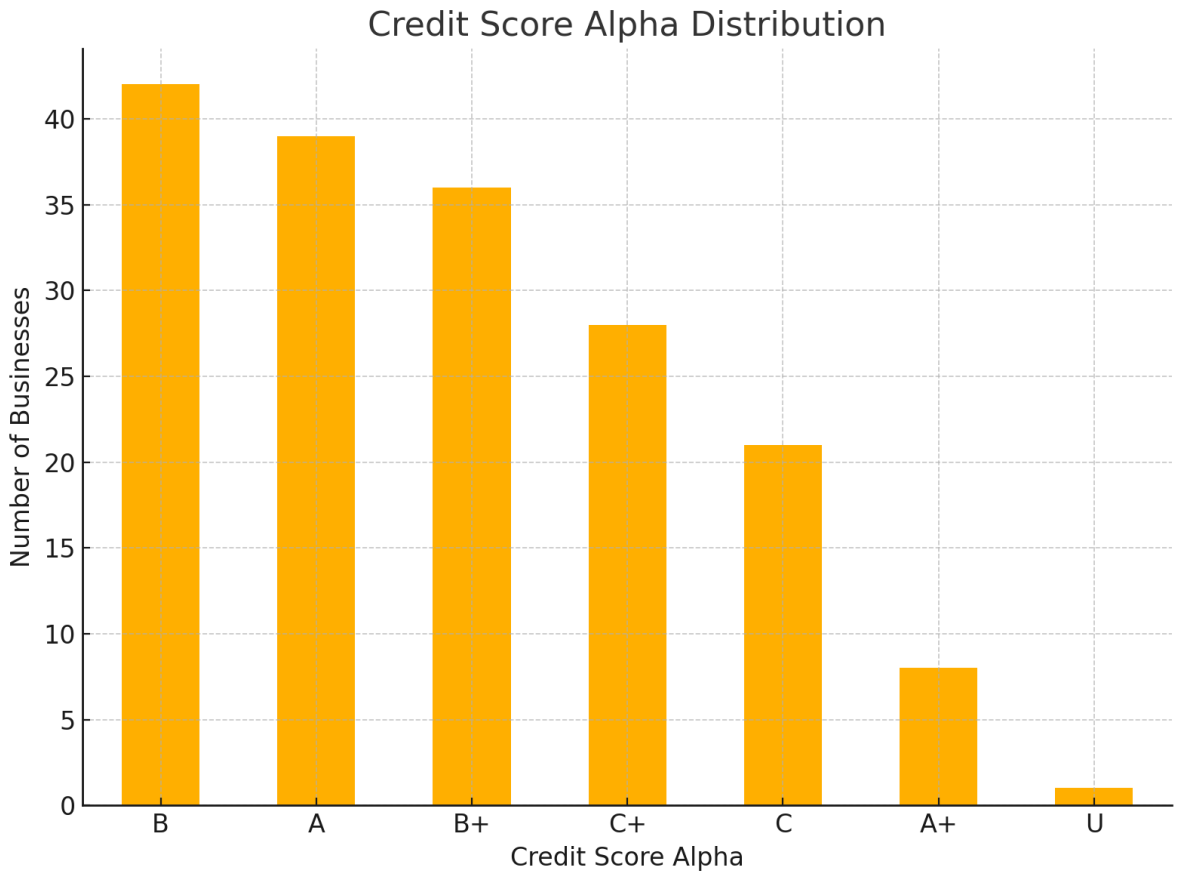

Figure 9: Credit score alpha for businesses within 14850

The analysis of the Location Sales Volume Range among businesses (Figure 10) reveals a strong concentration of small businesses within the study area. A majority of businesses fall within the Less Than $500,000 revenue bracket (N=56), highlighting the prevalence of modest-scale operations. This is followed by a gradual decrease in representation as sales volumes increase, with $500K–$1M (N=42) and $1–2.5M (N=34) ranges also showing moderate activity. Only a small number of businesses operate in the $5M and above categories (N=14), and just two of those exceed $50M in annual sales. This distribution suggests a largely localized, small-business-driven economic landscape with relatively few high-revenue enterprises playing a dominant role.

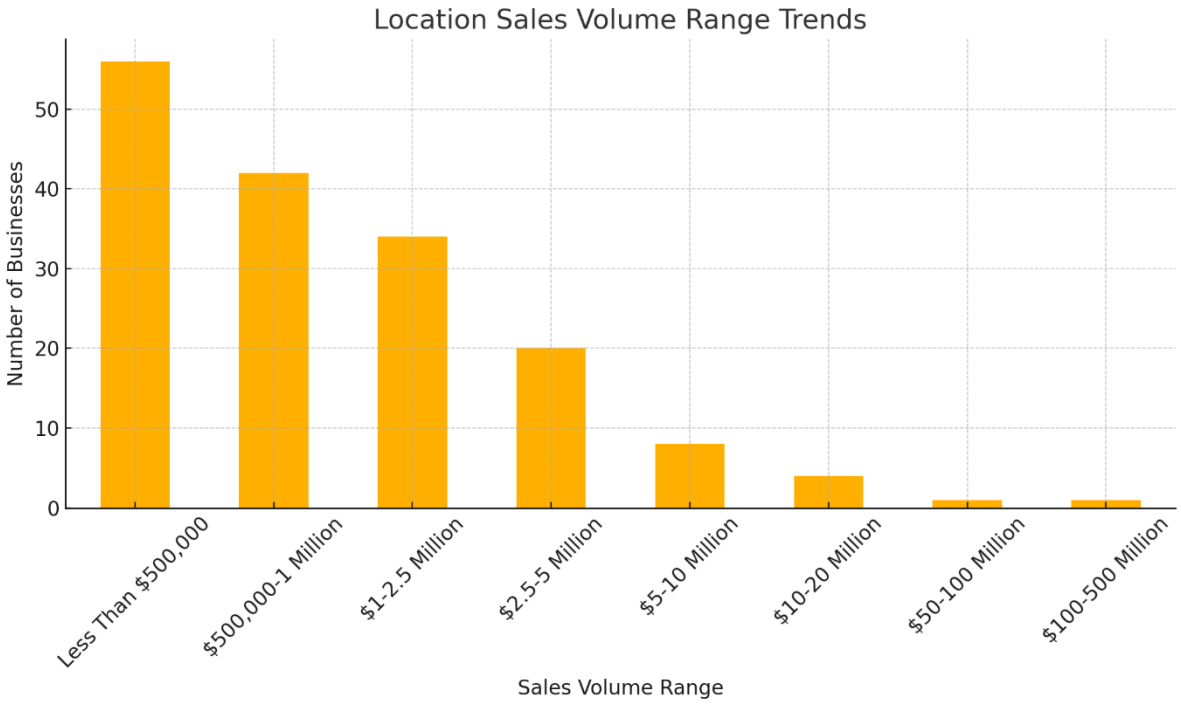

Figure 10: Sales volume range for businesses within 14850

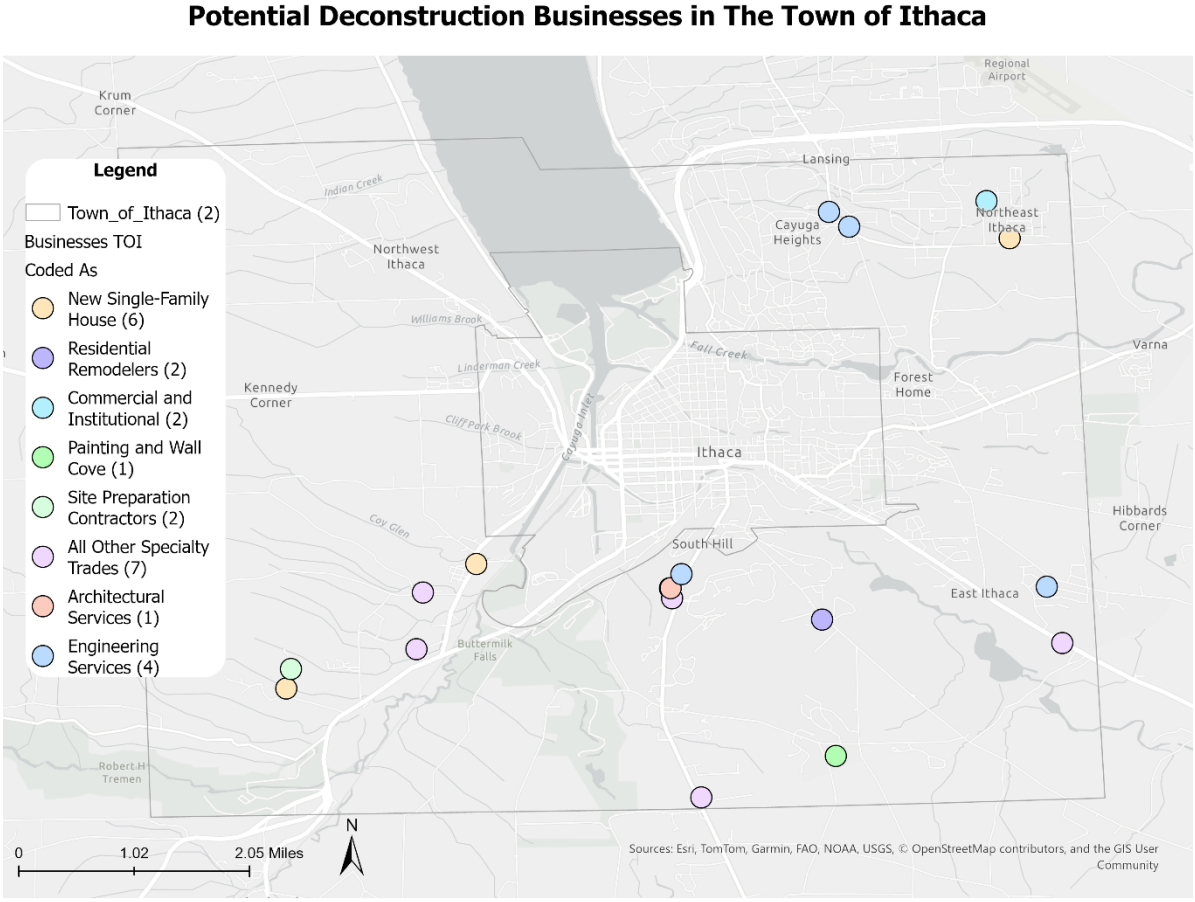

Figure 11: Potential Deconstruction Businesses within the TOI

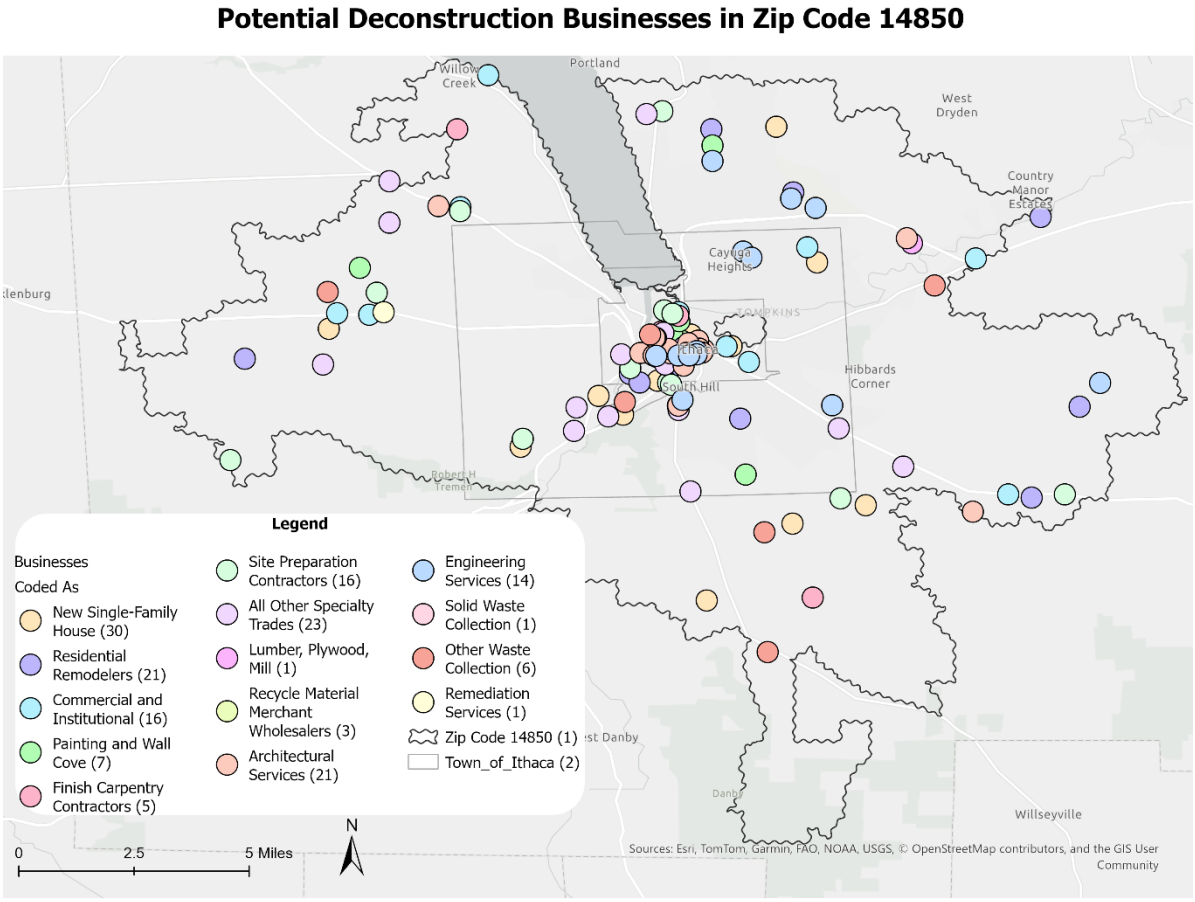

Figure 12: Potential Deconstruction Businesses within Zip Code 14850

NAICS Code	Business Type	Count of Businesses in Ithaca	Total Businesses in NYS	Total Businesses Percent	Cities with Business Type	Percent Within Ithaca
236115	New Single-Family House	33	13736	0.24%	1128	2.93%
236118	Residential Remodelers	22	6977	0.32%	869	2.53%
236220	Commercial and Institutional	16	5277	0.30%	835	1.92%
238320	Painting and Wall Cove	7	2477	0.28%	589	1.19%
238350	Finish Carpentry Contractors	5	2039	0.25%	558	0.90%
238910	Site Preparation Contractors	18	3807	0.47%	948	1.90%
238990	All Other Specialty Trades	26	7579	0.34%	921	2.82%
423310	Lumber, Plywood, Mill	1	865	0.12%	365	0.27%
423930	Recycle Material Merchant Wholesalers	3	1101	0.27%	408	0.74%
541310	Architectural Services	21	4040	0.52%	474	4.43%
541330	Engineering Services	14	3381	0.41%	554	2.53%
562111	Solid Waste Collection	1	131	0.76%	89	1.12%
562119	Other Waste Collection	7	1055	0.66%	433	1.62%
562910	Remediation Services	1	625	0.16%	249	0.40%

Figure 13: Businesses in the State of New York and within other cities in New York compared to zip code 14850

CHAPTER 7: DECONSTRUCTION PROGRAM RECOMMENDATIONS

Based on the findings of this report, the Town of Ithaca appears well-positioned to implement a deconstruction program that aligns with its Green New Deal goals, supports workforce development, and strengthens the local circular economy. Given the Town of Ithaca's size, existing reuse infrastructure, and regional partnerships, a phased approach is recommended to maximize impact while minimizing administrative burdens. (See figure 15, which is a recommendations matrix.)

Adopt a Phased Implementation Approach

A successful deconstruction program should be introduced in phases, allowing for policy refinement and stakeholder engagement along the way. The following phased approach is recommended:

Phase 1: Resolution & Public Awareness Campaign

Just as the Town of Dryden and the City of Auburn have done, the Town of Ithaca should introduce and pass a deconstruction resolution to signal the Town's commitment to material reuse and waste reduction. To continue with the momentum of a resolution, it is recommended that the Town develop an education and outreach campaign to inform property owners, contractors, and developers about deconstruction's benefits. To maximize outreach and align materials, this should be in partnership with local organizations such as Finger Lakes ReUse (FLR) and CR0WD. An example could be hosting an informational workshop on deconstruction benefits and best practices. By raising awareness for deconstruction, the Town would be not only educating the community but also establishing relationships with local businesses, including builders and resale stores, to eventually connect salvaged materials to end-users.

To support these broader goals, the Town of Ithaca should also improve data collection practices within the demolition and building permitting process. Current permit records lack consistent terminology and detailed information about the scope of work, which limits the ability to track demolition trends and assess deconstruction opportunities. The Town could revise permit forms to include standardized fields that clearly distinguish between demolition, renovation, and deconstruction activities. These could include checkboxes for material salvage, reuse intentions, and estimated quantities of recoverable materials. Additionally, requiring applicants to submit post-project reports summarizing material outcomes would provide valuable insights into reuse potential and actual recovery rates. Improved data transparency would not only support program evaluation and policy development but also help identify frequent project types or materials best suited for targeted deconstruction outreach and support.

During Phase 1, the Town can also strengthen local reuse infrastructure. While the Town benefits from the presence of FLR, the lack of large-scale storage and processing space remains a challenge. They should explore the short-term use of municipal properties as temporary storage for salvaged materials. By working with regional partners, the Town can support the growth of a reuse marketplace, creating a shared materials exchange for contractors and community members to source affordable reclaimed materials—eventually collaborating on grants and funding opportunities for deconstruction infrastructure improvements, such as a dedicated reuse warehouse or material sorting facility.

Phase 2: Pilot Program for Town-Owned Projects

Phase 2 of establishing a deconstruction program could be conducting a pilot project. The Town should select a municipally owned building scheduled for renovation or demolition to serve as a pilot deconstruction project. (The planned Town Hall renovations could be a potential option.) During this process, the Town should systematically track material recovery

rates, detailed cost categories, including labor, equipment, salvage operations, overhead, and any revenue offsets such as avoided disposal fees and resale value of reclaimed materials. Additionally, environmental benefits, such as landfill diversion and carbon savings, should be documented to support a comprehensive feasibility assessment.[lxxvi] For this process, it is recommended that the Town partner with FLR and others in CR0WD, BOCES, Cornell University, Tompkins County Community College and local workforce training programs and unions to integrate hands-on deconstruction training as well as tap into previously established relationships to both apply for grants and redirect salvaged materials to end-users.

During Phase 2, the Town can participate in developing a workforce training pipeline to support job creation and ensure a skilled labor force for deconstruction activities. This can be made possible by partnering with local trade schools like TST BOCES, workforce development programs, and Finger Lakes Reuse to create training modules for deconstruction techniques. If funding is available, the Town could offer paid apprenticeships or certification programs for at-risk populations.[lxxvii]

Phase 3: Full Ordinance & Incentive Program

Once the Town has gained confidence in the deconstruction process and the pilot project, the subsequent recommended step is to utilize the data from the pilot project to draft and enact a deconstruction ordinance. The ordinance could require material recovery for specific demolition projects. The Town should consider appointing a dedicated staff member to oversee a deconstruction program and manage a permit deposit system modeled after Boulder, Colorado. In Boulder, applicants pay a refundable deposit tied to meeting specific material recovery and reuse targets, creating a financial incentive for sustainable demolition practices. A similar approach in Ithaca could ensure consistent oversight, improve compliance, and reduce the amount of enforcement on deconstruction projects from the Codes Department. If the volume of deconstruction activity becomes challenging to manage, the Town could

implement tracking software, such as Green Halo, or explore whether OpenGov offers compatible functionality. These tools can help streamline permit processing and automate material diversion reporting, improving efficiency and data accuracy.

The Town of Ithaca should coordinate with Tompkins County, CR0WD, and neighboring municipalities to align with county-level waste reduction goals and advocate for state-level incentives for deconstruction. Incentive programs can be implemented for homeowners and businesses that choose deconstruction over demolition. To encourage participation in deconstruction, the Town can introduce financial and regulatory incentives, which could include permit fee reductions and fast-track permitting for projects that integrate deconstruction plans. At a minimum, the Town should model and maintain deconstruction requirements for Town-funded projects, ensuring municipal construction aligns with sustainability goals.

By adopting this phased and strategic approach, the Town of Ithaca can establish a successful, scalable deconstruction program that not only reduces landfill waste but also stimulates local economic development, promotes workforce training, and advances environmental justice goals. Through partnerships, policy incentives, and infrastructure investment, Ithaca can position itself as a leader in sustainable building practices in Upstate New York.

Recommendations Matrix for the Town of Ithaca Deconstruction Program				
Phase	**Goal**	**Action Items**	**Key Stakeholders**	**Expected Impact**
Phase 1: Resolution & Public Awareness (Short-Term: 6-12 months)	Establish a foundation for deconstruction and community engagement	Pass a **deconstruction resolution** Launch **public awareness campaign** Incorperate **deconstruction** and **improve** building permit collection	Town Board, Planning Dept., CR0WD, FLR, local contractors	Increased community awareness and policy foundation for future action
Phase 2: Pilot Program (Short to Mid-Term: 1-2 years)	Test feasibility of deconstruction for municipal projects	Identify a **Town-owned pilot project** Develop partnerships with **workforce training programs** Collect data on **material recovery, costs, and emissions reductions**	Town Planning & Public Works, Cornell University, Workforce Development Agencies, FLR	Data-driven insights to refine future policies, workforce training opportunities
Phase 3: Deconstruction Ordinance & Incentives (Mid-Term: 2-3 years)	Implement a structured, enforceable deconstruction policy	Pass a **deconstruction ordinance** Introduce **permit deposit system** (similar to Boulder, CO) Provide **tax credits, permit rebates, and fast-track permitting** for deconstruction projects	Town Board, Planning Dept., Builders Association, FLR, Local Businesses	Increased material recovery, reduced landfill waste, incentivized participation
Infrastructure Expansion (Ongoing – Begins in Phase 2 & 3)	Enhance material storage, processing, and distribution	Identify **municipal properties for storage** Establish a **regional material exchange** Seek **grants/funding** for storage and reuse centers	Town Facilities Dept., FLR, Tompkins County, NYS Agencies	Expanded material recovery capacity, streamlined reuse process
Workforce Development (Ongoing – Begins in Phase 2)	Build a skilled workforce for deconstruction and reuse	Partner with **FLR & workforce programs** to train workers Develop **apprenticeship/certification programs** Encourage **local contractors to hire trained deconstruction workers**	FLR, Workforce Training Programs, Local Contractors, Trade Schools	Job creation, economic development, skilled labor force
Regional & Policy Alignment (Ongoing – Begins in Phase 1 & 2)	Ensure TOI aligns with regional & state sustainability goals	Collaborate with **Tompkins County & CR0WD** on regional strategy Advocate for **state-level deconstruction incentives** Explore **partnerships with reuse networks**	Tompkins County, NYS DEC, CR0WD, Regional Municipalities	Policy cohesion, funding opportunities, broader marketplace for materials

Figure 14: Recommendations Matrix

CONCLUSION

The Town of Ithaca's current reliance on a linear economy—a system in which resources are extracted, used, and ultimately discarded—is producing adverse environmental consequences, negatively impacting public health, and limiting economic and employment opportunities. This approach not only generates excessive waste but also overlooks the potential value embedded in building materials that are routinely landfilled during demolition. As the costs of new construction materials continue to rise, this lost opportunity becomes even more significant, as many of these discarded materials could instead be reclaimed, reused, and resold. By diverting these valuable resources into the local market, the Town could help lower material costs, strengthen the reuse economy, and support sustainable job creation.

A necessary move the Town should consider to advance building material reclamation and reuse is to pass a deconstruction resolution. As this report demonstrates, deconstruction creates new sources of economic and social value that can be measured in potential jobs, economic activity, and advancement in building materials innovation. It also presents an opportunity to save valuable, high-quality building materials from ending up in already-overflowing landfills and to lower the amount of GHG emissions produced.

Shifting to a circular economy is an opportunity the Town of Ithaca is well-positioned to seize. The Town has strong partnerships with the surrounding municipalities, the area has a base for a deconstruction market and workforce development, and there are local institutions working on making deconstruction more efficient. Given the small number of demolitions over the past three years, the Town can efficiently enact a deconstruction program through phases, starting with a solid foundation for future improvements. It also underlines the importance of collaborating regionally to coordinate in building a regional marketplace as well as coordinating best practices and regulations.

With a deconstruction program in place, the Town of Ithaca can continue to build partnerships with surrounding agencies, public partners, and private organizations to develop a robust deconstruction and salvage program that supports a healthy local reuse industry. These efforts will enable the Town to move towards a circular economy and achieve affordable housing, sustainability, waste reduction, public health, and equity objectives.

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