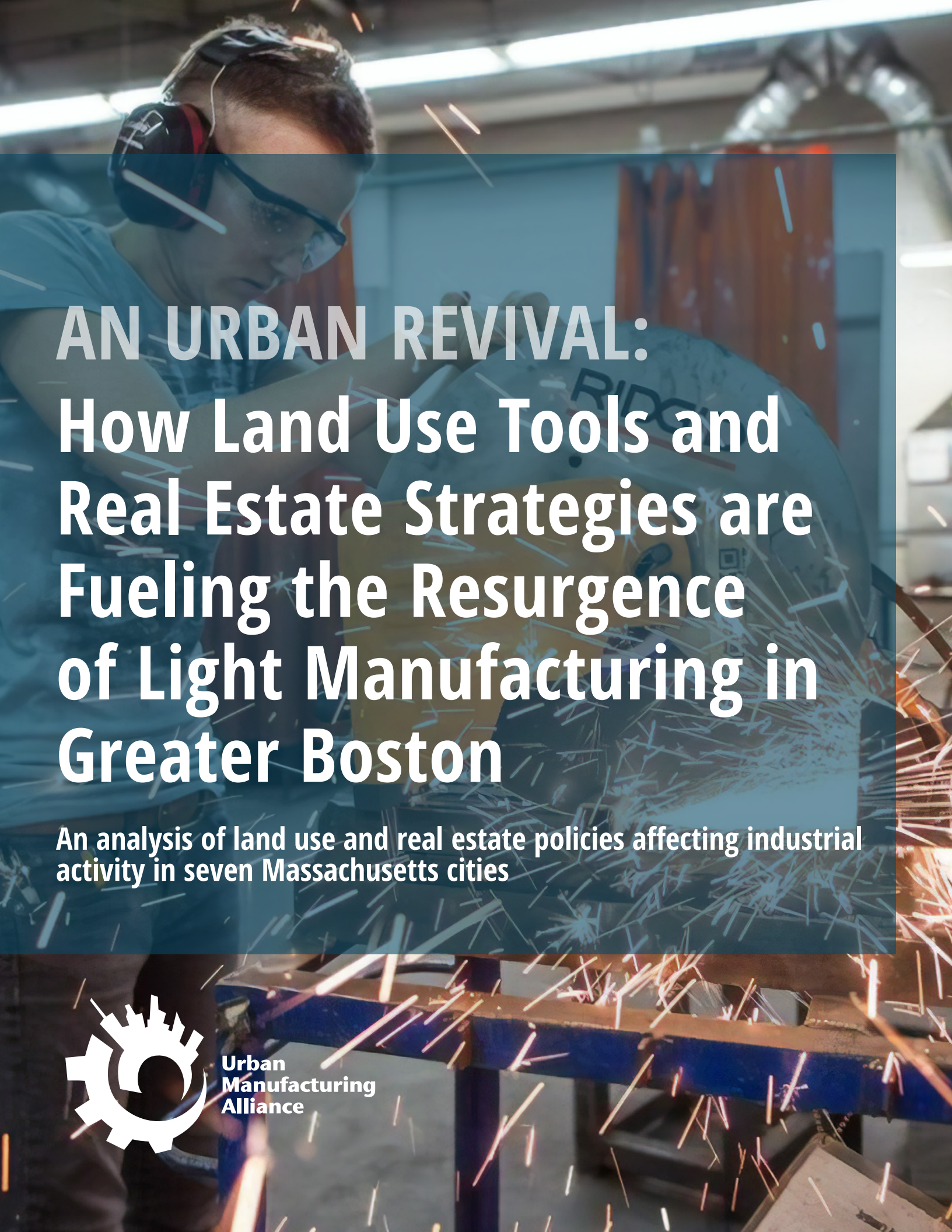




AN URBAN REVIVAL: How Land Use Tools and Real Estate Strategies are Fueling the Resurgence of Light Manufacturing in Greater Boston

An analysis of land use and real estate policies affecting industrial activity in seven Massachusetts cities



Urban
Manufacturing
Alliance

ABOUT

The Urban Manufacturing Alliance is a national coalition that strives to build vibrant, equitable neighborhoods by promoting urban manufacturing economies fit for the 21st century. Through our online platforms, we provide webinars, toolkits, and research and policy writing with national partners to inform our growing membership on contemporary strategies for supporting small- to mid-sized manufacturers. Each year we host gatherings in cities across the country, which have attracted hundreds of manufacturing practitioners interested in learning from one another on complex topics like local branding, equity, workforce development, and land use policy.

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Introduction

National Context

The composition of manufacturing firms has changed radically over time. Across the United States, we are moving from a manufacturing sector dominated by mass producers with hundreds of employees, to one characterized by masses of small and medium-sized firms. Many of these firms have honed high value-added production processes that leverage industrial design and product customization to gain a competitive edge.^{1, 2}

The size of these firms can be quite small. While small- and medium-sized manufacturers (SMMs) are generally defined as firms with less than 500 employees,³ manufacturing firms with 10 or fewer employees make up nearly 60 percent of the nation's manufacturing economy. And while the sector lost six million jobs between year 2000 and today, U.S. manufacturers still provide a living for more than 12 million workers.⁴ Moreover, manufacturing output has remained a strong contributor to the U.S. economy, generating \$5.7 trillion in GDP in 2016.^{5,6}

Despite this economic contribution, land use and real estate development frameworks in cities across the country do not match the space and location demands of many of today's smaller manufacturers. Cities and towns are now turning to land use policy to create a greater array of spaces in urban areas for small, low-impact manufacturers. This is a notable shift, as manufacturers have historically been pushed to the outskirts of cities for fear that they would be disruptive to local communities. Today, we are seeing the opposite trend, with manufacturers locating in downtowns and mixed-use neighborhoods.



Youth gather at the South End Technology Center Fab Lab, a maker lab and training ground for computer technologies in Boston that is free or low-cost for nearby residents. Credit: Boston Fab Lab

Because these firms depend on thriving neighborhoods that include universities, local customers, suppliers, and other small manufacturing firms, city environments can be catalysts for their growth.⁷ Mayors and municipal managers recognize that manufacturers are an important part of a healthy, equitable local economy, because many of the positions in this sector offer opportunities to workers with less experience, education, and—in some cases—English proficiency.

Commonwealth of Massachusetts Context

Nearly a decade after the 2008 economic recession, manufacturing is poised for growth in the Commonwealth of Massachusetts. In 2015, economic output from Massachusetts'

manufacturers hit \$48 billion, marking the highest output from the industry in history.⁸ The year capped ten years of a variable rise in gross output from manufacturers, a sector that employs more than 250,000 people and constitutes a vital 10 percent of the Commonwealth's economy. While larger pharmaceutical and computer manufacturers contributed the greatest dollar amount to 2015's record output, more than 54 percent of the Commonwealth's manufacturing companies have 10 or fewer employees.⁹

As we look at manufacturing in cities located in and around the Boston core, this report refers to "light manufacturers," which are defined here as SMMs that produce little or no noise, odor, or pollution.¹⁰ They are the dominant presence among manufacturers, and they may play an even greater economic role

in the future. Light manufacturers can form agile, hyper-local manufacturing ecosystems and distribution supply chains, which fulfill the demands of larger manufacturing companies and entrepreneurial ventures.¹¹ This trend is evinced by firms like 99Degrees Custom, a growing textile manufacturer in Lawrence with 58 employees that produces textiles for Under Armour, and organizations like Greentown Labs, a green-tech incubator whose startups have created more than 500 jobs and manufactured prototypes for companies not just in Massachusetts, but across the globe.¹²

To tap into this growth, city leaders must balance the preservation of industrial space with growing demand for non-industrial uses like office and residential. Otherwise, manufacturing companies will struggle to scale in place, instead being pushed farther and farther from the urban core to more remote areas where industrial conversion has not yet taken root.

Greentown Labs is a prime example. The green-tech incubator was initially priced out of Cambridge. It relocated to Boston's Fort Point neighborhood, only to face escalating rent pressures as that neighborhood experienced real estate development. The company has since relocated to the former Ames Envelope factory in Somerville, where it has reached capacity and is now expanding into a second, adjacent location slated to open in early 2018. The City of Somerville is contemplating new "fabrication" zoning—an overlay district that includes the Ames Envelope factory complex—as a mechanism for preventing non-industrial redevelopment. Absent some form of protection, it is likely that market pressures would lead to redevelopment of the Ames complex, pushing Greentown out along with other light industrial tenants.

These are the market realities in the Greater Boston area. Real estate has become significantly more expensive over the past seven years, making the region's cost of

Greentown Labs is currently preparing to expand into more than 50,000 square feet of operating space. Credit: Scout Somerville





living 47.9 percent higher than the national average.^{13,14} Industrial space is increasingly vulnerable, as industrial landlords often generate higher returns on their investment by redeveloping their sites for non-industrial uses like residential, commercial, or retail space. Meanwhile, cities like Lawrence, Lowell, Chelsea, and, farther west, Fitchburg, have created overlay zoning designations to incent adaptive reuse of vacant or underutilized industrial buildings, like historic factories and mills, to residential.¹⁵

These challenges, mixed with rising industrial rent prices, declining vacancy rates, and real estate demands by major commercial and distribution tenants, are threatening to permanently shift the Boston area's industrial character away from manufacturing.¹⁶

But many of these industrial buildings are the last of their kind to house manufacturers, due to their structural integrity and open floor plans that are ideal for large manufacturing operations or multiple small-scale manufacturers. Additionally, once industrial neighborhoods are rezoned for other uses, they rarely return to their original industrial use. Market economics make it challenging to build new industrial space in hotter real estate areas like the Boston region, where Class A industrial sites are expensive and unaffordable to most light manufacturers. Therefore, preserving the current stock of industrial real estate means preserving Massachusetts' manufacturing jobs, which are vital for working class communities because they often don't require college degrees yet pay more than double the salary of other low-barrier-to-entry jobs in industries like retail and hospitality.¹⁷

This report focuses on the real estate and land use tools being employed in seven cities in the Greater Boston area: Boston, Lawrence, Lowell, Chelsea, Fitchburg, Somerville, and Malden.¹⁸ Each of these cities is interested in protecting portions of their industrial neighborhoods, and it is easy to understand why. Total manufacturing jobs in Massachusetts declined by nearly a third between 2001 and 2013, but manufacturing wages across the state have continued to rise, reaching an average salary of \$67,687 for all manufacturing industries and \$84,584 for advanced manufacturing jobs.¹⁹ In Chelsea, the food manufacturing, wholesaling, and distribution industries support 11,000 regional jobs and contribute \$2.3 billion to the Greater Boston economy.²⁰ Sixty-four percent of the jobs along Malden's Commercial Street corridor, the city's dominant industrial hub, pay nearly \$40,000 a year.²¹ In Somerville, manufacturing jobs pay an average of \$52,000 a year.

But these cities also recognize that there are local and regional challenges that have complicated, and will continue to complicate

industrial preservation. In Fitchburg, the Economic Development Office says manufacturing companies have had to leave the city because multi-story historic mills do not meet the demand for high ceilings and expansive, single-story floorplates now typical of today's larger, modern manufacturers. In Lawrence, a mill conversion overlay district established nearly a decade ago provides tax credits to developers if they turn old industrial spaces into affordable housing, which clashes with the city's interest in attracting light manufacturers to pockets of its available mill space. In Boston, developers purchasing space along and near the New Market industrial corridor are causing jumps in nearby rents that are adding pressure to existing industrial tenants.

This report looks at the various land use and real estate strategies that municipalities can leverage as they balance industrial preservation with the equally important need for additional housing, office, and other uses.

The seven cities featured in this report and their proximity to the Greater Boston area.



Methodology

For this report, the Urban Manufacturing Alliance (UMA) studied seven cities within the Greater Boston area: Boston, Lawrence, Lowell, Chelsea, Fitchburg, Somerville, and Malden. These cities were chosen based on a number of factors, including geographic diversity, population density, varying market contexts, and experimentation with land use and real estate development models to support light manufacturing. However, they represent only a subset of cities with rich industrial legacies across the Commonwealth.

UMA then interviewed 11 municipal planning staff members in Massachusetts, and referenced dozens of interviews with community organizations and economic development practitioners that are part of UMA's national network. With this network, we were able to compile an analysis of the land use and development dynamics that characterize light manufacturing in those seven cities.

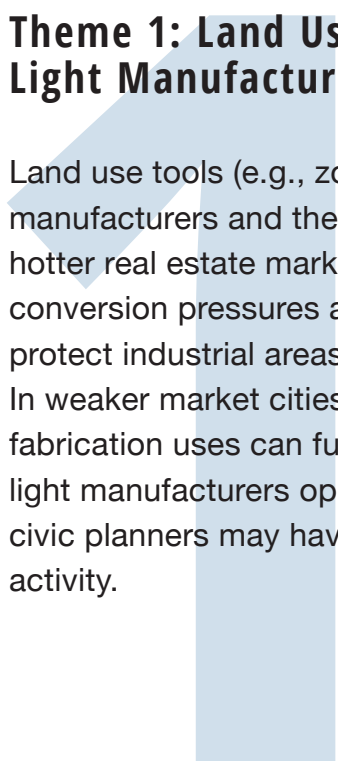
Through this process, four themes emerged:

- The role of land use tools in supporting light manufacturing
- The importance of leveraging broader planning processes to support light manufacturing uses and businesses
- The opportunities tied to legacy manufacturing neighborhoods and buildings
- A desire for greater regional collaboration

Specific case studies from each city are used to illustrate these themes.

Four Themes as Illustrated Through Case Studies

While each city has made various degrees of progress in expanding opportunities for light manufacturing, the officials interviewed all expressed interest in nurturing this sector. The themes and case studies below touch on land use and real estate strategies in each city that hold promise for activating light manufacturing and preserving existing industrial space. These are themes that have also emerged at the national level, and as such, we offer national case studies that may be applicable locally.



Theme 1: Land Use Tools are Critical for a Vibrant Light Manufacturing Economy

Land use tools (e.g., zoning and permitting) can serve light manufacturers and their local communities in two ways. In hotter real estate markets, where industrial vacancy is low and conversion pressures are high, more restrictive zoning can protect industrial areas and urban manufacturing operations. In weaker market cities, zoning around artisan, craft, or fabrication uses can function as an activation strategy, giving light manufacturers opportunities to locate in neighborhoods that civic planners may have never considered viable for industrial activity.

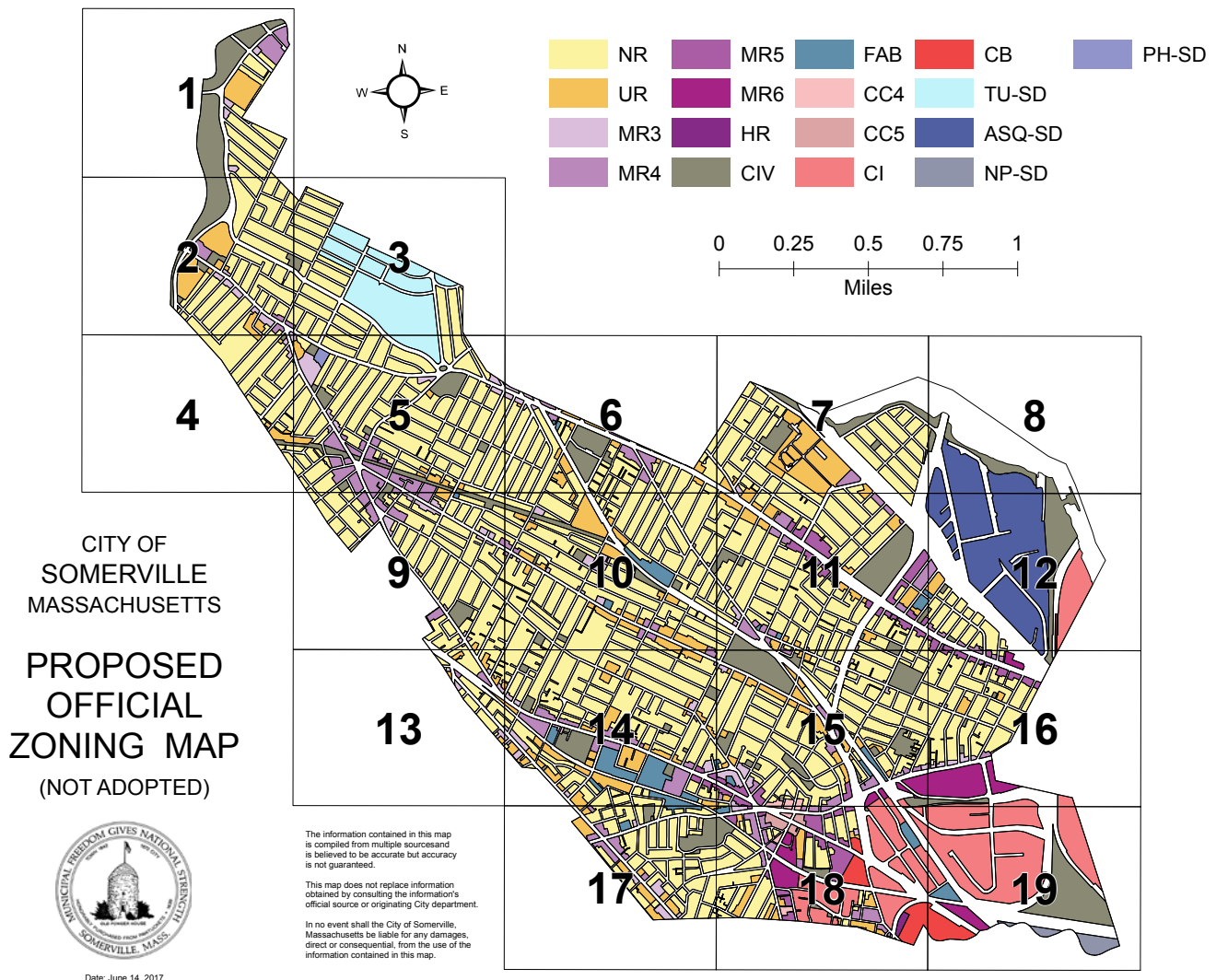
Artisan Zoning

Artisan zoning refers to land use designations that give space to light manufacturers that produce little to no vibration, noise, fumes, or other forms of pollution.²² Cities and towns across the nation are working to identify manufacturing uses that fall within this definition and allowing those uses within commercial corridors or mixed-use neighborhoods. Somerville is one city that has proposed this

approach. In their citywide zoning overhaul, the city has proposed creating a “Fabrication” or “FAB” district that would both restrict residential uses in certain areas and establish a framework to encourage light manufacturing.

The FAB district²³ would permit buildings of up to four stories and four plates of up to 30,000 square feet to be retrofitted for mixed-use commercial activity that satisfies creative and light manufacturing uses. High-rise and mid-

A proposed zoning ordinance for the City of Somerville that includes a Fabrication designation, which would help preserve light industrial/fabrication districts. Credit: City of Somerville



rise zones would require new developments to preserve a minimum of five percent of ground floor square footage for “Arts and Creative Enterprise” uses, which includes light manufacturing and creative studio space. Through this addition, the city is designating space for the artisan and light manufacturers that operate out of facilities such as Greentown Labs, which is currently expanding into more than 50,000 square feet to become the largest green-tech incubator in the world,²⁴ and Artisan’s Asylum, one of the country’s first and now largest makerspaces. The only residential uses permitted in the district are *work/live*²⁵ spaces for artists, designers, or light manufacturers. Even these spaces, however, require a special permit approved by the city’s planning board—a provision that offers tight controls on any co-located residential use. Retail and office spaces are also prohibited. The City of Somerville expects its Board of Aldermen to vote on the proposed zoning changes in spring 2018.

Balancing Permitting and As-of-Right Approaches for Light Manufacturing Uses

Many Massachusetts cities and towns are creating special permits for light manufacturing activity as opposed to allowing the uses as-of-right. This gives local governments two methods of oversight. First, it allows them to see whether light manufacturers can thrive in a range of industrial or non-industrial areas, per zoning designations. Second, it helps them control the definition of light manufacturing, allowing them to test assumptions around how intensive particular light manufacturing uses may be.

Malden, for instance, introduced a “Light Manufacturing” designation into its land use code in 2012 to allow light manufacturers to locate in five of its nine zoning categories, including industrial neighborhoods, commercial corridors, and neighborhood business districts. Malden defines light manufacturing as, “fabrication, assembly, processing or packaging operations employing only electric or other substantially noiseless and inoffensive motor power, utilizing hand labor or quiet machinery and processes.”²⁶ Light manufacturing land uses are only granted through special permits by the city’s planning board, even in industrial areas, and are limited to buildings that are either 30 feet or two stories tall. Kevin Hunter, Senior Planner and Policy Manager at the

Malden Redevelopment Authority, says the city is discussing ways to update its Light Manufacturing zoning partially because these light manufacturing land use definitions are more restrictive than heavier industrial uses, despite light manufacturers having a lighter impact.

Chelsea has two zoning districts for light manufacturing uses, titled “Light Industrial/Office” and “Light Industrial/Office 2”. These designations are distinct from the city’s industrial zoning district because they allow for light industrial, office, and R&D uses that will not adversely affect nearby residential neighborhoods. Such districts allow for research establishments, machine shops and metalworking sites, printing, graphic arts, and renewable energy manufacturing. Food production facilities are also allowed to operate in Chelsea’s two light industrial districts and its industrial district, but only with a special permit.²⁷ Within these industrial districts, retail sales of products manufactured on-site are allowed as an accessory use. This carving out of food manufacturing and on-site retail is notable as it can create a destination for the public, which means greater sales opportunities for these businesses, but also traffic impacts that planning officials may want to monitor.

Creating special permit requirements for light industrial areas should be considered carefully, however, as the process can potentially add costs and delay start times for local businesses.

Industrial Zoning Protections

In Boston, the Newmarket industrial area is home to about 235 industrial companies with nearly 20,000 employees.²⁸ Real estate pressure in the neighborhood led the city to update its zoning code in 2014 to protect this cluster, which is predominantly made up of food manufacturers. It is now known as the “Newmarket Industrial-Commercial Neighborhood District,” which allows 51 industrial and non-industrial use groups. Light manufacturing uses include food manufacturing, green technologies, artist work studios, apparel manufacturing, woodworking studios, computer and electronic product manufacturers, and more. Heavy industrial uses are not permitted, like civil engineering construction, petroleum and coal products manufacturing, and waste remediation services. Non-industrial uses like offices, restaurants, research and development, and technical and trade schools are permitted, while non-industrial uses like residential, hospitals, bars, and hotels are forbidden.²⁹ This type of designation is meant to limit residential real estate speculation, while encouraging uses that may complement light manufacturing in the area.

Discuss space needs with light manufacturers; this can build a constituency for artisan zoning designations.

The local business community can serve as a powerful voice for zoning policies. It is a crucial source of information for city planners as they contemplate new zoning tools. Businesses can describe in detail the kinds of production or fabrication uses tied to their operations, the impacts associated with those production processes, the range of spaces that suit their needs, and their location preferences in various commercial corridors or neighborhoods. These businesses can also join advocacy efforts to support zoning code changes:

- In **Somerville**, over 80 small makers and artists attended community hearings to support the proposed Fabrication district.³⁰
- In **Baltimore, Maryland**, the city participated in extensive surveying of light manufacturers through UMA's *State of Urban Manufacturing* process, which is now informing their Carroll Camden Industrial Real Estate Study.
- In **Duluth, Minnesota**, local manufacturers helped lead the effort to modernize zoning in the Lincoln Park district to include a mix of retail and light manufacturing uses.³¹ The newly designated Lincoln Park Crafts District is now home to a vibrant mix of manufacturing and non-manufacturing companies.

Note that artisan zones are vulnerable; as market dynamics change, it may be difficult to maintain light manufacturing uses.

While some artisan zones restrict residential uses and encourage a range of creative industries, there is no guarantee that light manufacturing uses will be maintained in these districts over time. Indeed, planning officials in Somerville noted that companies in the FAB district are vulnerable to rising rents that could price out current light manufacturing activities despite the zoning restrictions.

Cross-subsidy mechanisms can provide an important resource for cities and towns looking to promote light manufacturing within mixed-use districts. These policies incentivize developers to build light manufacturing space alongside high rent-generating uses like commercial or office space, which help subsidize rents while also keeping light manufacturing jobs within mixed-use areas. They are most effective for retaining industrial users, however, when matched with enforcement measures to guarantee light manufacturing land uses in designated developments.³²

- **San Francisco** established Production, Distribution, and Repair (PDR) zoning districts in 2004, which prohibit non-ancillary office, retail, hotel, and other non-industrial uses. In 2014, it developed a cross-subsidy model to encourage the development of PDR uses. This model allows commercial office space in industrially zoned lands, so long as at least a third of the space is set aside for PDR uses.³³

Consider artisan zoning designations that are tailored to local clusters.

On top of adopting artisan zones, some cities have opted to create specific designations for clusters, using titles like “Artisan Food and Beverage.” Food and beverage uses can be an ideal sub-designation for artisan zones, as these uses can become retail or commercial destinations, which come with specific opportunities and impacts.^{34,35}

These sub-designations can also help create a stronger local identity by building food and beverage industries in their neighborhoods. Two zoning approaches targeting food clusters are described below:

- In **San Diego**, the city created an ***Artisan Food and Beverage Producer***³⁶ use category that allows businesses whose primary use is on-site production to occupy spaces less than 20,000 square feet in a range of neighborhoods. In certain areas, these businesses are allowed as-of-right, while in others the city requires a *Neighborhood Use Permit*. The use category sets out specific hours of operation for retail sales, outdoor activities, and product consumption depending on proximity to residential areas. Shipping and receiving activities are confined to certain parameters, such as time of day, so as not to disturb residential neighbors.
- In **Kansas City, Missouri**, the *Artisanal Food and Beverage Manufacturing*³⁷ designation was adopted in 2015. The impetus for this ordinance came from a local beverage producer that was looking to operate in a commercial district, but was not permitted to do so under the current zoning. Kansas City wanted to embrace opportunities in artisan food and beverage production

without disrupting retail activities in their commercial corridors. To strike the right balance, they designed new zoning for businesses that were producing at least half of their food for sale on-site, which maintains the retail utilization. The designation was also geared toward food and beverage businesses with a much smaller real estate footprint—occupying less than 5,000 square feet—which can be accommodated in commercial corridors.

Reinforce industrial zones to preserve existing light manufacturing and limit real estate speculation.

Industrial neighborhoods are integral to the success of light manufacturers. These are areas where businesses can find contract manufacturers, locate their businesses as they scale-up, and benefit from the ease of operating alongside other industrial uses. Without zoning protections these areas can become vulnerable to alternative uses, especially in strong real estate markets. This is particularly true when non-industrial uses, like commercial office or big-box retail, is allowed as-of-right. In other areas, it may be permits or variances granted in the industrial area that are chipping away at industrial protections. Some cities have reinforced their industrial zoning with stronger restrictions. For instance:

- **Seattle** strengthened its industrial zones in 2008 by lowering maximum sizes for office and retail uses. It also currently limits office, entertainment, and retail uses in marine and rail-related industrial areas to 10,000 square feet.³⁸
- The Industrial Sanctuary Program in **Portland, Oregon** limits office and retail uses to 3,000 square feet within its general industrial and heavy industrial zones.³⁹

Theme 2: Broader Planning Processes Can Be Harnessed for Light Manufacturing

Cities and towns may find it difficult to implement a planning process that is specifically focused on light manufacturing, or even the industrial sector broadly. Other planning issues, from housing, to parks, and open space, have stronger political constituencies that help build momentum for planning efforts. Light manufacturing generally does not have this same groundswell of support. Instead, communities may leverage larger-scale planning processes that address a variety of community and business needs as a platform for supporting light manufacturing. Because light manufacturing can be integrated into a variety of neighborhoods, it can therefore be incorporated into a range of planning exercises—from transit development, environmental remediation, and blight reduction.

Transit-Oriented Development

Transit-oriented developments are likely to be viewed as a source of light manufacturing displacement, as new transit can drive up property values, and make the spaces untenable for light manufacturers. Yet paired with the right set of land use tools and planning objectives, transit investments can actually bolster light manufacturing. Better transit improves access to jobs, making for a more equitable manufacturing sector. Transit options can also improve goods distribution by reducing vehicular traffic. The additional density of non-industrial development can cross-subsidize light manufacturing space with other higher rent-generating uses.

In Boston, the Fairmount Indigo Community Development Corporation (FICDC) is working with the Newmarket Community Partners, a non-profit that provides financial support to community and job placement groups like Boston Career Link and JVS CareerSolution to pair jobseekers from the Fairmount/Indigo transit corridor with light manufacturing jobs near the Newmarket neighborhood.⁴⁰ (The transit line passes through a low-income region of Boston that has been historically disadvantaged.) The project has leveraged federal and local funding⁴¹ by establishing clear goals: creating more than 800 jobs in sectors like light manufacturing for corridor residents; 1,200 mostly affordable residential units; and 500,000 square feet of commercial space. Notably, the FICDC focuses on protecting and promoting light manufacturers in two concentrated areas along the corridor instead of trying to weave light manufacturing into the entire corridor development plan.

A key player in the Fairmount/Indigo transit corridor effort is the Dorchester Bay Economic Development Corporation (DBEDC), a non-profit real estate developer that focuses on community outcomes.⁴² The corporation is developing four mixed-use properties within the Boston area, but their newest project, called Indigo Block and located in Upham's Corner, a minority-



A concept image of the Indigo Block, a mixed-use housing, commercial, and light industrial development that includes 20,000 square feet for light industrial tenants. Credit: Davis Square Architects

DEVELOPMENT STRATEGY: The Indigo Block development shares characteristics with the vertical factory concept, in which multiple manufacturers occupy different floors in a single industrial building. Manufacturers that don't need access to a loading dock can occupy the upper floors in this model, leaving space for larger manufacturers at the bottom. Policymakers should refer to Nina Rappaport's research on the Vertical Urban Factory concept for more insight.

majority commercial district and the largest neighborhood in Boston, will provide 20,000 square feet of light industrial space (out of the development's 125,400 square feet total) to encourage more small manufacturers to establish near the corridor. The result of a planning process guided by DBEDC and the city, Indigo Block will be constructed in a previously vacant lot in an area that is zoned for light industrial uses.^{43,44} The project is set to include 80 affordable housing units and a separate commercial building that will provide space for light manufacturers, including high-tech manufacturing operations, food kitchens, wholesale distribution, and other small to medium-sized firms. The second floor of the commercial building is being considered for artisan and design studios for tenants that don't need access to a loading dock. As cities continue to wrestle with how to incorporate light manufacturing and residential into a broader development plan, the approach used at the Indigo Block is one that should be considered.

Logistics Planning

The City of Chelsea is leveraging infrastructure improvements to better business conditions along a tributary to the Mystic River where its food production and distribution cluster lies. The city is pursuing funding to ensure industrial buildings along the Mystic are more flood resilient, and to improve the road network throughout this industrial corridor. In doing so, the city hopes to expand on the industrial neighborhood's legacy as a food production and distribution cluster. This cluster includes shared-ownership business models like the multi-tenant New England Produce Center and the Signature Breads Cooperative. Infrastructure investments along this major freight corridor will also signal to residential and parking developers, which are aggressively pursuing industrial properties near the waterfront, that Chelsea is committed to preserving its industrial space.

Commercial Corridor Planning

City planners can find ways to incorporate light manufacturing spaces into land use plans that spur commercial revitalization and creative placemaking. Light manufacturers can promise early tenants in new or revitalized commercial corridors in part because they do not rely solely on foot traffic to make their business models work.⁴⁵ A concentration of artisan manufacturers can create ecosystems where they share knowledge, attract diverse suppliers, and bring skilled workers to commercial corridors.

Malden is investigating ways to accomplish this through its Commercial Street planning effort. Segments of the Commercial Street corridor are plagued by brownfield sites in need of remediation for the private sector to invest in new development. A cluster of manufacturing, distribution, and warehouse businesses are located in the center of the corridor, forming a quasi-industrial park. The opposite end of Commercial Street feeds into Malden Center, which is served by an MBTA Orange Line station, and is the beneficiary of significant new multifamily development. Amid growing market pressures, the City has undertaken a planning effort with the Malden Redevelopment Authority and MassDevelopment that will help enunciate the importance of Commercial Street's industrial jobs to the community. The planning process is aimed at preserving these jobs while creating a more cohesive and vibrant mixed-use district.

The Commercial Street planning effort grew out of a 2015 study by the Urban Land Institute that identified ways to revitalize Commercial Street with a focus on light manufacturing.⁴⁶ Malden's proximity to Boston and relatively low rents are among Commercial Street's assets that can be leveraged to realize its full potential. These traits helped lure Stock Pot to establish near the Commercial Corridor, for instance. Stock Pot is a shared commercial kitchen space that runs a food manufacturing

incubator, venture fund, and a program that supports food entrepreneurs to launch businesses. Stock Pot is home to more than 20 food manufacturers, best known for its food trucks, but also home to fast-growing, centrally-prepared meal companies that deliver to individuals or institutions in the Boston area.



Stock Pot Malden hosts more than 20 food entrepreneurs and manufacturers that serve the Greater Boston area. Credit: Elizabeth Scorsello

In Fitchburg, local partners like Fitchburg State University and the Fitchburg Public Library are leading redevelopment efforts that could prime areas like Main Street for light manufacturing. The public library on Main Street is expanding by nearly 60,000 additional square feet and will include a 2,000-square-foot makerspace, equipped with a 3D printer and tools for CAD design, sewing, digital art and design, and other facilities that engage STEM skills. The makerspace is designed to provide an introduction to light manufacturing processes to Fitchburg residents, particularly teenagers and children, with the capacity to host up to 19 people at a time.⁴⁷

Further east of Main Street, Fitchburg State University is absorbing a 28,000-square-foot theater into its campus. The building, which had been vacant for more than 20 years, is being redeveloped into an entrepreneurship center and computer lab for game designers.⁴⁸ While not targeted specifically for light manufacturing, this space will complement nearby artist housing developments like the B.F. Brown School, which is being redeveloped by NewVue Communities, a local community development corporation. Developers behind that project are currently analyzing whether the B.F. Brown School can accommodate a makerspace, along with 16 market-rate housing units and 39 affordable housing units designated for artists who make between \$22,700 and \$45,386 a year.⁴⁹

Leverage broader planning processes.

While the case studies explored in Massachusetts were largely focused on transportation plans and commercial corridor activation, there is also an opportunity to connect light manufacturing strategies to environmental planning. Historic industrial areas often include contaminated sites that are the target for environmental remediation; and these sites, once remediated, may be suited for cleaner light manufacturing uses. Additionally, many of these older industrial areas are located at the water's edge, making them prime locations for resiliency planning.

- In **Brooklyn**, Red Hook was one neighborhood that was especially impacted in the aftermath of Hurricane Sandy in 2012. The neighborhood has a long industrial history, with one of six of the city's ports. Roughly a third of its land is dedicated to industrial and manufacturing uses.^{50,51} Residents, community organizations like the Southwest Brooklyn Industrial Development Corporation, and business owners rallied around several post-Sandy planning efforts to create new opportunities for manufacturers in Red Hook. Plans include upgraded piers for industrial uses, streamlined permitting processes along the industrial waterfront to ease activation, increased job-training opportunities, and direct support for the area's 67 micro-businesses.⁵²
- In **Milwaukee**, Menomonee Valley Partners, a group of local, mission-driven industrial developers, has been leading a cleanup and revitalization effort in the valley's historic manufacturing district along its eponymous parkway. Since 1999, partners have worked to secure state and federal grants with an eye toward building

sustainable infrastructure and greywater systems to serve the valley's industrial tenants.⁵³ To date, they have redeveloped 300 acres of brownfield sites and attracted 44 new companies to fill the region's refurbished industrial infrastructure—including its one million square feet of new, sustainably designed buildings.⁵⁴

Tap into community organizations and other local institutions when pursuing planning efforts.

This approach encourages a broad base of engagement in planning efforts across diverse groups of residents, businesses, and other stakeholders. Some of the strongest advocates for light manufacturing space can come from unexpected voices and institutions, like libraries and schools. A coalition-based approach to planning is more likely to create a robust and supportive ecosystem for light manufacturing and can set the stage for many of the zoning tools described above.

- In **Cleveland, Ohio**, the St. Clair Superior Community Development Corporation is leading research for potential zoning updates by reaching out to communities to identify clusters of artisans and light manufacturers in the St. Clair/Superior neighborhood. The goal is to identify a boundary within the neighborhood that could benefit from a “live/work/sell” overlay district, potentially permitting artists and artisans the ability to live, work, and sell their products from the same unit within these districts. Participants in the planning process will include makers, artisans, businesses, residents, and community stakeholders in the neighborhood.

Theme 3: Capitalize on Industrial Legacy by Repositioning Vacant Buildings For Modern Manufacturing

A legacy of Massachusetts' manufacturing history is the number of historic industrial buildings that are ripe for continued manufacturing use by multiple tenants. When upgraded to code and right-sized for the operational needs of today's manufacturers, these industrial buildings can become a hive for entrepreneurs and established manufacturers. These buildings can also house applied training programs and makerspaces that benefit from being co-located with light manufacturing operations.

The case studies below highlight how these spaces—many of which were built for large single tenant use—can be subdivided to support multiple light manufacturing tenants. They also highlight the role that mission-driven developers play in preserving and rehabilitating these industrial spaces.

Right-Sizing of Historic Industrial Space

In Lawrence, the Everett Mills complex provides 525,000 square feet of mixed-use space that houses approximately 50 firms, including textile manufacturers, tech companies, and a makerspace. The owner leases space to a variety of tenant sizes, with some light manufacturing tenants sharing space on single floors. The complex now houses entrepreneurs that are revitalizing the local textile industry that has long characterized the city, led by companies like 99Degrees Custom, and National Fiber Technology. It is also home to local food producer Coco's Cafe & Catering, and provides warehouse and retail space to clothing retailer Vineyard Vines.

Additionally, 10,000 square feet of the complex is devoted to The Maker Innovation Lab Lawrence (MILL), a multi-tenant makerspace within the Everett Mills complex. When completed, the MILL will provide member entrepreneurs with a wood and metal shop, a 3D printing and robotics lab, a textile lab, a motion capture lab, and more services to help, in its own words, "incubate the region's next generation of manufacturing."

Everett Mills represents a way to subdivide industrial buildings into light manufacturing space at the scale and price point of today's small, growing manufacturers. Spaces here range from 1,000 to 50,000 square feet, and rent starts at \$6.00 per square foot in order to accommodate a range of manufacturers at

different points of growth. The co-location of non-profit programming within the industrial complex, along with for-profit office and technology firms, creates a dynamic blend of business activity that is a crucible for more entrepreneurial energy and continued light manufacturing development. Because of this diversity, Abel Vargas, the Director of Business and Economic Development at the City of Lawrence, says Everett Mills is a model worth replicating throughout the city. To that end, his office is creating marketing tools to promote Lawrence as a location for startup companies and small fabrication firms.

Leveraging Academic Anchors to Strengthen New Light Manufacturing Space

Since the 1970s, more than 90 percent of the historic mill buildings in downtown Lowell have been redeveloped for housing, retail, and office uses; only a small fraction is still designated for artist and artisan/light manufacturing activity. Lowell is now looking more closely at the Hamilton Canal and Acre districts—traditional manufacturing neighborhoods adjacent to downtown that house anchor institutions like the University of Massachusetts Lowell (UMass Lowell)—as locations that can support an innovation district with spaces for light manufacturing.⁵⁵

Surrounding the Acre district are more than a dozen mixed-use residential, commercial, and office spaces that are planned or being built. The city is hoping to render these formerly heavy industrial neighborhoods into a cohesive “innovation district” that will potentially include spaces for light manufacturing firms in addition to housing and commercial space. This 15-acre public-private development, called the Hamilton Canal Innovation District, will improve transit infrastructure in the region and promote light manufacturing and research and development as a means of providing living wage jobs and economic opportunity to the district’s large immigrant population.⁵⁶ UMass Lowell launched its Innovation Hub, a co-working space and incubator in a former textile building in the upcoming Hamilton Canal Innovation District, which provides facilities for light manufacturing of design prototypes in conjunction with the Massachusetts Medical Device Development Center (M2D2). The M2D2, which shares the same four-story building as the Innovation Hub, was created in partnership with UMass Lowell to provide services to small medical device companies and inventors, linking Massachusetts’ booming health sector with Lowell’s historic capacity for supporting manufacturing entrepreneurs.

WORKFORCE STRATEGY: Makerspaces are sometimes seen as exclusive spaces for hobbyists who know how to operate shop floor machinery. But through partnerships with local organizations, like faith-based institutions and neighborhood groups, makerspaces can actually become community centers where residents come to learn new skills and explore the manufacturing process. The MILL in Lawrence is working with the city's large immigrant and minority populations so that its image and services will reflect the community it operates in.

In 2018, the Innovation Hub will expand, filling the remaining vacant space in its building with the state's new Fabric Discovery Center, a research hub backed by \$11.3 million in public funds. The Center will act as a testing and development center for smart textiles that incorporate sensors and other electronic technologies designed for hospitals, the military, and everyday consumers.⁵⁷

A concept image of the UMass Lowell Innovation Hub, located in downtown Lowell. The Innovation Hub is part of an innovation district in Lowell that will provide facilities and space for light manufacturing. Credit: UMass Lowell Innovation Hub



Makerspaces as Catalysts for Light Manufacturing

Many of the rehabilitation projects referenced above incorporate makerspaces and other shared space models. These spaces provide a training grounds for businesses and local residents alike, with classes ranging from woodworking to 3D printing and laser cutting. Makerspaces can also help small companies access certain types of equipment that would be cost-prohibitive to purchase. Additionally, one of the advantages of these spaces is the sense of community they provide to businesses that might not otherwise collaborate with one another.⁵⁸

MAKING THE MAKERSPACE MODEL WORK: There are still plenty of unanswered questions about the makerspace revenue model, as evinced by national makerspace group TechShop's bankruptcy in November 2017. Makerspaces that share space or services with other partners — like universities or libraries — may have lower risk profiles because they are supported by larger, relatively stable institutions. Additionally, some makerspaces have looked to diversify their revenue streams by engaging in contract manufacturing work.

The makerspace movement is especially prominent in Somerville. In 2010, the Ames Envelope Factory announced it was shuttering its century-old Somerville operation, resulting in the loss of 150 jobs.⁵⁹ That same year, a robotics engineer from Olin College and a costume designer from MIT began the hunt for affordable fabrication space outside Boston's urban core. In 2011, they founded Artisan's Asylum and signed a 5-year lease for 40,000 square feet of production space in the former Ames factory complex. Family members of Ames founder John W.

Fitzgerald offered the space to Artisan's Asylum because they were intent on maintaining the complex for light manufacturing. Artisan's Asylum moved into the space in November 2011⁶⁰; today the organization has an estimated 400 active members and is heralded as a national example of a successful makerspace.⁶¹

Other portions of the former Ames factory complex have since been leased by incubator spaces like Greentown Labs and light manufacturers like Aeronaut Brewing, a local brewery that offers part of its operating space for community events and subleases to a few local small-scale manufacturers. These "anchor" tenants have attracted other food distributors, robotics companies, and commercial office tenants to the complex—a potent mix of entrepreneurialism that Somerville Mayor Joe Curtatone has described as a "village of innovation."

Non-Profit Industrial Development

Community development corporations (CDCs) may be best known for affordable housing development, but they can also play an important role in advancing light industrial development. This is especially true in hot real estate markets or areas in transition, where the fate of industrial real estate is uncertain. CDC-led projects also regularly advance other community objectives by leasing to local entrepreneurs and connecting light manufacturers to local workforce programming.

In Boston, for instance, the Dorchester Bay Economic Development Corporation manages a former hot dog factory that now houses Commonwealth Kitchen, a food entrepreneur incubator. Commonwealth Kitchen hosts more than 45 food entrepreneurs, the majority of which are women or minorities who depend on the site's 12,000 square feet of kitchen space, alongside a shared office space and a warehouse used by the food manufacturers. Commonwealth Kitchen has won multiple grants for its creative use of previously underutilized manufacturing space and its focus on including low-income and immigrant communities. Commonwealth Kitchen and Dorchester Bay Economic Development Corporation redeveloped the hot dog factory with \$15 million in equity and a \$20 million HUD grant to make this project possible.

Food manufacturers work their magic at Commonwealth Kitchen, an incubator and shared kitchen space that hosts more than 45 food entrepreneurs. Credit: Lucas Mulder



Explore how academic partnerships can reinforce light manufacturing rehabilitation.

As the Lowell case study illustrates, local universities can act as anchor tenants in redevelopment projects. In doing so, they can provide critical revenue flow in the early period of tenancy. They can also connect spaces to university resources, including business support programming and a pipeline of new light manufacturing tenants from the university's students, graduates, and faculty.

- In **Flint, Michigan**, non-profit developers, universities, and private investors are leading a \$100 million redevelopment of vacant buildings in the downtown area.⁶² As part of the investment, Mott Community College will move their culinary arts education to a 36,000-square-foot vacant downtown building, soon to be home to two culinary kitchens, two bakery and pastry kitchens, a meat fabrication laboratory, and a fine dining space. Skypoint Ventures is leading a \$7 million renovation of a 40,000-square-foot Art Deco building downtown which will host 100k Ideas, a non-profit incubator supporting light manufacturing. 100k Ideas will provide job and training experience in entrepreneurship for students from University of Michigan-Flint and Kettering University.

Support local developers who are committed to retaining, enhancing, and building new industrial spaces.

Both market-driven and mission-driven developers play an important role in retaining, enhancing, and building industrial space. Mission-driven developers may be more likely to keep rents affordable for manufacturers. However, they may lack development capacity in areas like financing or tenant recruitment. These developers would benefit from programs, partnerships, and other technical assistance that supports developers as they bring light manufacturing space to market.

- In **New York City**, the New York City Economic Development Corporation created a \$150 million Industrial Developer Fund intended to support 400,000 square feet of new development and redevelopment projects that provide affordable space for industrial users like light manufacturers. It was created with \$60 million in public funds and \$90 million in private dollars. These funds are issued in the form of grants, low-interest subordinate loans, and guarantees on senior private loans to both for-profit and non-profit entities. This fund was created in partnership with the Association for Neighborhood and Housing Development, a coalition of 100 affordable housing and economic development organizations that provide training, capacity-building, and apprenticeship programs to mission-driven developers interested in creating local jobs.⁶³
- In a historic industrial area of **St. Louis**, DeSales Community Development is joining forces with St. Louis Makes, the city's local branding organization, to transition a five-story, 87,000-square-foot industrial building into an industrial complex for multiple light manufacturing tenants. Rents are tentatively estimated at \$1,000 gross

for 1,300 square feet of space, and tenants will have access to business development assistance through St. Louis Makes. Brick City Makes, as it will be called, will use both New Market and Historic Tax Credits, which are important funding sources that have been used for the redevelopment of previously industrial spaces throughout the country. As the project was launched, project leaders spent time touring other U.S. cities to meet with other non-profits that successfully leveraged similar tax credits to bring their projects to fruition.

Provide capacity for makerspaces interested in opening in your community.

Makerspaces vary widely in terms of size, capacity, and corporate structure. While most makerspaces are unlikely to provide the stability of an anchor tenant like a more established manufacturer or university partner, they provide a valuable amenity within the building and for the local community. City leaders can advocate for makerspaces in community facilities, like libraries and public schools, and serve as a gatekeeper of resources to help these makerspaces become self-sustaining over time. For example:

- FabLabs for America has its roots in **Boston**, and was launched in collaboration with MIT's Fab Foundation. The organization advocates for shared spaces for making and learning in a range of spaces and neighborhoods. They see their work as an opportunity to create vibrant places and ensure that STEM education is reaching low-income communities and communities of color throughout New England.

WORKFORCE STRATEGY: The MILL makerspace is committed to providing its shop floor and resources for minority and immigrant entrepreneurs in the greater Lawrence area. This helps the organization succeed in Lawrence because the city's historically large immigrant population sees itself represented within the makerspace's membership, thus rendering it into a community asset instead of a place for hobbyists.

Theme 4: There is Significant Value in Regional Coordination

Regional coordination can help encourage light manufacturing in two key ways. Manufacturers often source materials and sell to customers outside of their home city, meaning partnerships with nearby cities can help them navigate regional supply chains. For example, one of the main barriers to scaling for light manufacturers is identifying contract manufacturers; information gaps can make it difficult to identify firms that are willing to produce in small batches for these smaller businesses.

Regional collaboration also strengthens the regional economy, and can boost joint economic goals, like protecting valuable industries or expanding workforce development pipelines. Too often, communities focus on their own municipality without acknowledging the reality that regional economies blur municipal boundaries. In the Greater Boston area, many people live in one city but work in another. Regional collaboration helps to sustain the local economy for the benefit of all.

Regional Supply Chain Connections

The federal government has directed funds to a regional partnership to help bolster light manufacturing in Middlesex and Essex Counties. The Economic Development Administration awarded \$1 million to four partners—the Metro North Regional Employment Board, City of Somerville, Greentown Labs, and the Northeast Advanced Manufacturing Consortium—to provide small hardware manufacturers with engineering expertise, workforce assistance, and connections to regional contract manufacturers.

The initiative, called Form to Factory, will soon start its second year and will last for a total of three years. The Metro North Regional Employment Board distributes the funds to the other three partners. As a hallmark of the program, Greentown Labs connects small hardware companies with contract manufacturers in the region identified by the Northeast Advanced Manufacturing Consortium. Greentown Labs staff also host meetings, workshops, lunches, and open office sessions for startups looking for business advice, while the City of Somerville provides funding for startups to hire temporary engineers and interns. These connections help Somerville's hardware manufacturers identify businesses they can work with in the region as they move from prototyping to commercialization. As of October 2017, partners have facilitated ten new contracts between contract manufacturers and hardware startups in the Northeast Massachusetts area. The program has also provided technical assistance to seven early-stage companies, along with a software, hardware design and engineering grant, totaling \$10,000, to a startup that requested additional support with product development.⁶⁴

Regional Capacity Building

Regional planning efforts encourage cities to build capacity around supporting industrial clusters. Chelsea, for example, is preparing to work more closely with nearby Everett and Boston to preserve their shared food manufacturing and distribution cluster at the regional level.⁶⁵ To lay the groundwork for this regional effort, Chelsea is pursuing infrastructure upgrades along its food distribution cluster that will help target food manufacturers that have been priced out of Boston, Cambridge, and Somerville. This collaboration is in its nascent stages, but shows promise as a model for regional collaboration to protect light manufacturing supply chains.

Chelsea is also part of the Greater Boston Regional Economic Compact. This compact was signed in December 2015, and commits each city to bi-monthly meetings and regional planning efforts on pressing issues such as transportation, housing, and economic development. Preservation of industrial activity is another hot-button issue that this group could foreseeably tackle.

Separately, the Merrimack Valley Planning Commission (MVPC), a regional planning authority serving 15 communities including Lawrence, has designated manufacturing as part of its equitable economic development strategy. Its “Merrimack Valley Means Business” initiative acts as a clearinghouse for zoning regulations, industrial real estate, and grant opportunities for local businesses interested in acquiring industrial land. MVPC works with anchor institutions to support the creation of new makerspaces and taps into federal sources of funding to create new innovation centers to spur light manufacturing. This regional approach is bringing additional capacity to cities like Lawrence, which is now exploring the feasibility of a fashion innovation center with the support of federal funding from the Economic Development Administration (EDA).

Consider investing in independent planning positions or regional coordinators that can oversee collaborative efforts.

Third parties can help guide the coordination process, provide neutral feedback on its progress, and ensure that participating cities—despite their different population sizes and economic impacts—contribute to planning efforts at an equal level. These positions can be housed within a public agency, such as a regional planning authority, or an economic development non-profit.

- In **San Francisco**, SFMade, an economic development organization that focuses on supporting local manufacturers, created a position for a regional program manager who oversees regional coordination efforts through SFMade's Bay Area Urban Manufacturing Initiative. SFMade is now the primary convener for manufacturing industries not only in San Francisco but throughout the Bay Area, providing in-person forums, webinars, and regional toolkits for city officials. SFMade also tracks manufacturing data throughout the region, which they then provide to city and county economic development agencies to help develop policy and economic growth programs.⁶⁶

Where regional coalitions do not yet exist, leverage the expertise of national planning organizations and public agencies.

- At the federal level, the **Economic Development Administration** (EDA) provides tools for regional planning efforts through its Comprehensive Economic Development Strategy (CEDS) program. The Merrimack Valley Planning Commission utilized this program to establish a Merrimack Valley CEDS, which outlines a five-year plan intended to spur job creation, economic growth, innovation, and entrepreneurship in the 15-city region.⁶⁷

Conclusion

Light manufacturing is well-suited for integration into a range of places and space, including commercial corridors and legacy buildings that have been subdivided for multiple, smaller tenants. The sector has shifted significantly, yet land use policies are only beginning to adapt to the modern needs of light manufacturers. Moreover, policymakers and planners are reorienting their long-held understanding of the manufacturing sector at large, recognizing that these businesses can be vital to creating vibrant local neighborhoods, which offer a range of benefits from creative placemaking to employment opportunities with pathways to the middle-class.

This report explored place-based strategies that are harmonizing land use policies with the needs of modern manufacturers. From artisan zoning mechanisms to broad-based planning initiatives, communities in the Greater Boston area are experimenting with a variety of real estate tools to ensure that light manufacturers have space to grow well into the future.

Many of these experiments are showing early signs of success, though there are challenges ahead given market pressures and limited planning capacity. To pave the way for future light manufacturing growth, municipalities should concentrate on building capacity for local planning offices and community-based organizations that are right-sizing manufacturing space, creating supply chain connections, and engaging in long-term planning for the sector.



UMass Lowell's iHub provides a prototype lab and makerspace to local startups like Nonspec, a company run by UMass Lowell graduates which designs prosthetic limbs. Credit: Johnny Magdaleno

Building capacity for local planning offices can take different forms, from tapping into funds for light industrial initiatives to regional coordination around shared economic development goals. To set the stage for this work, municipalities should invest in industrial real estate studies that outline total available stock of industrial space, thus informing larger conversations on commercial or residential real estate development, and industrial neighborhood preservation.

Ultimately, it is important to create a connected ecosystem for light manufacturing, where local policies can be adapted and replicated without forcing industrial into its own segregated silo. Elevating the kinds of tools detailed in this report is a necessary step in that direction.

City Profiles



Lawrence

Lowell

Fitchburg

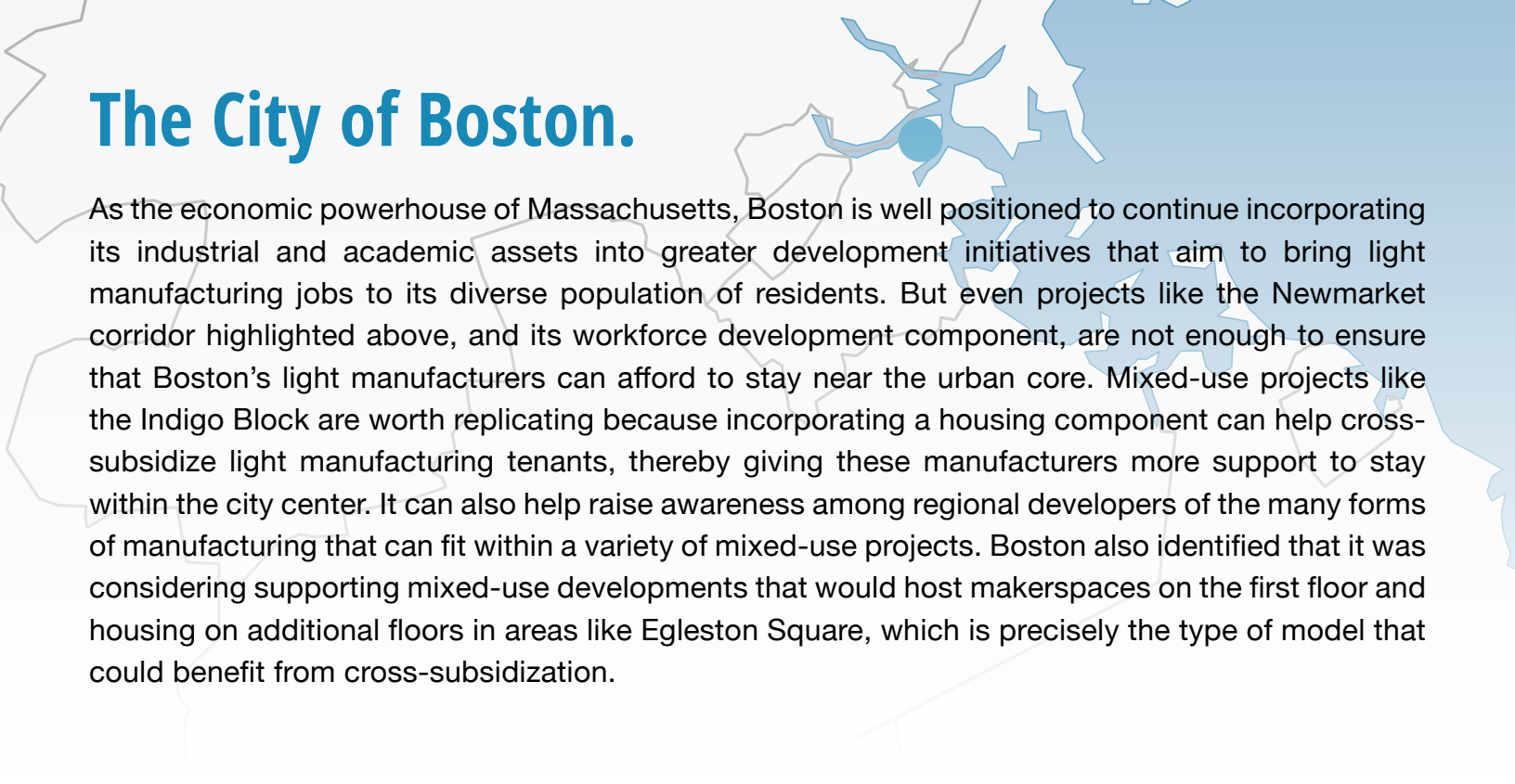
Malden

Somerville

Chelsea

Boston

The City of Boston.



As the economic powerhouse of Massachusetts, Boston is well positioned to continue incorporating its industrial and academic assets into greater development initiatives that aim to bring light manufacturing jobs to its diverse population of residents. But even projects like the Newmarket corridor highlighted above, and its workforce development component, are not enough to ensure that Boston's light manufacturers can afford to stay near the urban core. Mixed-use projects like the Indigo Block are worth replicating because incorporating a housing component can help cross-subsidize light manufacturing tenants, thereby giving these manufacturers more support to stay within the city center. It can also help raise awareness among regional developers of the many forms of manufacturing that can fit within a variety of mixed-use projects. Boston also identified that it was considering supporting mixed-use developments that would host makerspaces on the first floor and housing on additional floors in areas like Egleston Square, which is precisely the type of model that could benefit from cross-subsidization.

Developments mentioned in report:

- **Commonwealth Kitchen.** Shared kitchen space totaling 12,000 square feet that hosts more than 45 food entrepreneurs. Partially developed by Dorchester Bay Economic Development Corporation.
- **Fairmount/Indigo Corridor.** Project led by Fairmount Indigo Community Development Corporation that aims to create more than 800 jobs in sectors like light manufacturing for Fairmount/Indigo corridor residents; 1,200 mostly affordable residential units; and 500,000 square feet of commercial space. Includes housing and commercial redevelopment and development, and advocacy for preserving light manufacturing industries.
- **Indigo Block.** Mixed-use redevelopment that will provide 80 affordable housing units and 20,000 square feet of light industrial space to encourage more small manufacturers to establish near the Fairmount/Indigo transit corridor.
- **Newmarket Industrial-Commercial Neighborhood District.** Result of a zoning code update to protect the Newmarket industrial area, which is home to about 235 light-industrial companies with nearly 20,000 employees.

Zoning definitions:

Light manufacturing: The design, development, manufacture, compounding, packaging, processing, fabrication, altering, assembly, repairing, servicing, renting, testing, handling, or transfer, in accordance with performance standards provided in [Section 36-8](#), of products including the following: Ceramic products, including pottery and glazed tile; construction equipment and products; gas, diesel, and electrical machinery, equipment, or supplies; electronic and communication products, including, but not limited to, computer equipment, sound equipment, and household appliances; fish or other food products; instruments for engineering, medical, dental, scientific, photographic, optical, or other similar professional use; metal and wood products; office equipment or machinery; pharmaceutical products, cosmetics, or toiletries; textile products including, but not limited to, products from the following: canvas, burlap, cotton, knit goods, rope, and twine; photographic supplies, including processing solutions; supplies related

to printing or engraving.

- *Permitted in:* Use is permitted differently among Boston districts and sub-districts. Please see the most recent zoning manual for further reference.
- *Newmarket Industrial-Commercial Neighborhood:* Zoning overhaul in 2014 allowed for 51 industrial and non-industrial use groups in this neighborhood. Light manufacturing uses include food manufacturing, green technologies, artist work studios, apparel manufacturing, woodworking studios, computer and electronic product manufacturers and more. Heavy industrial uses are not permitted, like heavy and civil engineering construction, petroleum and coal products manufacturing, and waste remediation services. Non-industrial uses like offices, restaurants, research and development and technical and trade schools are permitted, while non-industrial uses like residential, hospitals, bars, and hotels are forbidden.

The City of Chelsea.

Chelsea's strong food distribution cluster, and a surfeit of industrial lands along the Chelsea River that are zoned for water-dependent uses, has positioned its industrial territories in a relatively stable position. But encroaching casino and residential developments in nearby Everett are threatening to raise prices along the waterfront for the entire region. As the city embarks on attracting more food manufacturers and leading a regional food manufacturing coalition, it should consider developing contacts with food entrepreneurs within the Boston area, as real estate prices in that city continue to rise and these entrepreneurs look to scale into larger spaces and operate closer to distributors.

Developments mentioned in report:

- **New England Produce Center.** Food production and distribution cluster of more than 40 enterprises, located in Chelsea's industrial district along a tributary of the Mystic River.
- **City of Chelsea flood resiliency planning efforts.** Analysis of Chelsea areas, including the food production and distribution district, and how they would be most impacted by flooding associated with environmental threats like climate change.

Zoning definitions:

Light Industrial: Research establishments, machine shops and metalworking sites, printing, graphic arts, and renewable energy manufacturing.

- **Permitted in:** Light Industrial/Office zone, which provides for office, light industry, research and development, wholesale and related distribution activities in locations with suitable access and without an adverse impact upon residential uses. Light Industrial/Office 2 provides an area for light industrial uses compatible with the adjacent residential district.

The City of Fitchburg.

Fitchburg is currently investigating different industries on which to focus its economic development as part of its Community Compact agreement with the Massachusetts Governor's office. The city has identified urban agriculture as an emerging sector based on the recent concentration of grow facilities established within industrial warehouse spaces. These spaces can also be seen as multi-tenant community work spaces for the city's creative industries, which the city is attempting to elevate through partnerships with Fitchburg State University, and affordable housing spaces designated for artists. Fitchburg is also focusing on strengthening the food economy locally, both through expansion of the restaurant sector and future attraction of small-scale food processors and artisan producers. By continuing to lay the foundation for a diverse industry of creative stakeholders, the city can attract the next generation of artisan producers and light manufacturers.

Developments mentioned in report:

- **Fitchburg Public Library.** The library's 60,000-square-foot expansion will include 2,000 square feet for a limited makerspace intended for teenagers and children. Facilities will include a 3D printer and tools for CAD design, sewing, digital art and design, and other facilities that engage STEM skills.
- **Theater Block development.** Redevelopment of 28,000-square-foot theater space, led by Fitchburg State University, that will include incubator and education space for entrepreneurs, along with a computer lab. One portion of revitalization efforts occurring along Main Street, as part of Fitchburg's attempt to expand its creative industries, which may include light manufacturing in areas like food and artistic production.
- **B.F. Brown public school redevelopment.** A redevelopment project led by NewVue Communities and the Fitchburg Art Museum

that plans to turn an abandoned public school into 55 residential units for artists. Sixteen of these units will be market rate, while the remaining 39 will be affordable units designated for artists who make between \$22,700 and \$45,386 a year. There are also discussions to house a makerspace within the building.

Zoning definitions:

Light manufacturing: The production, fabrication, processing or assembly of goods in a manner that is in compliance with all state and federal rules and regulations; confines disturbing smoke, fumes, dust, chemical discharge, and noise to the premises; and is not hazardous to abutters because of potential fire, explosion, or radiation.

- **Permitted in:** Industrial and Limited Industrial zones. Planning board permit required for use in central and neighborhood business districts, and commercial districts. Not permitted in neighborhoods zoned for residential use, or medical or college campus districts.

The City of Lawrence.

Lawrence's affordable housing demands, an overlay district that permits historic mills to be converted into housing, and the introduction of federal and state tax credits that cover upwards of 40 percent of the cost of rehabilitation these buildings have ushered in hundreds of new housing units over the past decade. Yet with the success of Lawrence's innovation district, and the Everett Mills Real Estate agency's diverse industrial park, the city is now interested in ensuring that space is available for light manufacturing firms, particularly those that revolve around the textile industry. The city should continue supporting mixed-use development models like Everett Mills while also coordinating with Gateway cities that share similar industrial structures to analyze different approaches for creating more mixed-use developments. Lawrence should also consider targeting its promotional efforts at regional colleges and incubators so that it can attract more entrepreneurs and manufacturing tenants like those that fill Everett Mills.

Developments mentioned in report:

- **Everett Mills.** Old textile mill complex that now stands as 525,000 square feet of mixed-use space, housing about 50 firms including textile manufacturers, tech companies, and a makerspace. Helmed by Everett Mills Real Estate.

Zoning definitions:

Light manufacturing: Light manufacturing is not an identified use, but the city has three industrial zoning designations that permit varying intensities of industrial activity. Industrial park district permits "less intense industrial uses." General industrial district permits "most intense industrial uses of the City in an environment whereby the uses are safe, healthy, and pleasant" and do not affect other industrial tenants or tenants in adjacent areas. Limited industrial district permits "medium intensity industrial use."

- **Permitted in:** All three industrial districts permit manufacturing, warehouses but also schools, mobile homes, churches, retail sales establishments and offices.

The City of Lowell.

Lowell has several historic mills, most of which have low vacancy rates. Surrounding one of the city's traditional manufacturing districts, Hamilton Canal, are more than a dozen mixed-use residential, commercial, and office spaces that are planned or being built. The city is hoping to render this portion into an "innovation district" that would ideally include spaces for light manufacturing firms. However, the city's property tax rate for industrial and commercial ventures is twice as high as residential, making it more difficult for small-scale firms to occupy their own spaces. The city should consider strengthening zoning regulations around at least a portion of its remaining industrial mill stock, incorporating either artisan zoning designations or fabrication zoning designations similar to Somerville, with strategies to maintain enough space for light manufacturers that could also incorporate work-live scenarios.

Developments mentioned in report:

- **UMass Lowell Innovation Hub.** Coworking space and incubator in a former textile building in the Acre district that also provides facilities for the light manufacturing of design prototypes in conjunction with the Massachusetts Medical Device Development Center (M2D2).
- **Hamilton Canal Innovation District.** Innovation district in Lowell's Acre district area, which will revitalize area by improving transit infrastructure in the region and promoting light manufacturing and research and development as a means of providing living wage jobs and economic opportunity to the district's vast immigrant population.

Zoning definitions:

Light manufacturing: Fabrication, assembly, processing, finishing work or packaging.

- **Permitted in:** City's two industrial zoning districts, Light Industry, Manufacturing & Storage, and General Industry, permit food and beverage manufacturing, storage and distribution, manufacturing assembly, and art/craft studio (under special permit). Residential is forbidden from two categories.

The City of Malden.

Malden introduced light manufacturing to its zoning code in 2012, but the definition provided actually makes it more difficult for light manufacturers to secure operating space in the city than heavy industrial users. In the city's Industrial 1 and Industrial 2 industrial zones, manufacturing activities are allowed as-of-right for heavy industrial, but light manufacturers have to go through the additional step of getting approved by the city's planning board. Research and development activities are also only permitted for industrial users and not light manufacturing users. To achieve its expressed interest in building out a local food innovation district, the city should consider updating its light manufacturing code to reduce bureaucracy while also investigating less limiting codes for a class of artisan food and beverage manufacturers. Permitting a greater diversity of small food manufacturers, like local brewers, in the Commercial Street corridor can also assist with attracting greater retail opportunities in the area.

Developments mentioned in report:

- **Stock Pot Malden.** Food production incubator space that provides a shared kitchen and startup resources for Boston-area food entrepreneurs.
- **Commercial Street Corridor.** A redevelopment effort of the primarily industrial Commercial Street, to create more public spaces, greater access to the Malden River, and remediation of brownfield sites. Manufacturing and light manufacturing will be incorporated into this development, maintaining the neighborhood's industrial character while also strengthening the manufacturing ecosystem.

Zoning definitions:

Light manufacturing: Fabrication, assembly, processing, or packaging operations employing only electric or other substantially noiseless and inoffensive motor power, utilizing hand labor or quiet machinery and processes. Manufacturing that is detrimental to the health, safety or welfare of persons working in or living near the proposed location of such manufacturing, including special danger of fire or explosion, pollution of waterway, corrosive or toxic fumes, gas, smoke, soot, dust or foul odors, and offensive noise and vibrations, is prohibited.

- *Permitted in:* Requires special permit in all districts. Both of the city's industrial and lighter industrial districts, neighborhood business districts, highway business districts, central business districts. Not permitted in residential or residential/office districts.

The City of Somerville.

If Somerville's zoning overhaul is passed in 2018, the city's new fabrication zone will ensure that light manufacturing remains a part of the economic fabric for the foreseeable future. Because of its proximity to the hot industrial real estate market of Boston, rising real estate prices could mean that the "village of innovation" that exists in the city today may not exist with the same light manufacturing tenants in the near future. To better protect small-scale manufacturers, the city should continue supporting housing models that make living expenses manageable for local artisans who utilize the Milk Row Creative Zone. The city is currently investigating work-live spaces (distinct from "live-work" spaces in that they prioritize more space for fabrication than housing) in its FAB zone, and can also consider measures like supporting affordable housing in nearby residential areas that give preference to artists or artisans.

Developments mentioned in report:

- **Ames Envelope Factory.** Twelve-building complex located in the Milk Row industrial and commercial neighborhood. The Ames Safety Envelope Corporation moved out of the complex in 2010 after ending their historic operation in Somerville. The complex's owners began leasing square footage to local organizations in need of warehouse and fabrication space that same year. Today it is home to tenants like Artisan's Asylum, Aeronaut Brewing, MIT Museum (storage), Genzyme, Brooklyn Boulders, and Riverside Community Care Guidance Center.
- **Artisan's Asylum.** Makerspace with 400 members that occupies 40,000 square feet in an industrial building. First maker/light manufacturing tenant to occupy Ames Envelope Factory complex, paving the way for Greentown Labs and Aeronaut Brewing.
- **Greentown Labs.** Green-tech incubator with more than 50 companies. Greentown

Labs will become the world's largest green-tech incubator by the end of 2017, after it expands into a 58,000-square-foot space that was previously an auto repair shop.

Zoning definitions:

Light industrial: Fabrication, finishing, packaging, or assembly operation utilizing hand labor or other quiet machinery and processes, and free from agents disturbing to the neighborhood, such as odors, gas fumes, smoke, cinders, flashing or excessively bright lights, refuse matter, electromagnetic radiation, heat, or vibration.

- *Permitted in:* Operations up to 5,000 square feet are allowed in central business districts and commercial districts with a planning board permit; by-right in commercial residential districts, industrial districts (non-intensive) and industrial park districts; and the Assembly Square Mixed-Use development with a site plan review permit. Operations larger than 5,000 square feet are required to have permits in more districts than operations smaller than 5,000 square feet, with greater restrictions in place the larger the operation is.
- *Fabrication district:* Characterized by moderate to large floor plate buildings up to

four (4) stories in height. Buildings are set close to the sidewalk to create a defined street wall that supports pedestrian activity and a sense of place. The district is entirely commercial with buildings typically designed or retrofitted to support multiple tenants. Permitted uses include artisan production, arts exhibition, co-working spaces, design services, libraries, caterer/wholesale food production, recording industries, manufacturing, among others. Residential, office and retail spaces not permitted.

Endnotes

- 1 National Endowment for the Arts, “Industrial Design: A Competitive Edge for U.S. Manufacturing Success in the Global Economy,” <https://www.arts.gov/sites/default/files/Industrial-Design-Report-May2017-rev3.pdf>.
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Last page: The Everett Mills historic mill complex in Lawrence, Massachusetts. Photo provided by Marianne Paley Nadel

