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The Deerfield Street Initiative (Greenfield, MA)

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THE DEERFIELD STREET INITIATIVE

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LA&RP Landscape Architecture
& Regional Planning

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Abbreviations

ADA – Americans with Disabilities Act

AGO – Attorney General's Office

AMI – Area Median Income

AHI – Abandoned Housing Initiative

DHCD – Massachusetts Department of Housing and Community Development

EEA – Massachusetts Executive Office of Energy and Environmental Affairs

FEMA – Federal Emergency Management Agency

FRCOG – Franklin Regional Council of Governments

GFHS – Greenfield Historical Society

GRP – Green River Planning Firm

GTD – Greenfield Tap and Die Factory

HUD – U.S. Department of Housing and Urban Development

LARP – Landscape Architecture and Regional Planning

LID – Low-Impact Development

Mass DOT – Massachusetts Department of Transportation

MVP – Massachusetts Municipal Vulnerability Preparedness Program

SRO – Single Room Occupancy

RRFB – Rectangular Rapid Flashing Beacons

RTH – Restoring the Heart: a community vision for the neighborhood of Aldenville

VPS – Visual Preference Survey

ZBA – Zoning Board of Appeals

Executive Summary

The Deerfield Street Initiative is a report compiled by the Green River Planning team, which attempts to synthesize public visioning exercises with academic research. In the Fall of 2018, the authors of this report -- a group of Masters of Regional Planning students at the University of Massachusetts, Amherst -- partnered with the City of Greenfield to create a visioning plan for the Deerfield Street neighborhood. Our group adopted the name of Green River Planning (GRP) to reflect the values of sustainability, balance, and progressive thinking we observed within the culture of Greenfield. Our project title is the Deerfield Street Initiative, which we chose to clearly communicate our focus area to the public and stakeholders and inspire excitement about investing in the area.

After engaging in an in-depth public engagement process, comprehensive literature review, and extensive precedent study research, the Green River Planning team is excited to present recommendations to support the successful growth of the Deerfield Street neighborhood.

Introduction to Greenfield and the Deerfield Street Neighborhood: Past and Present

Incorporated in 1753, the Town of Greenfield quickly became regional hub for tap and die manufacturing. In order to support the needs of a growing mill population, the study area developed as a traditional mill housing neighborhood. When the manufacturing industries and mill buildings began to close, people lost their jobs and the study area began to decline while the downtown neighborhood thrived only a few blocks away. Over time, the study area has become disconnected from the thriving Greenfield downtown and auto oriented development has taken over the study area. It is the hope of the GRP team that this report can help to reconnect the study area with Greenfields successful downtown, while also providing the tools for successful and sensitive growth in the coming years.

Client Directive

GRP's Client articulated three goals to achieve in our report development. The first of these client goal was to conduct a thorough public engagement activity, which would be used to determine current perceptions for the study area and visions for its development. The second goal was determining potential of vacant and undeveloped parcels, so the City of Greenfield may best know how to develop them to encourage future study area development. The GRP team's third and final goal was to develop a Neighborhood Vision Plan, which would provide recommendations on how best to improve and develop the study area. This Vision Plan is intended to respond to five client identified challenges.

Of the five challenges identified by our client, the first was an existing shortage of housing units and discovering the potential for new housing development, especially for an extremely low-income population. The second of our client identified challenges was discerning the potential flood risk of the Green River and how the Client should respond to this potential hazard. Simultaneously, the GRP team was also tasked with determining the potential of six publicly or potentially available sites, for the

purposes of priming the pump for future investment and development. Along with the potential of six vacant parcels, our client's fourth challenge was to determine the best course of option regarding commercial and residential vacancies in the study area. Finally, our client's fifth challenge was to build community support and develop a strategy for municipal receivership of distressed housing.

Understanding Housing

The Understanding Housing Chapter describes evolution of housing policy and trends across the United States.
The primary housing challenges used to be the physical condition of housing stock and overcrowding, but today it has become affordability. A majority of the population residing in suburban single family homes with high home-ownership rates, barriers to high-quality affordable housing have led to modern cost-burden and homelessness. Cost-burden on owners has decreased and burden on renters had increased steadily in recent years. The shortage of affordable units is the failure of the private market to produce and sustain extremely low-rent housing without government subsidies while homeowners also are facing affordability challenges due to increases in mortgage payments and properties taxes.

Following this national context, the chapter discusses the development of Massachusetts housing in response to national trends with a focus on affordability. Chapter 43B, the Home Rule amendment of 1966 gives municipalities broader power, especially in MA where home rule is deeply entrenched. Chapter 40B, the Comprehensive Permit Law of 1969 was created to

address a shortage of affordable housing in the state. This exclusive power is given to local Zoning Boards of Appeals (ZBAs) to approve their municipality's developments of affordable housing. Chapter 40A, The Zoning Act of 1975 helped to modernize zoning ordinances and established standardizing procedures. Chapter 40R, the Smart Growth Zoning and Housing and Production Act of 2004 encourages municipalities so zone for compact residential and mixed-use development in "smart growth" locations.

The Understanding Housing chapter concludes with a discussion of Greenfield's housing trends and a deeper context of housing within our study area. With the Deerfield Street neighborhood historically housing workers and their families, the deindustrialization of the area led to disinvestment and distressed properties. There is a low stock of affordable housing in the study area and the current General Commercial zoning of the area has led to challenges in developing mixed-use and residential units.

Public Engagement

On October 11th, 2018, the GRP team hosted a visioning workshop for the residents and business owners of Greenfield. This workshop consisted of three activities: Asset Mapping, a Visual Preference Survey, and Vision Mapping. The Asset Mapping activity asked participant groups to prioritize the current assets and need of the study area, using colored sticky dots on a paper map. Looking towards the future, the Visual Preference Survey asked participants to provide their preferences to a series

of different categories, while the Vision Mapping exercise challenged participants to envision these corridors potential locations along the corridor. These activities provided integral data and themes which guided the GRP team's recommendations.

Each of the visioning workshop's activities produced unique results, which together painted a detailed picture of the study areas present conditions and its future potential. The Asset Mapping Activity demonstrated a participant preference towards active and passive recreation, while also revealing concerns over neighborhood perception, accessibility, and a lack of available housing. The Visual preference survey revealed a participant preference for a mixed-use street feel and commercial development, single family and small multifamily residential housing, any for of parks and recreation space, as well as a favorable opinion of traffic calming tools. The Vision Mapping exercise echoed many of the opinions expressed in the Visual Preference Survey, with participants envisioning mixed use commercial developments, additional housing East of Deerfield Street, and additional recreational amenities along the Green River and at the site of the now vacant golf course. These results gave us an understanding of how Greenfield residents and business owners would like to see the study area develop, while our literature review aided in the development of recommendations on how to develop this public vision.

Literature Review

In order to best develop recommendations and understand the factors impacting the study area, the GRP team conducted a literature review focusing on four sections. The first section, regarding flooding, reinforces the need for redirected development to safer areas outside of the flood plain and the use of natural resources such as parks to absorb flood waters. The Housing section demonstrates that outdated zoning policies have limited development and revised polices are necessary, along with micro unit and increased density development around commercial centers. The Commercial section identifies local business owners as a key factor in neighborhood transformation, while also attempting to understand many of the challenges that interfere with new commercial development and ownership. Finally, the Street Scape section highlights the effects complete streets measures can have on the development of neighborhoods.

Precedent Studies

In conjunction with the literature review, the GRP team also conducted a complex precedent study. This process reviewed previous municipal plans, regional plans, and past Landscape Architecture and Regional Planning studio projects. The municipal and regional plans helped to frame Greenfields role in the region and helped to educate the GRP team on the goals of the region. The Sustainable Greenfield Master Plan and Sustainable Franklin County both echoed the goals and challenges of the Client Directive, such as determining the development potential of vacant parcels and supporting housing growth for a mix of incomes. By conducting this precedent studies research, the GRP team ensured that this Vision Plan would work in tandem with the existing planning efforts for the region.

Recommendations

The GRP team makes several recommendations for the development of the study area. These recommendations fall into six categories, five based on which of the five Client identified challenges they address and an additional category for general measures to be taken in addition. The six categories of recommendation are as follows:

- Neighborhood-Wide Revitalization
- Housing
- Priming the Pump
- Land-Use Mix
- Flooding
- Distressed Properties

On a neighborhood wide scale, GRP recommends the implementation of Form-Based Code. Form-Based Code would provide an alternative to traditional zoning and develop a concise visual feel across the neighborhood. This method would be an alternative to traditional zoning and enforces design standards over traditional use restrictions. GRP estimates this program could be implemented within six months.

To address Housing, the GRP team recommends two solutions, the adoption of a 40R Smart Growth overlay district and the adjustment of current zoning. A 40R Smart Growth Overlay District would encourage multi-family development and allow for higher density. This district would also provide state funding for the Client when multi-family development is undertaken. Adjustment of the current zoning would include

relaxed parking regulations and better allowance for housing by-right. The expected implementation of both recommendations is within three to five years.

To explore the viability of developing new residential housing in the Deerfield Street neighborhood, GRP has conducted a pro forma analysis to calculate the costs associated with a multi-family development in a client identified parcel. GRP's analysis has shown that this new development would be profitable for the developer if rents are affordable to incomes around the average median household income for the City but not for individuals or families with low to very low income. In order for new residential development to provide affordable options, additional public funding and assistance is required to incentivize developers.

With regards to Land-Use Mix, GRP recommends implementation of Commercial Adaptive Reuse Programing and design standards for mixed-use buildings. A Commercial Adaptive Reuse Program would incentivize local owners to relocate businesses and open new businesses within the study area. This would be done through the waiver of permit fees and process. Design standards would create consistency in aesthetic and build a more consecutive neighborhood character. The implementation of both measures is expected to take between six months and two years.

The risk of flooding is prioritized as the most hazardous challenge. To address this hazard risk, GRP recommends infrastructure improvements including a community rating system to reduce flood insurance costs and grant application to reduce flood related costs. Additionally, the recommendation is made to cease allowance of special permit usages in the

floodplain. This works in tandem with the 40R Smart Growth recommendation which redirects development to flood safe areas. Finally, the recommendation is made to convert non-conforming floodplain uses into flood safe recreational uses. Timelines for these recommendations range from as little as six months to as much as three to five years.

Finally, addressing distressed properties and disinvesting landlords, GRP recommends use of the Massachusetts Abandoned Housing Initiative. This program is enforced by the Massachusetts Attorney General's office and works in collaboration with municipal government. The program forces landlords and property owners to provide care for buildings considered to be in disrepair. Failure to do so can allow the property to go into foreclosure or for the town to receive ownership, at which time repairs can be made by a new owner. This program has been utilized in Greenfield before, so the expected implementation timeline is within six months.

How to Read This Report

This report is divided into seven thematic chapters according to the City of Greenfield's (also herein referred to as "the client") objectives. Chapter One introduces Greenfield and the Deerfield Street neighborhood (this project's Study area), and covers relevant social, economic, and physical characteristics of each location. Chapter Two presents the client's directive and deliverables for this Studio Project. Chapter Three contains information about recent housing trends and policies that inform our project, at national, state, and local levels. Chapter Four explains and analyzes the public engagement process GRP undertook to meet the client's goals. Chapter Five presents the results of a literature review conducted to inform our recommendations. Chapter Six analyzes relevant planning documents and previous Studio Projects as precedents for our work. Chapter Seven presents our recommendations for actions the City of Greenfield can consider to meet their objectives for housing and development. Chapter Eight is a conclusion section that summarizes the report.

All photos included in this report were taken by GRP, except for Figures 1 and 4, which are courtesy of the Greenfield Historical Society, and photos of the public engagement workshop, which were taken by Justin Risley.

Chapter 1: Introduction

Many smaller cities and towns in the United States currently face two significant challenges: providing high-quality housing for people of all income levels and adapting the car-oriented development style of the previous century to present needs. These challenges are related, as planning and design for car-centric lifestyles often promote inefficient land use (e.g., reserving land for parking, building suburban neighborhoods far from downtowns where there was enough space for large lot sizes) that reduce land available for new housing supply. Additionally, car-oriented areas, which often have one-story retail establishments surrounded by large parking lots, can fall short in providing a compact, walkable neighborhood feeling associated with traditional, older downtowns and Main Streets.

The City of Greenfield, Massachusetts has been working to address these issues through new investments specifically in the Deerfield Street neighborhood. A transitional zone between a local highway (State Route 5) and the city's downtown, this neighborhood has historically provided housing to low-income households, but private and public investment in the neighborhood has been limited until recently, and the neighborhood has faced challenges in the form of limited housing supply, several vacant residential and commercial properties, and flooding from the nearby Green River. Therefore, the City has engaged this Studio's help with developing an initial neighborhood vision plan that addresses transformations in housing, commercial development, streetscapes and transportation, recreation, and flooding, based on public input and extensive research, which can inform the City's future investment decisions.

To begin, Chapter 1 will introduce readers to the City of Greenfield and the Deerfield Street neighborhood, tying together historical background with the current nature of the area to provide context for the client directive, the methods used to meet the client directive, and the recommendations made in the Final Report. The first section in this chapter will provide an overview of the neighborhood's geography, while the second section will relate a brief narrative on the history of Greenfield and the Deerfield Street neighborhood, coupled with a photographic tour for visual context. The final section will present relate demographic data to provide a deeper picture of the study area's current conditions.

35.
Taken shortly after 1910, this photo depicts Deerfield Street, looking toward the intersection of Meridian Street, which is spanned with a covered bridge.

Figure 1. Greenfield Tap and Die Factory overlooking the Green River and Deerfield Street.

Historical Context

Greenfield has historically been a regional hub for industry and commerce. Before the arrival of European settlers, the rivers that flowed through the region were important trade routes used by the Pocumtuck tribe and the surrounding plains, with their fertile soil, were used for agriculture.

When settlers arrived in the area in the 1680s, they recognized the opportunities presented by the confluence of the Connecticut, Deerfield, and Green Rivers. The Connecticut River became a primary trade route serving New England, and Greenfield evolved into an important trading port and stopping point. Commercial enterprises like hotels and taverns were established to serve traders and a growing population of permanent settlers.

As the primary trade transportation mode shifted from boats to railways, Greenfield remained an important destination. Through the 19th century it grew into a prominent mill town, with factories that manufactured cutlery, baseball bats, and a range of other products. Eventually, Greenfield became an internationally-recognized precision manufacturing hub, specializing in tap and die (GFHS, 2018).

The tremendous water power of Greenfield's rivers was fully realized in the late-1800s, when the Green River was made into a canal used to operate the Greenfield Tap and Die Corporation (GTD). In 1872, John J. Grant established the GTD on what would become Deerfield Street, using his patented design for a more efficient threading tool. This revolutionary tool went on to make Greenfield the "tap-making center of the world," according to the Greenfield Historical Society. In the early 20th century, GTD boasted the highest quality of life for machinists in the world. Immigrants from across the globe were drawn to the promise of stable employment, good schools, and affordable cost of living.

A neighborhood evolved around the GTD, complete with worker housing, a schoolhouse, and a variety of shops and taverns. By the middle of the 20th century, GTD employed 19,000 people while the population of Greenfield was 16,000. However, in the decades following World War II, manufacturing facilities began to significantly reduce their operating capacities. The GTD was absorbed by another corporation and while precision manufacturing is still a significant industry in Greenfield, the closure of GTD marks a transition towards disinvestment in the Deerfield Street neighborhood surrounding the factory. However, the legacy of this rich industrial history is retained by the neighborhood and should inform future planning and development efforts.

Geography
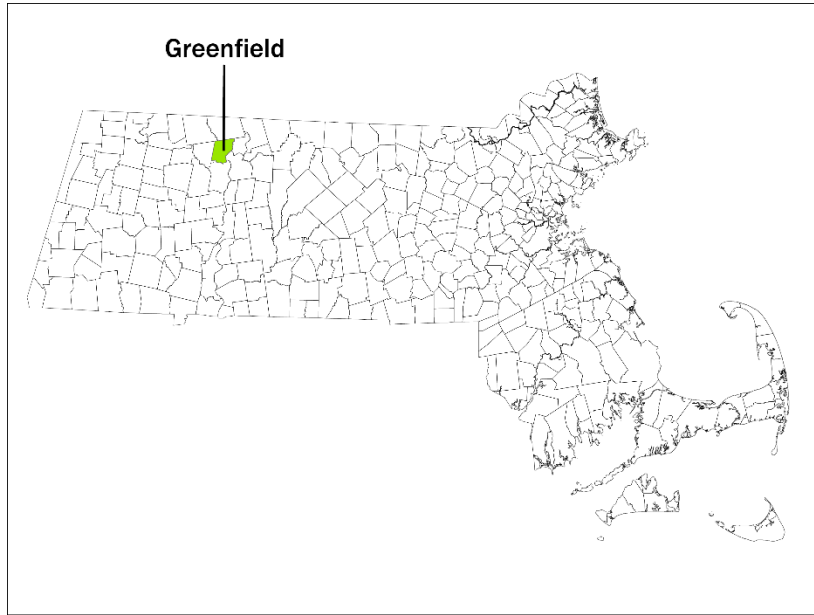
Figure 2. Greenfield within the state of Massachusetts

Greenfield is located in the north of Massachusetts, in the Western part of the state, shown here in green. It is the county seat of Franklin County. Major Interstate 91 and historic Route 2 intersect here. Residents and visitors can enjoy the scenic Connecticut River in the foothills of the Berkshire Mountains.
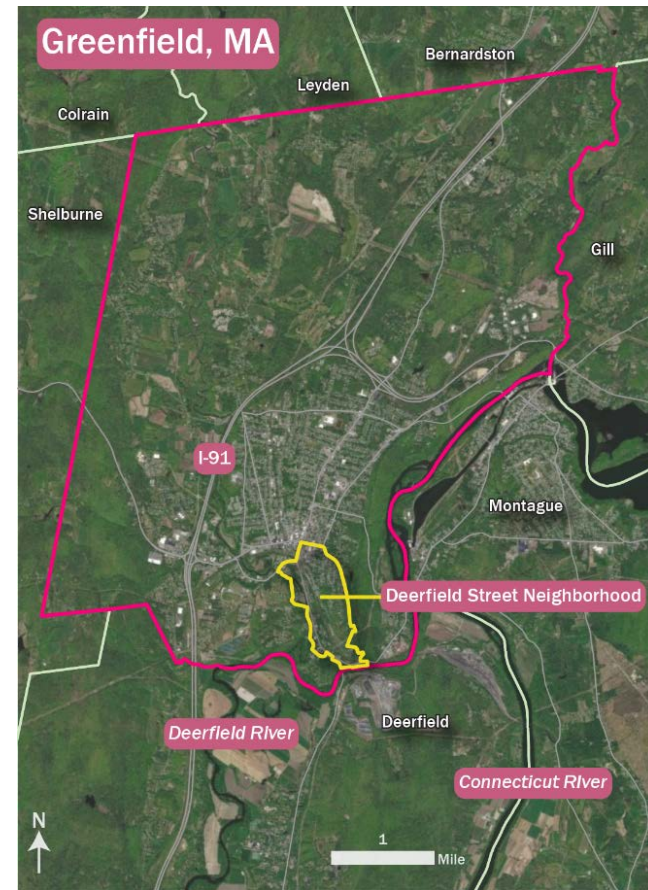
Figure 3. Satellite imagery map of Greenfield (pink) with study area (yellow) outlined

Here, Greenfield and the study area, the Deerfield Street neighborhood, are outlined. The downtown center is in the southern central part of the city, with outlying rural areas, I-91 to the west, and the study area along the Route 5 corridor. It is just south of downtown, within a walkable distance of Main Street, and forms the southern entrance into Greenfield.

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This flood picture was taken from the lowe end of washington Street looking down Deerfield Street.

Figure 4. Flooding of Deerfield Street following a 1936 storm event
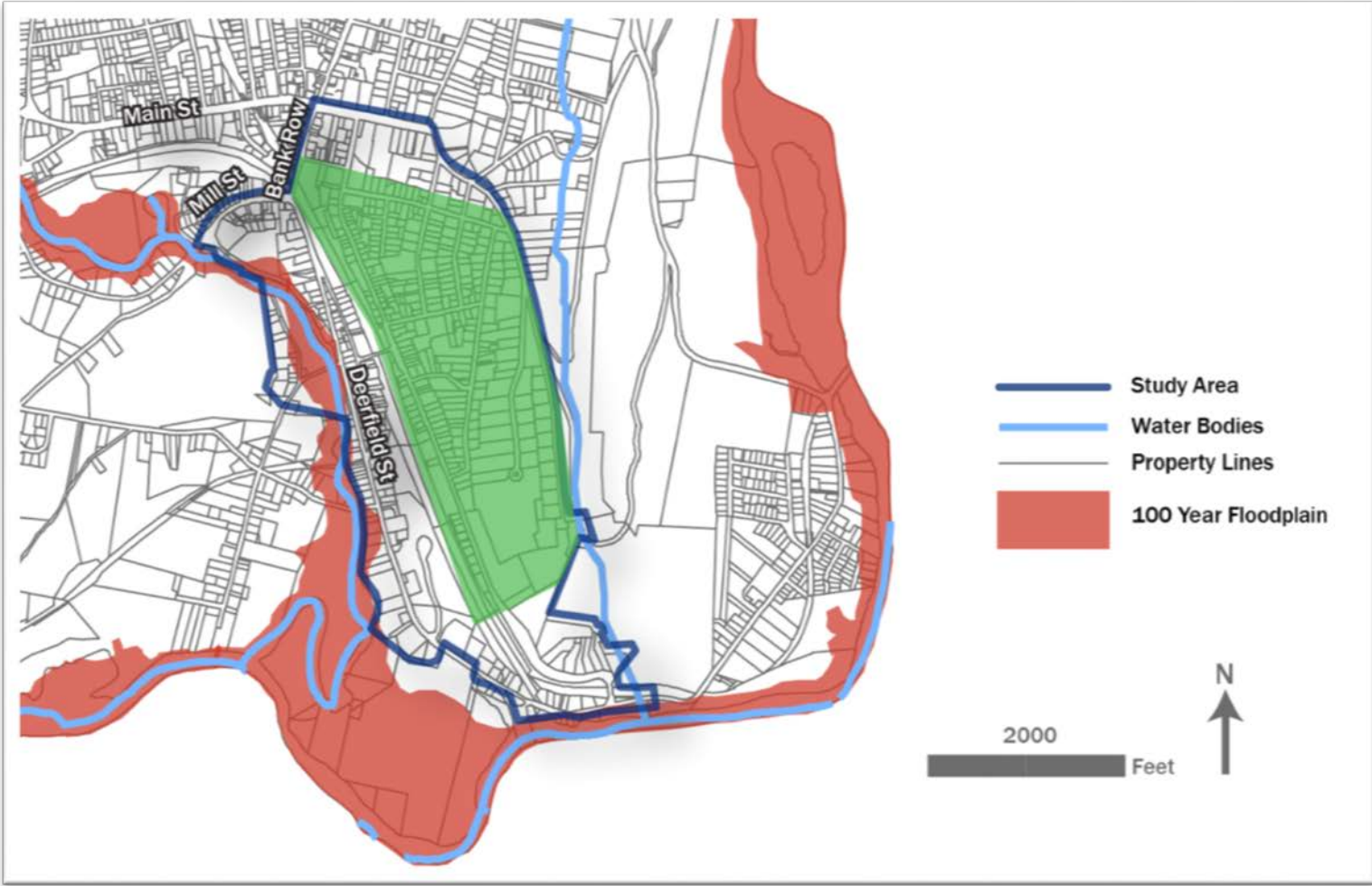
Figure 5. Map depicting current 100-year floodplain in relation to Study Area

Walking Tour

This following walking tour of the study area will encompass a photo of the site to the left, and a guiding map the right, with an explanation of the site below.

FIRST STOP

Greenfield's Main Street is a classic example of a walkable, mixed use downtown street with an attractive streetscape. It is home to many restaurants, cafes, and stores, and represents the core axis of Greenfield's downtown.

SECOND STOP

Bank Row, one of the main streets that intersects Main Street, is home to renovated historic buildings, restaurants, and cafes. It is the main route from downtown to the Deerfield Street neighborhood, becoming Deerfield Street after it crosses under the railroad bridge in the background of this image.

Moving down the hill towards the Deerfield Street neighborhood, one encounters this railroad bridge. This crossing presents a physical and visual barrier between downtown and the Deerfield Street neighborhood, which could be mitigated by aesthetic interventions (improved lighting, wayfinding signage, etc.).

THE DEERFIELD STREET INITIATIVE

Greenfield Coffee

Main St

Transit Center

Animal Crackers

Ruggeri's

The Arbors

Leon's Auto Repair

Green River Park

Available Parcels
Primary Study Area
Secondary Study Area

N

0.25 Miles
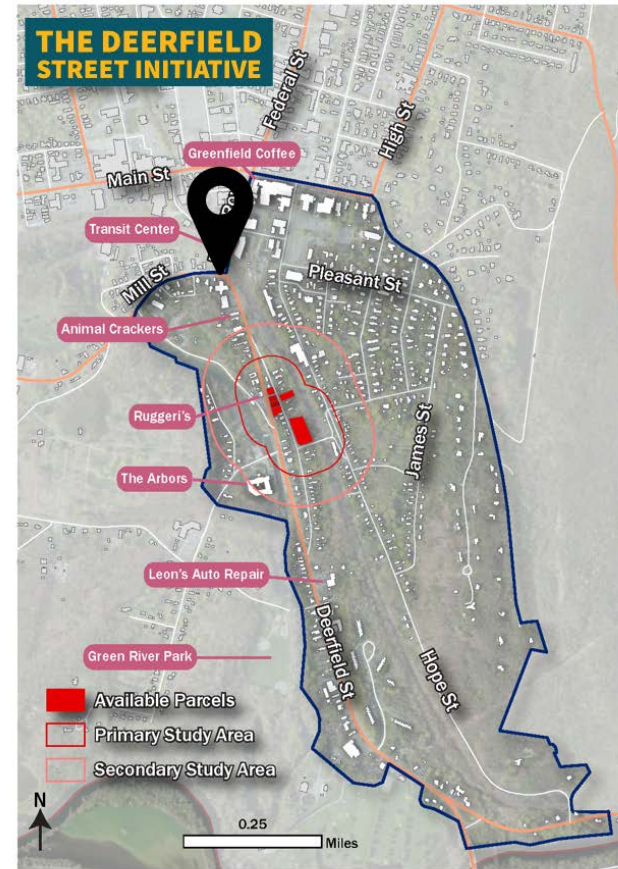
THIRD STOP

The railroad bridge also presents an entryway to Greenfield's Energy Park, a charming green space in the center of town. As the park's northern entrance connects to Main Street via Miles Street, one block west of Bank Row, the main path through Energy Park is also a principal route to the Deerfield Street neighborhood. The park's southern entrance (out of service in this image) has since been repaired, restoring this pathway.
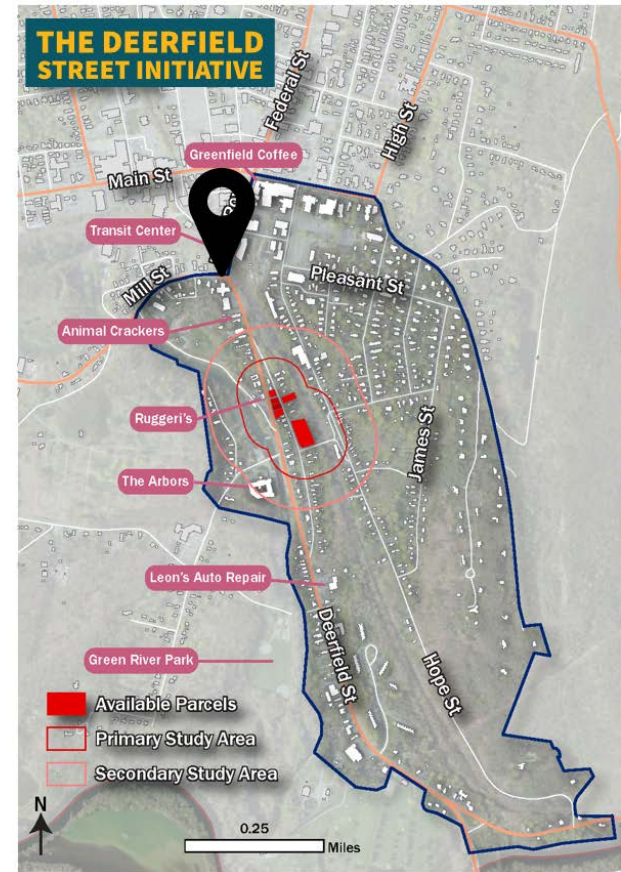
FOURTH STOP

Passing through the railroad bridge brings you to the northern end of Deerfield Street, and forms a transition from the walkable, pedestrian-oriented downtown to a more auto-oriented street. Building density is lower, there are fewer mixed-use structures, and some of the commercial building facades may lack certain visual features on the first floor (for example, large windows for displays). Deerfield Street continues in the leftward photo above.

FIFTH STOP

After passing several businesses (an automobile repair shop and a pet store) and two churches, a visitor will see the Green River Commons, just south of the intersection with Washington Street (a residential street that runs parallel to Deerfield Street). The Commons is a recently constructed housing development of two buildings and seven units, four of which are reserved for low-income households. This construction is one of the City's larger recent investments into the Deerfield Street neighborhood, with the goals of increasing housing supply and quality.

THE DEERFIELD STREET INITIATIVE

Greenfield Coffee
Main St
Transit Center
Pleasant St
Animal Crackers
Ruggeri's
The Arbors
Leon's Auto Repair
Green River Park

Federal St
High St
Bank Row
Mill St
James St
Deerfield St
Hope St

Available Parcels
Primary Study Area
Secondary Study Area

N
0.25 Miles

As one moves further south down Deerfield Street, the area's layout becomes clear: homes are spaced fairly far apart, and interspersed with some businesses, such as Green River Liquors (formerly Ruggeri's Beverage Center). Traffic congestion and pedestrian activity vary over the course of the day.

THE DEERFIELD STREET INITIATIVE

Federal St

High St

Greenfield Coffee

Main St

Bank Row

Transit Center

Pleasant St

Mill St

Animal Crackers

James St

Ruggeri's

The Arbors

Leon's Auto Repair

Deerfield St

Hope St

Green River Park

Available Parcels
Primary Study Area
Secondary Study Area

N

0.25 Miles

SEVENTH STOP

There are also several vacant lots on Deerfield Street, as shown in above. This site is one of this project's main study sites; it is composed of several lots owned by the City of Greenfield, and the City would like input on how to develop the site to best suit the neighborhood's needs. The stairway in view on the left is privately owned, separating the vacant lots in view from another City-owned vacant lot to the left. Details on this and all other study sites are included in the Existing Conditions section of this report.

EIGHTH STOP

More homes can be seen further south on Deerfield Street. The principal housing type in the neighborhood is single family homes of one or two stories, although there are several larger multifamily structures. There are also several mixed-use structures and commercial buildings, some of which appeared closed for business during site visits.

THE DEERFIELD STREET INITIATIVE
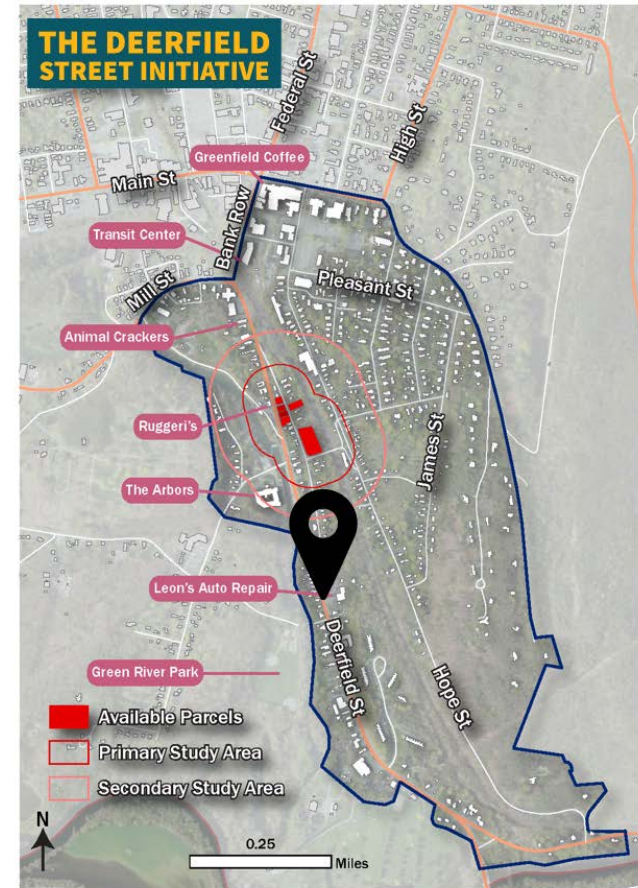
NINTH STOP

Several of the businesses that remain open are car repair shops, which form an essential asset and employment opportunity in the area. These establishments also reflect Deerfield Street's role as the continuation of State Route 5. Though it becomes a local road with a speed limit of 30MPH after crossing the southern intersection of Deerfield and Washington Streets, Deerfield Street remains a state highway throughout the southern portion of the study area, with high volumes of truck and other traffic. This presents an obstacle for safe multi-modal transportation (walking, biking, etc.) and pedestrian-oriented development.

THE DEERFIELD
STREET INITIATIVE

Greenfield Coffee

Main St

Federal St

High St

Transit Center

Bank Row

Mill St

Pleasant St

Animal Crackers

Ruggeri's

James St

The Arbors

Leon's Auto Repair

Deerfield St

Hope St

Green River Park

Available Parcels
Primary Study Area
Secondary Study Area

N

0.25
Miles

TENTH STOP

The Green River runs along the western edge of Deerfield Street. The river is a core natural amenity for the neighborhood, but it is often hidden below retaining walls; driving through the neighborhood, one may not even notice its presence. Expanding river access presents great potential for recreation in the neighborhood.

THE DEERFIELD STREET INITIATIVE

FINAL STOP

The City has begun investing in neighborhood walkability along the waterfront. The new granite sidewalk linings, light posts, and tree plantings shown above form a pleasant riverside walkway along the northern portion of Deerfield Street. Improving pedestrian access to the river and making walking even more pleasant in general by providing further physical buffers from traffic may also support increased visitation to local businesses.

Demographics

This section explores a number of socioeconomic characteristics, comparing the census tract in which the Deerfield Street neighborhood is located (termed the study area Census Tract in the graphs below) to Greenfield, Franklin County, and the state of Massachusetts. Each of the data sets originates from the 2016 American Community Survey, forming a snapshot of the four geographic areas at that moment in time. It is important to note that there is not an exact match between our study area and the surrounding census tract, which encompasses another part of the City. This affects the accuracy of our data, but it is still the best information available.

The demographic variables included here are:

- **Total population**
- **Population by Age**
- **Educational Attainment**
- **Housing Incomes**

These collected variables paint a detailed picture of the Deerfield Street neighborhood, which will inform our recommendations in the Final Report.
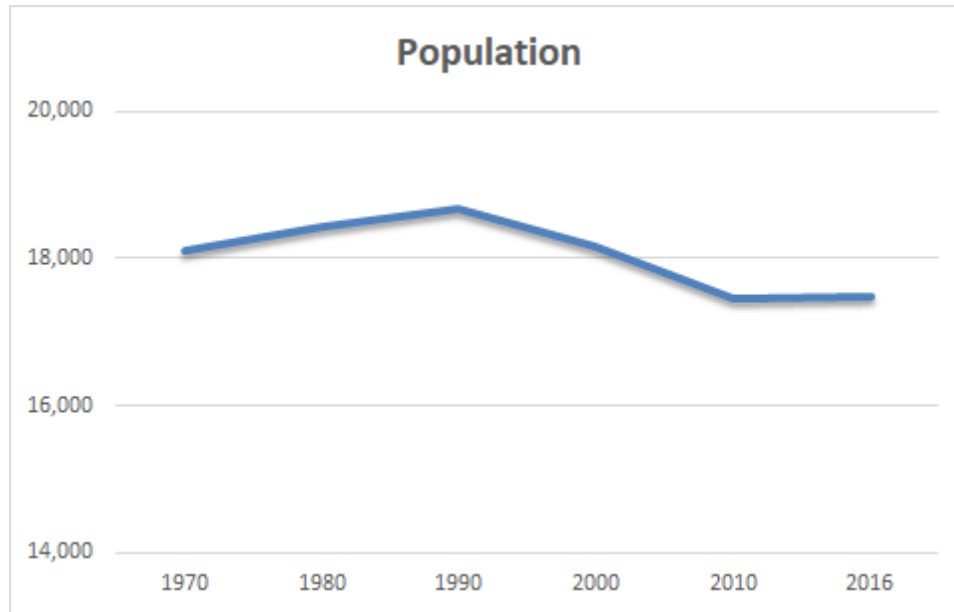
Figure 6. Total Population of Greenfield

Figure 5 depicts the change in population in Greenfield from 1970 to 2016. The population of Greenfield has gone through an overall decline since the 1970s. From 1970 to 1990, the City of Greenfield experience a steady increase in population, rising from roughly 18,000 people to almost 19,000 people. Following this 20 year growth, the town declined by almost 2,000 people over the course of 30 years. Since then, the population has remained relatively steady with minimal change since 2010. Greenfield's population is estimated to be 17,458 as of the 2016 American Community Survey.
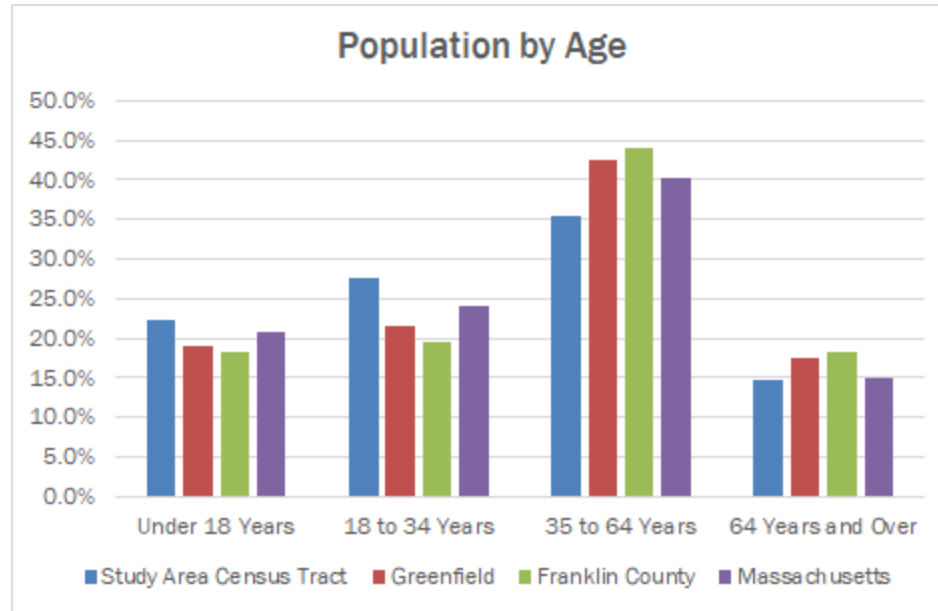
Figure 7. Percent Population by Age

Figure 7 shows the population broken down by age demographics. The age demographics of Greenfield and the census tract of our Study Area are both generally similar to Massachusetts norms. The most notable difference in our focus area are slightly younger-than-average populations. Specifically, the under-18 population and the 18-34 years of age population are both roughly 5% larger than average compared to the city of Greenfield, and are larger than Franklin County and Massachusetts as a whole. Conversely, the age ranges of 35-64 and 65+ are both proportionately smaller than each of the comparison regions, although the 35-64 age range still represents the largest number of residents.

These numbers suggest a need to accommodate young children and younger adults in addition to the older age ranges when considering housing and development along our corridor. These two age groups represent children as well as young parents, so amenities and development GRP proposes should be accommodating to these families. The percent of the population in our focus tract age 65 and over is likely influenced by the presence of The Arbors Assisted Living. The Arbors is an assisted living community, with 11 locations across Massachusetts. The Greenfield location services residents from more than 14 communities, extending north into Vermont. This presence likely skews the population percentage in favor of the 65 and over population.
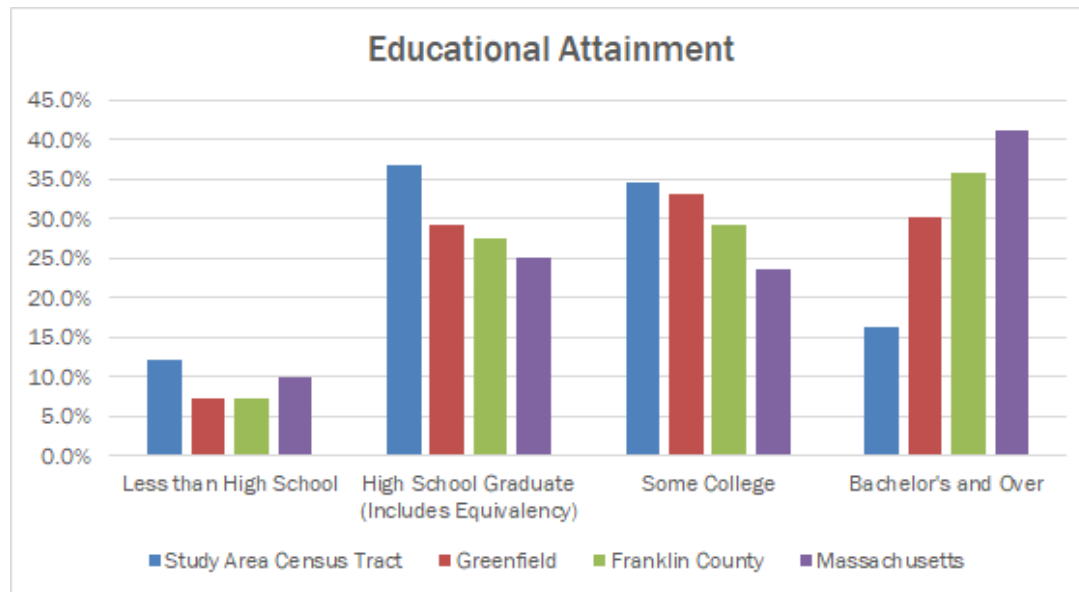
Figure 8. Educational Attainment

Figure 8 shows the percent population by highest educational attainment. The study area is predominately comprised of high school graduates and those receiving Certificate or Associate's degrees, each comprising roughly 35% of the study area's population. These two categories are roughly double the percentage of bachelor's degree recipients in the study area at just over 15%. What about less than high school? The study area has almost half the percentage of bachelor's degree recipients as the City as a whole, which is 30% of its total population.

This dominance of High School Graduates and Some College degree holders may be affected in part by the presence of Greenfield Community College, though more investigation would be necessary to determine whether this the case. The high level of Associate's degrees and completion of some college is noteworthy, as it dictates who our primary audience will be when conducting community outreach. Our outreach will need to be understandable by this educational attainment level.
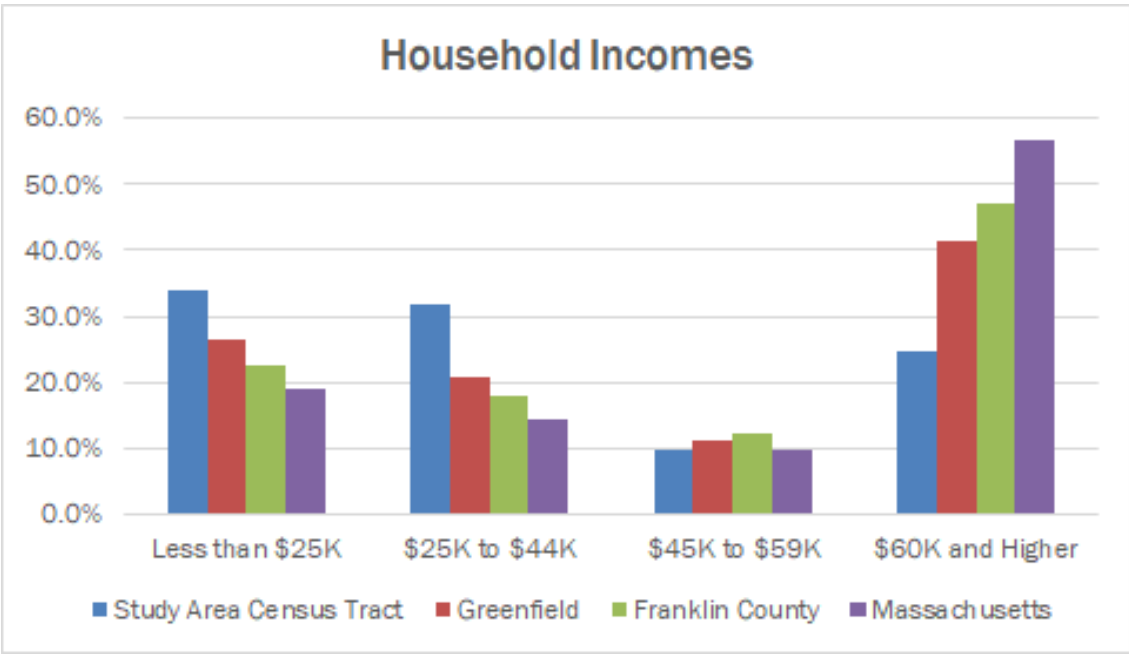
Figure 9. Household Incomes

Figure 9 shows the percent of the total population as broke up by income brackets. The two largest income categories in the study area are under $25,000, and $25,000 to $44,000. These two categories are higher in percentage than Greenfield, Franklin County, or Massachusetts. This distribution is unsurprising, given the area's history as a working-class neighborhood for mill workers and their families. However, it should be noted that there is some mixture of income classes, as the $60,000 and higher category is less than ten percentage points lower than the first two categories.

This income distribution couples with the educational attainment of our study area. Our study area is primarily comprised of high school diploma and associate degree recipients who earn less than $45,000 a year. This informs GRP on the average incomes we need to provide for when discussing housing development. Should we recommend housing development for low income populations, it will need to consider households that earn less than $44,000 a year.

Conclusion

Historically, like the rest of the former manufacturing regions of the country, the City of Greenfield, and the Deerfield Street neighborhood specifically, have undergone significant transformation over the past century as the local economy has transitioned from manufacturing. After its previous role as an area that housed skilled workers for the Greenfield Tap and Die Corporation, the neighborhood has seen some decline after the facility's closure, and average incomes, educational attainment, and property values are now somewhat lower than surrounding areas. The neighborhood also faces physical constraints to development due to the steep topography surrounding the Green River, the vulnerability to river flooding, and direct adjacency to the busy State Route 5.

Geographically, the Deerfield Street neighborhood itself is ideally positioned for investment targeted at improving quality of life for existing and incoming residents. Its key location within walking distance of Greenfield's downtown can connect residents to local employment opportunities and urban amenities. Residents can walk to the Olver Transit Center, providing access to the region and beyond, from Washington, D.C. to Burlington, Vermont. The neighborhood is flanked by green space, in the form of Energy Park and the Green River.

However, as shown by the relatively small population decrease between 1990-2010, Greenfield persevered through the shift away from a manufacturing-based economy. Its relatively lower housing costs, for renters and owners alike, can support housing options for both younger adults starting out in their careers and older adults on a fixed income. These advantages have already been borne out by high-quality housing developments such as the Green River Commons and the Arbors Assisted Living. The low vacancy rate evidences how essential the Deerfield Street neighborhood is for providing housing options to a range of income levels, while also showing the need for increases to the housing supply.

Future investments in the neighborhood can use these recent improvements as a springboard. However, the Client should consider the high number of renters in the neighborhood, which suggests a need to balance programming designed to benefit homeowners (such as grants for home improvement)with greater development of mixed-income rental and owner-occupied units.

Chapter 2: Client Directive

Introduction

Chapter 2 provides an overview of the City of Greenfield's goals and instructions for this Studio project. This directive guided the process of this plan's development. The client directive provided us with goals to achieve and challenges to address throughout our process and in our final recommendations.

As per the client, Greenfield's Deerfield Street neighborhood serves as the southern gateway to the Downtown. This area has been in transition for several years as the City has invested in housing and infrastructure along this stretch. The key projects have been upgrades of sidewalks, creation of a small riverside park, and renovation of distressed housing. Recently, the neighborhood has seen investment in new housing. The Arbors (constructed in 2007) is an upscale assisted housing residence that also has low-income housing units. The Green River Commons (2018) consists of new high performance (energy) modest-sized condominiums, which are under currently under construction with 4 low-income housing units. In addition, there are several multifamily homes have been or are scheduled for rehabilitation under the City's Housing Rehab Program. This context informs the specific goal areas presented below

Housing

Regarding housing, there are several aspects that Greenfield would like the Studio to examine. First, the City is encouraging more owner-occupancy in these multi-family homes as a strategy to strengthen community investment in this high-profile neighborhood. On the other hand, a few distressed vacant houses in the neighborhood have recently been acquired by private landlords, who have upgraded the units and bringing them back into occupancy. The mix of housing challenges in this neighborhood calls for focused attention by the City. The addition of seven new homeownership units and the upgrading of several multi-family units has made a dent in housing needs, but there is still much work to be done. What we have found is that the derelict condition of some of the housing is such that the cost to rehab (and de-lead) the unit is more than the unit is worth.

Flooding

Second, the City would like an overview regarding flooding near the southern end) of the neighborhood. Hurricane Irene (2011) demonstrated how vulnerable some of the housing in this neighborhood was to severe storm events because water had flooded the basements in the homes located on the east side of the Green River (south of Petty Plain Road). With the projections that the Deerfield River watershed will be one of the most impacted by climate change (per UMass Center for Climate Change - Professor Palmer), how should potential flooding influence land-use and city investments regarding housing?

Priming the Pump

The third challenge pertains to priming the pump. Should the Town use publicly owned parcels for new housing? If so, should these sites be low-, moderate-, or market-rate units, given the site and funding constraints. There are several parcels between Deerfield and Washington Streets in which the housing was of poor-quality housing and was demolished. Should the Town leave these sites as open space or do they present an opportunity for new infill development?

Land Use

The fourth challenge is land-use mix. In the corridor, there are parcel that are mixed-use with commercial/retail on the ground floor and residential on the upper floors. Do these parcels still work as mixed-use, especially when the commercial space is vacant?

Distressed Properties

The final challenge is distressed properties. There are several properties in this neighborhood that are on the Town's vacant/distressed property listing. Due to fiscal constraints, the Town is reluctant to use the receivership program to address these properties. Are their national or Massachusetts' precedents that can provide insight in order to build community support for receivership?

Existing Conditions: Introduction to Lynch Analysis

In *The Image of the City* (1960), a seminal work of urban design, planner Kevin Lynch describes five elements of a city that people use to understand their surroundings: **districts** (areas one can enter in and out of, with similar defining characteristics within), **paths** (e.g., streets, transportation lines), **edges** (boundaries to mobility, e.g., walls, water bodies, fast-moving traffic), **nodes** (central points of activity where multiple other elements intersect), and **landmarks** (physical points of reference for orienting oneself). Conducting a "Lynch analysis" creates a visual representation of an area with these five elements highlighted, providing insight into the function and organization of a physical place.

GRP conducted two Lynch analyses of the Deerfield Street neighborhood in order to better understand its structure: the first examined the entire neighborhood (Figures 10 and 11 below), while the second focused on the town-owned parcels available for development on Deerfield and Washington Streets (Figures 12 and 13 below).

Figure 10. Lynch Analysis of the districts in the Deerfield Street neighborhood

Districts: Though the Deerfield Street neighborhood as a whole is the study area of this project, there are several districts with different characters within the neighborhood itself. In the figure above, District 1 (in green) encompasses Deerfield Street, Washington Street, Meridian Street, Water Street (the latter two on the west side of the Green River), and Mill Street in the north. This district is defined by mixed commercial and residential land-uses and the high-traffic Deerfield Street. Though Washington, Meridian, and Water Streets are all quieter residential streets, their proximity to the busier Deerfield Street separates them from being purely distinct residential districts. The Mill Street portion of the district also contains the Museum of Our Industrial Heritage, connecting its historical use to the former industrial Greenfield Tap and Die facility on Meridian Street.

District 2 (in purple) contains the portion of the neighborhood that is more easily defined as part of Greenfield's downtown. This district contains the dense Main Street and Bank Row, home to large mixed-use buildings and civic structures like the Franklin County Justice Center. This district and these types of buildings extend partway down Hope Street.

District 3 (in blue) takes up where District 2 leaves off, as a more residential portion of the neighborhood, although there are some commercial and industrial land-uses along the upper part of Hope Street, particularly along the railroad. Thus, this district is similar to District 1, but more dominated by quieter residential streets, and Hope Street is not nearly as busy as Deerfield Street.

Lastly, District 4 is the lowest-density section of the neighborhood, dominated by a large hill in the central portion of the district (roughly where the '4' is located) and not home to many structures, distinguishing it from the other, more developed districts.
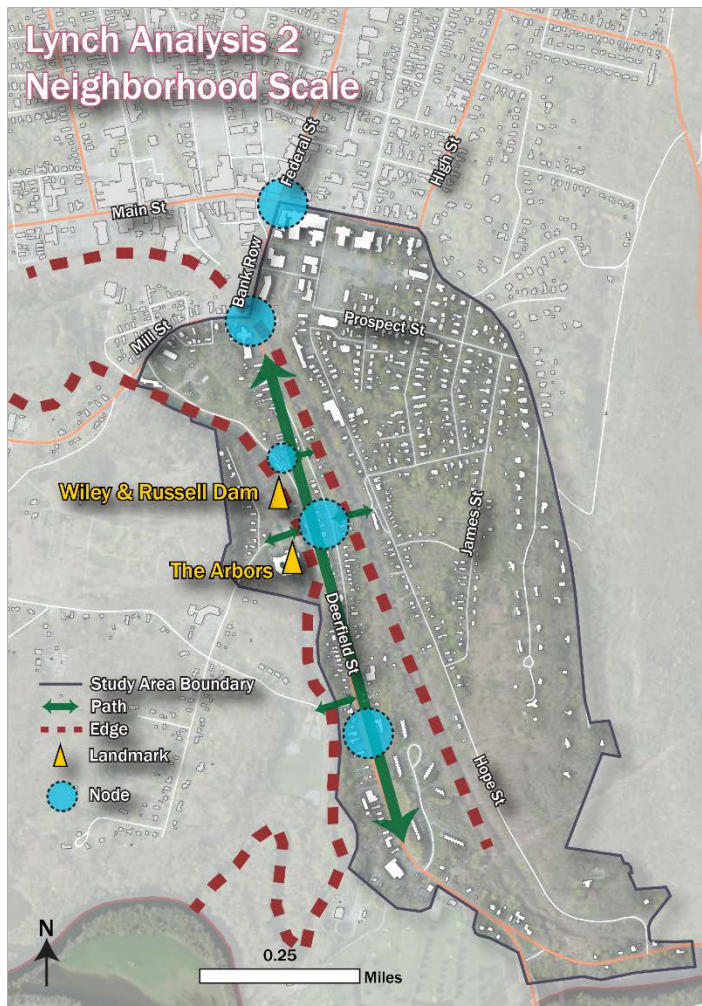
Figure 11. Lynch Analysis of the other elements in the Deerfield Street neighborhood

Paths (green arrows): The neighborhood is partially defined by the central path of Deerfield Street. As the continuation of State Route 5, Deerfield Street experiences consistently high traffic volumes and speeds. There are also several related paths leaving or crossing Deerfield Street worth highlighting. These include:

- A stairway which crosses from Deerfield Street to Washington Street several hundred feet north of the Wiley & Russell Dam (the only means of accessing Deerfield Street from the east on foot, besides the beginning and end of Washington Street; the small green arrow at the northern end of the large Deerfield Street arrow)

- Russell Street, the only access point across the railroad line separating Washington Street from the eastern section of the neighborhood (green arrow crossing the red dashed line on the right of the map)

- The Meridian Street Bridge, the only crossing point over the Green River open to vehicle traffic (green arrow above The Arbors)

- The foot bridge to Green River Park and Petty Plain Road, the only access point to the park from the eastern side of the Green River (green arrow just south of the Deerfield Street label)

Given the limited number of crossing points to and from Deerfield Street, these routes therefore represent the key paths for the neighborhood, although technically any road in the neighborhood constitutes a path. However, all roads are not marked as paths here for visual clarity.

Edges (red dashed lines): Edges are distinct from district boundaries in that, although they are both barriers, edges can

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separate areas within the same district. The Deerfield Street neighborhood is shaped by two key edges: the Green River immediately west of Deerfield Street, and the Amtrak railroad line on the east side of Washington Street. The railroad track crosses Deerfield Street at the north end of the neighborhood, forming a strong defining visual northern edge to the neighborhood. To the south, the river and railroad edges create a narrow corridor on either side of Deerfield Street and Washington Street, separating these streets from the low-density residential areas on the eastern and western sides of the neighborhood.

The narrowness of the corridor is furthered by the steep slopes that rise from the eastern bank of the Green River, forming a soft edge that requires stairs or other accessibility feature to negotiate. The slopes also require retaining walls on some properties such as the railroad track on Deerfield Street, north of Washington Street, and along the eastern side of Deerfield Street below Washington Street. These stone walls (which stand well over an average person's height) are an essential element of the neighborhood's visual character; however, as they can also present an impediment to street-level development, the walls can also be considered a soft edge.

Nodes (blue circles): The Deerfield Street neighborhood has several key nodes of activity. Moving from north to south, the first node can be found at the very top of the neighborhood where Bank Row intersects with Main Street. This intersection is home to numerous businesses and the Town Commons, and slightly further south, the Olver Transit Center—a link to local, regional, and national transportation.

The second node is located just south of the Amtrak railroad underpass, where several businesses are located at the corner of Deerfield Street and Mill Street. The third node is located at the

Ruggeri's Beverage Center (now under new ownership, with an upcoming name change of Green River Liquors), which has played a significant role in the neighborhood as a longstanding commercial anchor.

The fourth node centers on the intersection where the Meridian Street Bridge intersects with Deerfield Street. The bridge connects the residential area on the west side of the Green River, along with the Arbors Assisted Living (a recently-constructed facility for older adults), with Deerfield Street. There were also two furniture stores in operation at this intersection until recently. Thus, this is a central activity point for the neighborhood.

The fifth and final node encompasses the cluster of businesses on Deerfield Street just south of the entrance to Green River Park. This row of retail establishments includes a florist and several antiques and home furnishing stores. This is the largest collection of commercial activity in the neighborhood, except for Bank Row at the northern end.

Landmarks (yellow triangles): We have noted two main landmarks that stand out visually in the neighborhood: the Wiley & Russell Dam and The Arbors Assisted Living facility. Both were often mentioned as reference points by participants in our public workshop; they are also relatively unique features compared to the other structures in the neighborhood. The Dam has historical significance and aesthetic appeal, and Deerfield Street area lacks many large buildings, helping distinguish The Arbors.
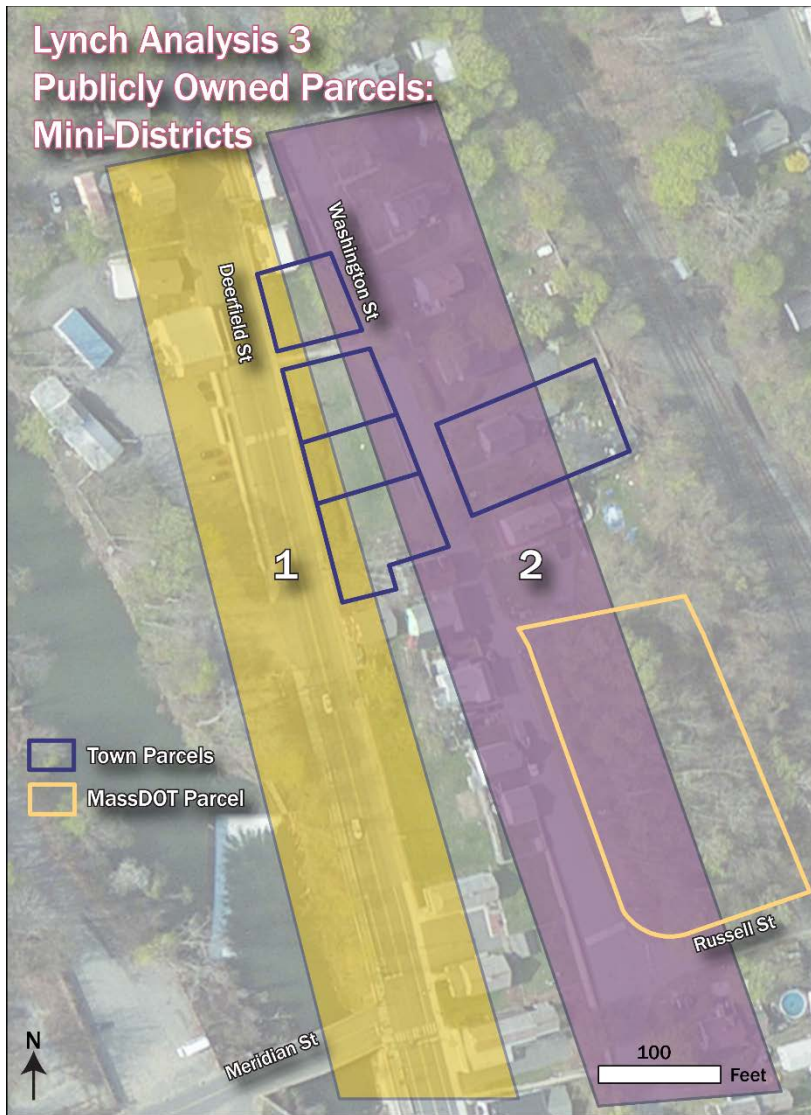
Figure 12. Lynch Analysis of the mini-districts surrounding publicly-owned parcels

This analysis focuses on the five City-owned parcels (outlined in purple in Figure 12) that were highlighted in our client directive, which are currently vacant and available for development. The large parcel on Washington Street, also publicly owned but by the state (specifically the Massachusetts Department of Transportation; parcel outlined in yellow in Figure 12), was also emphasized in our client directive for possibly representing development potential. It has been included here as it is adjacent to the City-owned parcels and is thus related to the same Lynch elements.

Districts: In this smaller-scale analysis, we have categorized Deerfield Street and Washington Street as individual districts. The two streets have markedly different characters: Deerfield Street is a busy street with mixed residential and commercial uses and public transit, while Washington Street is a quieter residential-only street. Thus, at this scale of analysis, these can be considered sub-districts, whereas at the neighborhood scale analysis they would be considered a single district.

Legend:
- Path
- Edge
- Landmark
- Node
- Town Parcels
- MassDOT Parcel

Wiley & Russell Dam

The Arbors
(across Meridian St)

N

100 Feet

Washington St

Deerfield St

Meridian St

Russell St
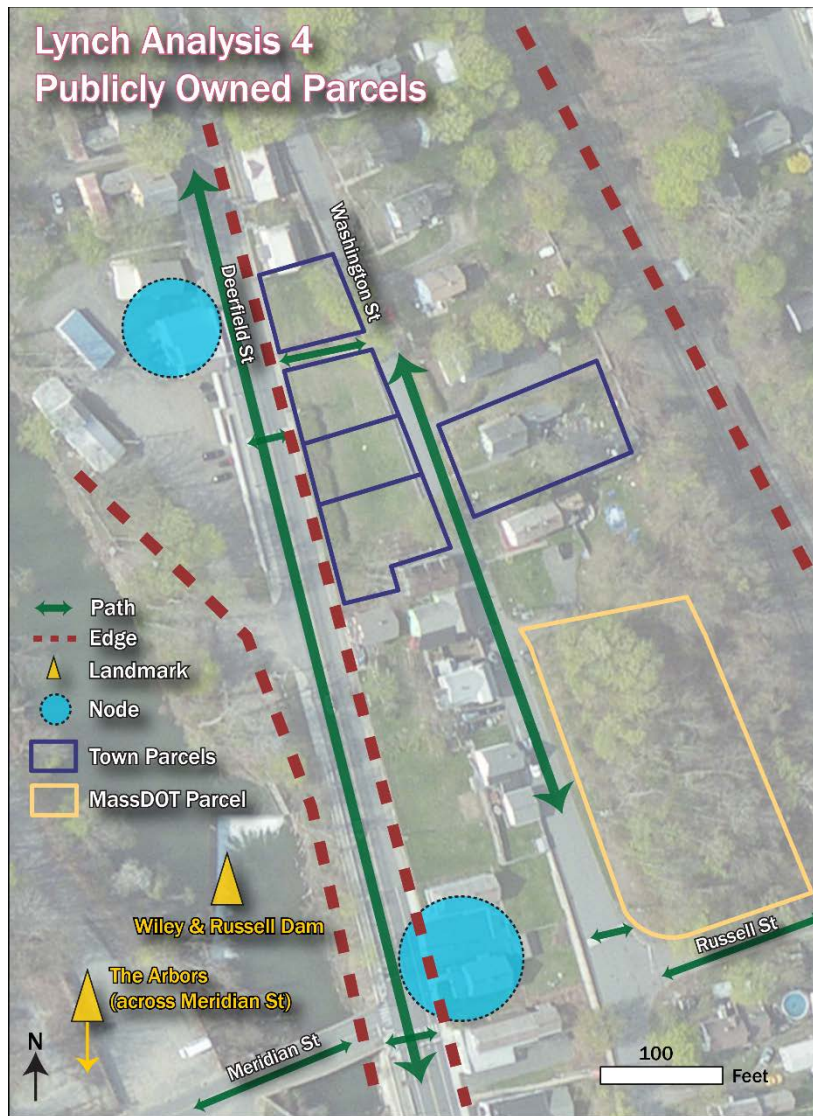
Figure 13. Lynch Analysis of the other elements surrounding the publicly-owned parcels

Paths (green arrows): As in the neighborhood-scale analysis, the main path in this area is Deerfield Street. In this parcel-scale analysis, we add Washington Street as a main path, as it provides access to the eastern side of the town-owned parcels. We have also identified the stairway that links Deerfield Street to Washington Street (the northern-most green arrow, located between two of the town-owned parcels) as a critical walking path that improves connectivity between these two main streets. Similarly, all crosswalks in the area (the small green arrows crossing streets) have been identified as paths that facilitate safe street crossing for pedestrians. It is worth noting that the northern-most crosswalk, located just south of the Ruggeri's Beverage/Green River Liquors store, is not aligned with the stairway that many pedestrians use to cross to the store itself. Re-aligning this crosswalk may be worthwhile to make crossing easier.

Additionally, the Meridian Street Bridge is a main path in this area (discussed in the neighborhood-scale analysis above), as is Russell Street. Russell Street is a major path in this area, as it passes under the railroad track to provide the only connection (pedestrian or vehicular) to the eastern portion of the neighborhood.

Edges (red dashed lines): As in the previous analysis (Figure 13 above), the railroad track and the Green River are the main edges in this area. We have also added an edge between Deerfield Street and Washington Street to represent the steep hill that separates these two streets, reducing access.

Nodes (blue circles): The two nodes in this area are Ruggeri's Beverage/Green River Liquors (the northern node) and the formerly open group of businesses just across from Meridian

Street (the southern node), as these are both intersections of activity (or were until recently, given the business closures). There are also bus stops just north and south of Meridian Street on Deerfield Street that contribute to these nodes.

Landmarks (yellow triangles): The landmarks in this analysis are the same as in the neighborhood-scale analysis, discussed above.

Upcoming Infrastructure Projects

In addition to the conditions discussed above, a number of infrastructure projects have already been planned for the neighborhood, and some have funding sources already secured. A map showing the location of these projects has been included in Appendix 11. They include: a pedestrian greenway/walkway along the Green River; a bike path road striping on Mill Street; lighting improvements for the underpass separating Deerfield Street and Bank Row; sewer and drainage improvements along Deerfield Street, until the southern end of Washington Street; repairs to the retaining wall and sidewalk near Green River Liquors; and a regional anaerobic digester addition to the wastewater treatment plant in the southern portion of the neighborhood.
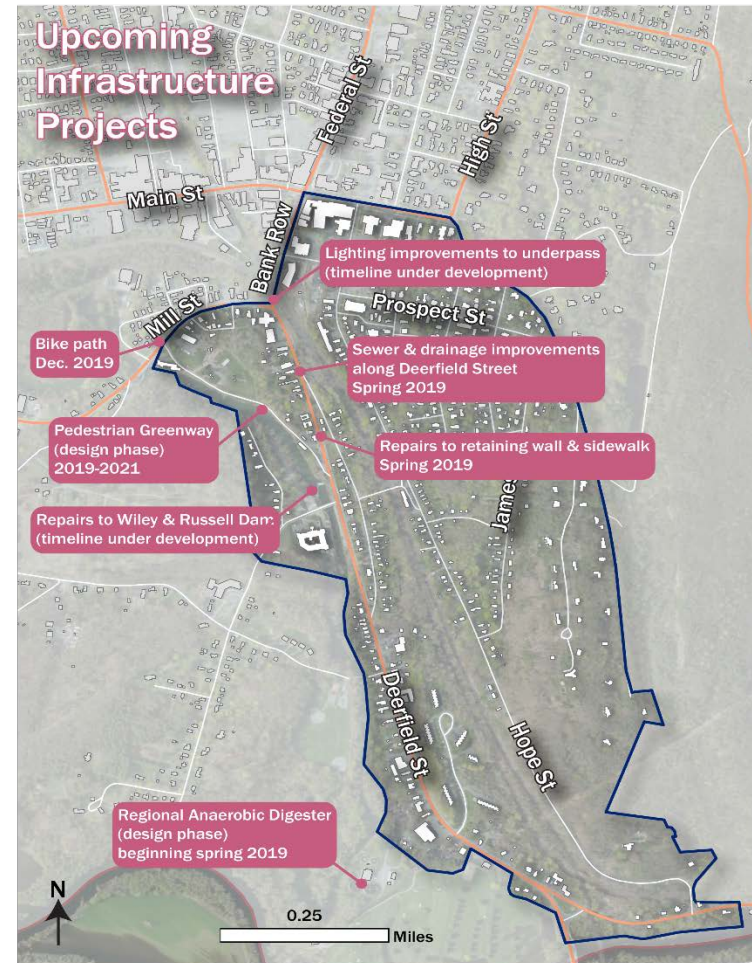
Figure 14. Upcoming infrastructure projects planned for study area

Conclusion

GRP conducted numerous site visits to the study area and City of Greenfield, MA. We met with our client, M.J. Adams, the Community and Economic Development Director of the City, and District 7 Councilor Otis Wheeler. On both visits we were able to walk the Deerfield Street neighborhood, gain valuable insight and information about the study area and our vacant parcels. Our client and Councilor Wheeler outlined various past plans, those currently in place, and ideas for future development and investment. Our client outlined our five goal areas to encompass challenges in our study area in housing, flooding, priming the pump, land use, and distressed properties. The three specific client goals were to explore parcel development potential, create a revitalization vision plan, and develop a public engagement process with the public to build our recommendations for the city. Of the six study parcels, five are city-owned, and one is owned by MassDOT. Four are located on Deerfield Street across from Green River Liquors, with three of the four lots contiguous. The two other parcels are located on Washington Street and the corner of Washington Street and Russell Street (the location of the MassDOT-owned parcel). GRP conducted two Lynch analyses displaying a map at neighborhood scale including the districts and other elements in the Deerfield Street neighborhood, and a map of the vacant parcels and mini districts surrounding the publicly-owned parcels.

Chapter 3: Understanding Housing

Chapter 3 discusses the influences of housing policy and market forces at national, regional, and local scales on shaping housing conditions in Greenfield, as well as how these external factors affect our recommendations. The first section will cover broad trends in housing in the United States that contribute to current high costs; the second section covers Massachusetts state legislation relating to housing and planning that affect housing costs; and the final section explores the housing stock in Greenfield and Deerfield Street as it relates to the city's history, development, and current demographics.

National Housing

A century ago, the nation's primary housing challenges were related to the physical condition of the housing stock and overcrowding, but since then the central problem has become affordability. At the beginning of the 20th century, the majority of households in the United States were renters living in urban areas, often living in crowded conditions. Deficient housing quality was a problem in both urban and rural areas; for example, in 1940, 45% of households did not have complete plumbing (Schwartz, 2015). In the decades following World War II suburbs proliferated, contributing to a gradual rise in single family homes and homeownership, and a decline in rental as the primary form of tenure. Deficiency reduced dramatically in the second half of the twentieth century, and now only a small portion of the overall housing stock is considered deficient.

Due to changes in the housing finance structure, such as low-interest loan rates and relaxed mortgage underwriting practices, homeownership rose sharply in the 1980s and 1990s. Rates of homeownership are highest among married couples, white

people, middle-aged and older households, and in suburban and non-metropolitan areas. Homeowners tend to be wealthier, with a median income that that is almost double that of renters (Schwartz, 2015). Today, the majority of the population resides in single family homes in suburbs, and two-thirds of Americans own their homes. However, barriers to high-quality housing that is affordable to all are still a problem in the United States, resulting in cost burden and homelessness among a wide range of vulnerable communities.

Suburbanization and related financing structures, which create a preference for single family homes, limit the number of units that can fit into an area and make the cost of these homes high. Building codes, minimum lot sizes, and increased property taxes all contribute to high costs. Income and wages have not kept up with these increased costs, which has led to an affordability crisis. More than 18% of the population spends over half of their income on housing. This number is higher among renters, of whom 27% spend more than half their income on housing. Households spending more than 30% of their income on housing are considered cost-burdened. This threshold is used to create affordable housing policy, and to calculate housing cost subsidies. In general, cost burden on owners has decreased and burden on renters has increased in recent years (Schwartz 2015).

The housing affordability crisis is deeply connected to income inequality, which has been increasing steadily over time but spiked during and after the 2008 recession. Renters' wealth and income have decreased over time, while rents have increased and the supply of appropriately priced housing has decreased. Another main cause of the shortage of affordable units is the failure of the private market to produce and sustain extremely low-rent housing without government subsidies. At the rents

needed for households in the lowest income bracket, many owners cannot cover their maintenance and operating costs, leading to one of two choices: disinvest until the property becomes uninhabitable, or flip the unit for higher-income occupants. Homeowners also face affordability challenges, primarily related to mortgage refinancing and changes in underwriting criteria, and the outpacing of homeowner income by increases in mortgage payments and property taxes (Schwartz 2015).

Homelessness is a fundamental housing issue that is also related to affordability and inequality. While it is challenging to accurately count and represent homeless and housing insecure populations, there has been a defined increase in these groups, especially as federal spending on housing programs has decreased since the Reagan administration and construction of public housing units has significantly slowed. Conflicts around why homelessness exists contribute to the variety of reasons it is difficult to find solutions.

Massachusetts Housing

Legislation and policy created at the state level influence how housing is geographically distributed, permitted, and constructed. This section will include an overview of relevant legislation in MA and how it has shaped housing in the state, with a focus on affordability.

Chapter 43B

Chapter 43B is the Home Rule amendment enacted in 1966. Home rule is the power of the city or town to set up its own system of self-government without receiving a charter from the state. According to Chapter 43B, cities and towns may regulate and control whatever is not barred by the constitution and not reserved as exclusive jurisdiction of the state. Massachusetts is unique in the fact that home rule is deeply entrenched. Aspects of Home Rule can include structure/format, site plan review, district regulations, general regulations such as parking and signs, design review, and a special permit authority (Barrett, 2018).

Chapter 40B

Chapter 40B, also known as the Comprehensive Permit Law, was enacted in 1969 to address the shortage of affordable housing statewide by reducing barriers created by local approval processes, local zoning, and other restrictions. It enables local Zoning Boards of Appeals (ZBAs) to approve affordable housing developments under flexible rules if at least 20-25% of the units have long term affordability restrictions which is completed through a consolidated local review and approval process, known as the comprehensive permit. The goal of Chapter 40b is to encourage the production of affordable housing in all cities and towns throughout the Commonwealth and has been used by communities to negotiate the approval of quality housing developments (Barrett, 2018).

For development to qualify under Chapter 40B, a proposal must first receive a letter of project eligibility under a state or federal housing program, such as Mass Housing, Mass Development, the Department of Housing and Community Development, or the U.S. Department of Housing and Urban Development. At least 25% of the units must be affordable to lower income households who earn no more than 80% of the area median income

(Alternatively, for rental housing, the project can provide 20% of the units to households below 50% of median income.) Towns are allowed to establish a local preference for residents (currently, up to 70% of the units can be for local preference). Developers (whether for-profit or nonprofit) must also agree to restrict their profit to a maximum of 20% in for-sale developments and 10% per year for rental developments (unless indicated otherwise in the subsidy program or the comprehensive permit) (Barrett, 2018).

After a project has been determined to be eligible, the developer can submit an application for a comprehensive permit to the local Zoning Board of Appeals (ZBA). The ZBA is empowered to grant all local approvals necessary for the project after consulting with other relevant boards, such as the Planning Board, and the Board of Health. This granting power results in a more streamlined review process at the zoning board, although it typically involves a number of hearing sessions. State regulations, such as the Wetlands Protection Act, Title 5, and all building codes, remain fully in effect under the comprehensive permit. Therefore, the local Conservation Commission will review the project regarding compliance with the state's Wetlands Protection Act (Barrett, 2018).

For units to count toward the state's 10% affordable housing goal, they must be part of a subsidized development built or operated by a public agency, non-profit, or limited dividend organization. At least 25% of the units must be income restricted to families with incomes less than the 80% of median and have rents or sales princes restricted to affordable levels. These restrictions must run at least 30 years. Additionally, the development must be subject to a regulatory agreement and monitored by a public agency or non-profit organization and owners must meet affirmative marketing requirements (Barrett, 2018).

Recent regulatory changes of 2001 and 2008 include regulation give more power to the municipality and have broadened the options for different types of affordable housing. These recent changes were geared towards project size limits, the ability of municipalities to prioritize projects if three or more are already underway, cost-certification guidelines, especially with 40B developments, and the allowance of new flexible housing. The allowance of group homes, accessory apartments, locally assisted units, and units funded under the Community Preservation Act to count toward a community's 10% affordability goal has also been a recent regulatory change to 40B (Barrett, 2018).

Chapter 40A

Chapter 40A, The Zoning Act, also referred to as Chapter 808, was enacted in 1975 to facilitate, encourage, and foster the adoption and modernization of zoning ordinances and by-laws by municipal governments and to establish standardized procedures for the administration and promulgation of municipal zoning laws. In section 2A, the purposes and objectives of this act are defined. Notable purposes and objectives of the Zoning Act include improving and maintaining safety and sanitation, lessening congestion in streets and preventing overcrowding of land, encourage housing for all income levels, facilitating the adequate provision of all public requirements such as transportation, schools, and water, and lastly to conserve the value of land and buildings (Barrett, 2018).

This chapter includes sections pertaining to exemptions from zoning regulations, zoning districts and maps, the adoption and amendment of zoning by-laws and ordinances, pre-existing nonconforming uses, structures and lots, exemptions for definitive and approval not required plans, single and common lots, enforcement of zoning regulations, basis for appeals to permit granting authority, special permits, procedural requirements, bonus zoning, PUD, cluster development, shared elderly housing, hazardous waste, special permits for adult bookstores and motion picture theaters, and solar access protections and special permits (Barrett, 2018).

Chapter 40B. Chapter 40S was introduced in 2008 and notes that additional funding can also be directed to cities and towns that establish a 40R district, in order to cover the costs educating school-age children that may move into the district. 40S was created in response to a concern for costly new housing in terms of municipal finances, due to imbalances of tax revenue and service costs (Barrett, 2018).

Chapter 40R

Chapter 40R is the Smart Growth Zoning and Housing Production Act enacted in 2004, which encourages cities and towns to zone for compact residential and mixed-use development in "smart growth" locations by offering financial incentives and control over design. This zoning includes overlay districts that encourage housing production including as-of-right densities of at least 8-20 units per acre, certain local characteristics, and an affordable component. Municipalities with qualifying districts receive incentives such as the zoning incentive payment of $10,000-$600,000 when they create a 40R overlay followed by a bonus payment of $3,000 per unit when developments receive building permits, and a $3,000 per unit payment when building permits are issued. Additionally, municipalities can receive a "school impact" reimbursement under companion law, higher state funding match for new school buildings, more favorable consideration when applying for discretionary grants from certain state agencies, and consideration of their 40R zoning if they oppose a project application under

Conclusion

The City of Greenfield must continue to use their power of Home Rule (Chapter 43B) and oversee their own jurisdictions by right. For the Deerfield Street Initiative, a portion of our study area includes a large parcel and streets owned by the MA State Department of Transportation (Mass DOT). The City has the choice to attempt to purchase this DOT-owned vacant parcel, if the DOT will agree to it. At the South intersection of Washington Street and Deerfield Street is where the highway begins, and Mass DOT maintains ownership of the street. This poses as an issue because if any streetscape or infrastructure improvements took place along the Deerfield Street corridor, they may not be applicable for the rest of the road once that intersection is reached. If the City of Greenfield wants to exercise their right of Home Rule, they must begin the process of purchasing this vacant parcel and seeing what can be done about infrastructure improvements at the junction between City-owned and State-owned property.

Chapter 40B is relevant to the Deerfield Street Initiative because this comprehensive permit can help to encourage more affordable housing in our study area and the City at large. With this permit, at least 25% of the units developed in the area must be affordable to lower income households who earn no more than 80% of the area median income. The City of Greenfield is also allowed to establish a local preference for residents. 40B is also significantly applicable to the City because of its increased allowance for social services and flexible housing such as group homes, accessory apartments, and locally assisted units.

Currently in our study area, one must secure a special permit to develop new housing, because it is commercially-zoned. Using Chapter 40A, we would recommend that the City of Greenfield modernize their current zoning ordinances to match the character of reality of increased housing in this corridor. If zoning is shifted to allow residents to not go through the special permitting process, housing will be more available and reachable.

For our study area, 40R would be a great tool for the City of Greenfield. If the City has qualifying districts, they will be able to zone for compact residential and mixed-use developments along the Deerfield Street corridor and be given financial incentives for it. These developments would have affordability components, which are a need in our study area, and would fit local characteristics of the area.

Chapter 4: Public Engagement

Chapter 4 provides a complete overview of GRP's public engagement strategy, demonstrating how the client goals for the project were met. Public engagement represents one of the main objectives in the client directive. The first section details the goals for engagement set out by the City of Greenfield. The second section details how the engagement strategy was developed, based on feedback from the client, our instructor, and consulting expert Jen Stromsten. The third section covers our final methodology, including outreach, a public workshop, a strategy for analyzing workshop data, and a public forum to share findings. Lastly, the results of workshop data analysis are presented.

Goals

In order to best develop our public engagement process, GRP adapted the 3 objectives from our Client Directive. As mentioned in Chapter 1, the first of these objectives was to survey the neighborhood residents, business owners, and other stakeholders to get their input on neighborhood revitalization. This information would then support objectives 2 and 3, which are respectively: to explore development potential on the vacant town-owned lots on Deerfield and Washington Streets, and develop a context-sensitive vision plan for neighborhood revitalization. Therefore, our Public Engagement process centered on developing a public workshop that would generate input from Greenfield residents on issues affecting the neighborhood, such as housing, commerce, parks & recreation, and traffic & safety.

Process

GRP began by reviewing previous Landscape Architecture and Regional Planning studio reports, each utilizing its own unique public engagement method. We were also directed to utilize a Visual Preference Survey (VPS) during our public engagement process. By comparing the methodologies of previous LARP projects we were able to determine that a public workshop would be the method best suited for our project goals. We then determined that our workshop would include three exercises: Asset Mapping, a Visual Preference Survey, and Vision Mapping. We used two significant pieces of literature to inform us within our public engagement process. An article titled the "Barry Farm Meeting Called Off Amid Angry Protests" and Debbie Collins' 2003 article titled "Pretesting survey instruments. An overview of cognitive methods". These two articles were essential in developing our public engagement process through the possibility of political backlash in Barry Farm and discussion of survey elements and validity.

Guiding Public Engagement Literature

It is imperative to conduct a public engagement process to include the opinions and viewpoints of the public and major stakeholders in the planning and development process. Without public engagement, the process would be biased and may lead to backlash, such as in the case of Barry Farm. The following article is about a community presentation by developers of their plan for Barry Farm in Washington, D.C. Furious protests from neighbors and outsiders opposed to redevelopment of the low-income housing community were rampant at the presentation. It became so chaotic that the presentation could not continue. Seven development teams responded to the city's solicitation for plans to convert the neighborhood near the Anacostia Metro station into a mixed-use development, and those seven teams were invited by the community's residential council to present their plans tonight at the Excel Academy Public Charter School. Representing the Barry Farm Community Redevelopment Team was potential mayoral candidate Robert Bobb. A large contingent of the people brought to the meeting were by the protest group Empower D.C. and not all of them were Barry Farm residents and not even all of the Barry Farm residents were against the redevelopment.

A chief concern of the residents was that they would be displaced by the redevelopment, either during the construction phase or permanently. Some doubted that they city would follow through on their pledge to replace existing low-income housing units with new ones on a one-for-one basis. Housing Authority spokesman Rick White said that he was confident that the developers wouldn't be dissuaded from continuing with their plans "because the development teams are familiar with the community process" (Wiener, 2013). One of the residents, Michelle Hamilton, insisted that full-scale redevelopment isn't needed and that all they need to do is remodel and fix-up, and that "the city needs to do their job and fix it up, and maybe it'll be a better place for us" (Wiener, 2013).

Keeping this article in mind during the development of our public engagement strategy was important because of the recent homeless encampment on the Greenfield Town Common. Tensions were high during this time between city officials and those living on the encampment (Lederman, 2018). During the methods development of our public engagement GRP was not there to propose development or make any changes to housing – we were there to listen and analyze the data we gathered from the conversation. Drawing experiential information from this article, we avoided possible backlash from the public and successfully engaged our workshop attendees. In order to help create out public engagement methods, we addressed Debbie Collin's 2003 article titled "Pretesting survey instrument: An overview of cognitive methods".

Collin's journal article describes numerous theories and tools for surveys and argues that cognitive testing should be a standard part of the development process of surveys. This was important to analyze during the development of our public engagement survey in relation to the creation of our visual preference survey. According to this journal article, there are three kinds of evidence to evaluate the performance of survey questions: statistical, direct study of the question-and-answer process, and experimental. Statistical identifies the specific effect of question measurement error on survey estimates. Direct study identifies how and where the question fails to achieve its measurement process. Experimental identifies whether the proposed changes to questions forms actually improve data quality (Collins, 2003).

Pre-testing questions enabled us to establish three things: whether respondents can understand the question concept or task, whether they do so in a consistent way, and whether they do so in a way the researcher intended (Collins, 2003). The question and answer model suggests four actions that respondents must complete in order to ask question. This model includes comprehension, retrieval, judgment, and response (Collins, 2003). Limitations of this model include the issue of not all cognitive processes being able to be verbalized, because some happen so quickly that they leave no trace in their working memory (Collins, 2003). Some of these methods also can discriminate against less articulate respondents who have difficulty verbalizing their thought processes and are less inclined to participate in cognitive testing experiments (Collins, 2003). Lastly, cognitive methods are still relatively new, so they haven't been standardized yet. Due to being non-standardized they are not always reliable.

Keeping in mind the possible challenges of pre-testing, GRP created our visual preference survey and made sure to make it as accessible and fair as possible for our participants. This accessibility was shown through an understandable Likert Scale to determine likability of certain Deerfield Street preferences, clear organized photos, and straight-forward sheet titles and main questions.

Timeline

GRP's public engagement timeline includes dates of presentations, outreach, workshop and forum implementation. Our total timeline stretches from 9/12/2018 until 12/12/2018; a full timeline is below:

9/12/18: Client Directive Received

GRP received instruction from the client stating the background, objectives, and methods of the project. This point marked the beginning of GRP's engagement with the City of Greenfield. The date for the public workshop was also set for October 11th, 2018.

9/26/18: Public Engagement Strategy Presentation to Client

After receiving the Client Directive, GRP understood that the client's first objective was a public engagement process to survey the opinions of residents, business owners, and other stakeholders. Therefore, GRP developed a proposed strategy for developing a public workshop as the centerpiece of a public engagement strategy, which would use various engagement tools to collect a variety of input on issues in the Deerfield Street neighborhood.

GRP presented this proposed strategy to the client on 9/26/18. This presentation included a PowerPoint slideshow discussing the specific agenda and materials for the public workshop. After the presentation, GRP received feedback from our client discussed revisions to the engagement strategy and several of the tools proposed for use in the workshop (including changes to several of the images and Likert scale used in the Visual Preference Survey, a tool covered in more detail in the Methods section of this chapter). These revisions included edits to the proposed map of the Deerfield Street neighborhood, the order of activities within the workshop (activities are discussed in more detail in the Methods section of this chapter), how to handle potential questions from participants and when to defer to our client, M.J. Adams, and finally how to continue with outreach. These revisions were made and determined the direction of engagement going forward.

10/3/18 - 10/9/18: Outreach to Community Members

At this point, outreach materials (flyer, postcard, and newspaper ads; each are discussed in more detail in the Stakeholder Outreach portion of the Methods section below) had been developed and were sent out digitally through Greenfield civic groups (specifically, the Sustainable Greenfield Implementation Committee, the body responsible for pursuing the City's master plan; and Greening Greenfield, a sustainability-oriented citizen organization) and City government communication channels. Flyers and postcards were also distributed during this time (method discussed in the Methods section below). As the public engagement strategy was approved on 9/26/18, there was a small window of just over a week to develop materials and conduct outreach for the workshop.

10/11/18: Public Workshop

Our public workshop was held at 114 Main St. (Planning and Development office) in Greenfield, MA at 5:00pm. This workshop, the center of our public engagement strategy, involved members of the Greenfield community in activities designed to collect input on issues affecting the Deerfield Street neighborhood. Conducting this workshop allowed GRP to address Client Goal #1, surveying residents and other stakeholders on their opinions about the future of the area.

11/1/18 - 12/1/18 Report Development

After the public workshop took place, GRP began analyzing the data gathered from the workshop, conducting a literature review and precedent research on the challenges included in the Client Directive, and developing a synthesis of the above for this report. GRP also began planning and outreach for a public forum on 12/13/18, in which the team will present analysis and recommendations for the Deerfield Street neighborhood.

12/12/2018: Final Presentation

In preparation for the final public presentation we sent out updated postcards to all households and businesses in the study area and emailed stakeholders and participants who attended the October public workshop. The final presentation was held at the John Zon Community Center in Greenfield, MA. At this event, our digitized Assets and Vision maps from our public workshop were displayed, along with our final poster, which included a summary of our project and our recommendations shown in renderings and discussed in detail. With the help of the Sustainable Greenfield Implementation Committee for outreach, we had turnout of about sixty attendees at our final presentation and a very engaging Q&A session to end the night.

The primary vehicle for our public engagement was our public workshop. The data gathered and analyzed from this event defined our recommendations and suggestions for the City of Greenfield and led our research following. We carefully created our methods for our public workshop and the materials that accompanied the event.

Methods

The final public engagement method centered on a public workshop that would garner input from Greenfield residents, business owners, and other stakeholders regarding the future of the Deerfield Street neighborhood. Three individual engagement tools were used during the workshop to solicit extensive comments from participants. The tools included Asset Mapping, a Visual Preference Survey, and Vision Mapping. The development of the workshop, its tools, and the outreach GRP conducted to ensure workshop attendance are explained in detail below.

Workshop

A public workshop is an event that uses intentionally designed activities and guided discussion to collect ideas from people who will be affected by a project, or who want to be involved in the development of their city or town. As mentioned in the Goals section of this chapter, GRP's objective for this workshop was to meet Client Goal #1 (surveying residents, business owners, and other stakeholders), understand what community members thought about the Deerfield Street neighborhood currently and how it should develop in the future, and use this information to create recommendations for the Client Goal #2, the neighborhood Vision Plan.

The workshop occurred on October 11th, 2018 from 5pm-6:30pm in the former Planning and Community Development Offices at 114 Main Street in Greenfield. Upon arrival at the event participants were broken up into four small groups, which they would be working in for the remainder of the evening. Group sizes ranged from three to six people, joined by a facilitator and a note taker.

The event was attended by approximately 25 participants, broken up into four groups. The workshop agenda went as follows:

Introductions by GRP, our client MJ Adams (Director of Community and Economic Development) and Greenfield City Councilor Otis Wheeler;

Activities for the participants, facilitated by GRP;

A large group reporting session, in which a volunteer from each group was asked to recount highlights of their discussion during the facilitated activities;

Closing statements by GRP, studio instructor Dr. Ramsey-Musolf, and MJ Adams, which completed the workshop and informed participants about the public forum taking place on December 13 in which GRP would present findings from this Studio Project.

The facilitated activities utilized three engagement tools specifically designed to collect different types of input regarding the Deerfield Street neighborhood: Asset Mapping, in which participants defined features of the neighborhood that were positive, needing attention, or that the town should be aware of; a Visual Preference Survey (VPS), in which participants ranked different options for development according to aesthetics; and Vision Mapping, in which participants commented on how they wanted the neighborhood to develop.

GRP created contingency plans in order to prepare the possibility of unexpected changes in our workshop's agenda and methods. Plan A would take place if an extremely high number of attendees show up. In this case, we will split into groups based on activities, and each group will only do one of the planned activities (Asset Mapping, Visual Preference Survey, Vision Mapping). Plan B will

take place if there are too few people. In this case, one large group will be formed in place of smaller groups. Plan C will take place if attendees show up late. In this case, we can have a helper place them in a group.

GRP developed the workshop structure, tools, and contingency plans through collaboration with: our client, who specified the use of a Visual Preference Survey (VPS); our instructor, Dr. Ramsey-Musolf, who provided resources on creating a VPS and demonstrated the technique behind Asset Mapping and Vision Mapping; and Jennifer Stromsten of Lewis & Stromsten, LLC, expert on public engagement.

Each of the workshop tools will be discussed in detail in their own sections below.

Activity 1: Asset Mapping

The first activity of the workshop was Asset Mapping, an exercise in which participants used a map of the Deerfield Street neighborhood (Figure 15) to identify various positive, negative, or potentially negative features that were key to understanding the area. GRP's goal for this exercise was to solicit comments regarding how participants perceived the neighborhood in its current state. This activity was developed based on instruction from Dr. Ramsey-Musolf.

To identify assets, participants placed color-coded, adhesive dots on a large map of the Deerfield Street neighborhood (see Figure 15for the blank map participants used during the workshop). Each group of participants was given three colors: green, yellow, and red. Green dots signaled an area that residents feel positively about, yellow dots indicated an area that we should keep on our radar for potential problems, and red dots indicated an area that needs immediate attention. Attendees placed dots where desired and then were invited to write directly on the map to explain what each dot represented, especially if there were multiple dots placed in specific areas. The Asset Mapping activity therefore identified individual assets and concentrated areas of positive or negative assets.

At the end of the activity, GRP facilitators introduced four blue dots to the table. These four blue dots represented priority locations, which were placed on the map according to participant opinion as well as density of green, yellow, and red dot placement. The facilitator asked if the group felt this location would be a good place for a priority blue dot and participants were given the opportunity to either agree or disagree with that placement. In the case of participant disagreement, the facilitator asked if another location would be more pertinent. After all 4 blue priority dots were placed, the Asset Mapping activity was complete and the Visual Preference Survey activity began.
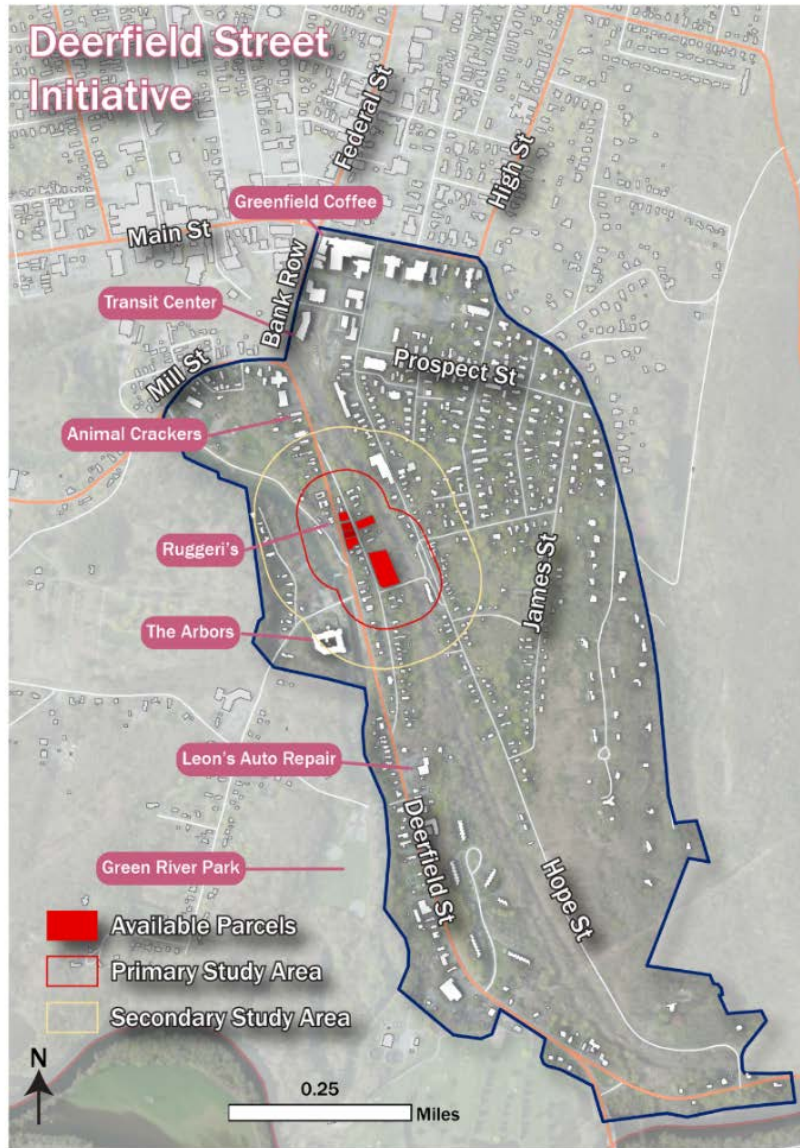
Figure 15. Map used by participants in workshop

Figure 16. Visual Preference Survey Housing Sheet

A Visual Preference Survey (VPS) is a method of collecting input on physical designs of places. The survey presents images of various design alternatives which participants rank according to their preferences. GRP's goal for this particular VPS (see example sheet shown in Figure 16; a full VPS has been included in Appendix 5) was to determine which types of urban development workshop attendees would like to see in the Deerfield Street neighborhood. To ensure that the VPS collected data that matched the five challenges specified in the Client Directive, the survey design included five categories of development: street feel (representing the overall character of Deerfield Street itself); housing; commerce; parks; and traffic management at crosswalks (which was not identified in the Client Directive but arose as a key issue through client discussions and meetings). The challenge of flooding was not included in the VPS, as identifying potential design alternatives for flood mitigation was not included within the scope of this Studio Project. Each of the five categories included 3-4 options for participants to rank; these options were chosen by GRP to match reasonable development paths for the Deerfield Street neighborhood based on existing conditions in Greenfield, review of local and regional planning documents (see Chapter 6: Precedent Studies), and client meetings. The VPS was tested by members of the Department of Landscape Architecture and Regional Planning at UMass Amherst; based on feedback received during the test, several images were changed for clarity.

At the workshop, paper copies of the VPS were handed out and a projector displayed a digital version of the survey at the front of the room. Each of the five categories (Street Feel, Housing, Commerce, Parks, and Crosswalks) was given its own page with a set of options to rank.

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Categories and options used in the Visual Preference Survey

Street Feel	Housing	Commerce	Parks	Crosswalks
Mixed-use street	Single-family home	Plaza-style retail	Pedestrian walkway	RRFBs (Rectangular Red Flashing Beacons)
Commercial street	Pocket neighborhood	Standalone storefront	Active recreation	
Dense residential street	Small multi-family home (2-4 units)	Mixed-use retail/housing	Community garden	
Less dense residential street	Large multi-family apartments (5+ units)		Multipurpose combo	

On the VPS, each option within the categories was numbered. A facilitator introduced the participants to each category and the different options via the projector. Following the introduction of each category, the groups then discussed their preferences and voted on the paper surveys using a Likert scale, which allowed them to rate each image using one of the following ratings: 'Love It,' 'Like It,' 'It's Okay,' 'Not for Me,' or 'No Way'. Participants were also encouraged to write their thoughts and conversation topics directly on the paper survey to capture richer data. On the final page of the survey, participants were introduced to High Intensity Activated Crosswalks (HAWKS; a traffic mitigation system that slows traffic at crosswalks for pedestrians to pass safely) and asked to rate the system. Following their ratings, participants were asked to draw directly on the workshop map where they would like to see the HAWKS placed along the corridor.

The VPS activity began a rich dialogue within groups. After small group discussion and rating of each category's options, each table hared their opinions in a large group format. This discussion was conducted using a brief exercise called "Love It? Hate It?" led by Professor Ramsey-Musolf, where attendees were asked to call out which option in each category, they "loved" or "hated". This exercise provided a concise pre-analysis of popular opinion among participants. Following the Visual Preference Activity, the groups began the third and final activity of Vision Mapping.

Vision Mapping

Vision Mapping is an activity in which participants place markers (in this case, post-it notes were used) on a map to identify locations where a change to the environment is desired. Its purpose is to document spatial feedback from the public about where development should go in the future. GRP's goal for this activity was to have participants show where in the Deerfield Street neighborhood they would like to implement the various types of development presented in the Visual Preference Survey.

During the workshop, the Vision Mapping activity functioned simply: Having just completed the VPS, the participants were asked to choose elements from the VPS that they would like to envision along the corridor and write them down on post-it notes, which were then placed on the specific location participants had in mind. This led to further discussion within the small groups over preferences of development types, as well as areas of need and opportunity.

As mentioned previously, after the Vision Mapping activity and sharing of each small group's findings with the whole group, closing statements completed the workshop.

Outreach

To ensure that the public workshop collected feedback from the residents, business owners, and other stakeholders specified in Client Goal #1, GRP needed to conduct outreach to encourage these groups to attend. GRP's goal for this outreach was to publicize the workshop as widely as feasible given the short timeframe between presenting the proposed engagement method to the client and hosting the workshop itself (as mentioned above, a timeframe of roughly two weeks). To accomplish broad publicity for the workshop, phone calls and emails were made to a list of key stakeholders (discussed in detail under *Stakeholders* below), and three main outreach tools were developed: a flyer, a postcard, and a newspaper advertisement (in print and digital). These three tools are explained in depth in their own sections below.

Flyer

GRP designed a flyer with images and text using Adobe Creative Cloud software, a graphic design program, whose purpose was to inform potential attendees what would occur at the upcoming public workshop and why they should attend. This flyer was distributed to every business and establishment open to the public along Main Street (from Franklin Street to Conway Street) and along Federal Street (from Pleasant Street to Olive Street), as these street sections serve as the center of Greenfield's downtown.

Figure 17. Workshop Flyer printed in the Greenfield Recorder

Postcard

GRP designed a postcard (Figure 18) with images and text using Adobe Creative Cloud software, a graphic design program, whose purpose was identical to the flyer, but with a key difference: the postcard could be sent through the mail to inform potential attendees about the upcoming public workshop. The postcard was distributed with the flyer to downtown businesses and establishments open to the public, and it was also mailed to every resident in the Deerfield Street neighborhood whose address was located within 300 feet of the vacant town-owned parcels specified in the Client Directive. This 300-foot buffer was selected to align with Greenfield's and Massachusetts public notification requirements, which specify who must be informed of potential new development, although technically a student project like this Studio has no legal notification requirement.
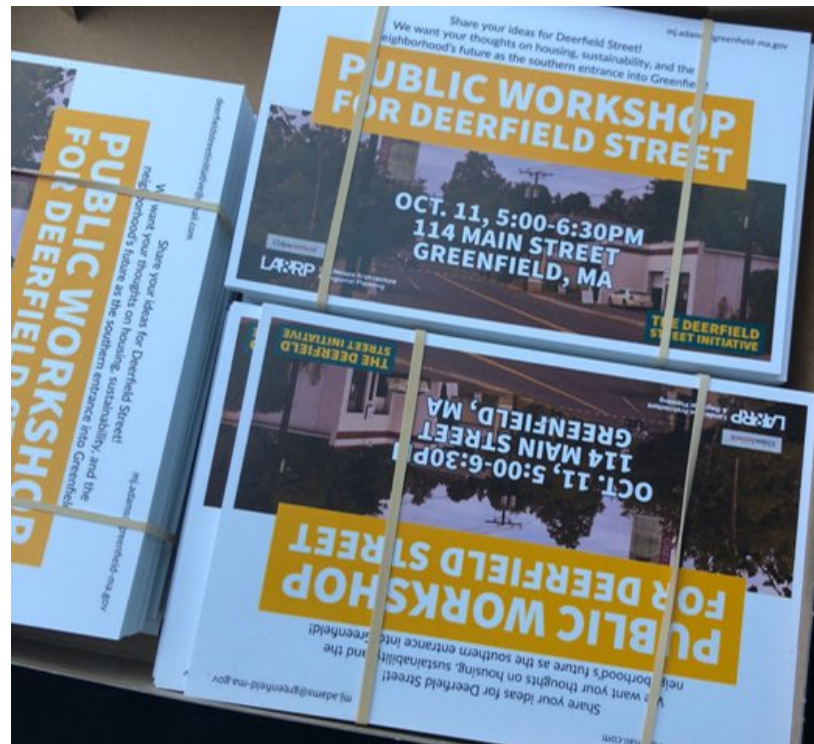
Figure 18. Postcards in print

Newspaper Coverage

To reach potential attendees who may not have seen the flyers or received postcards, a visual advertisement and a written press release were placed in *The Recorder*, Greenfield's main local newspaper. The visual advertisement was identical to the flyer. The written press release described the Deerfield Street Initiative project and the upcoming public workshop and encouraged Greenfield residents to attend. The visual advertisement was run in the newspaper on the Saturday before the public workshop (because the Saturday paper is the week's most-read edition), and then again on the day before the workshop (October 10th).

Figure 19. Staff report in the Greenfield Recorder

Figure 20. Newspaper article on the Greenfield Recorder's website

Stakeholders

In addition to residents of the Deerfield Street neighborhood, institutional stakeholders for this project include local government bodies, businesses, and community organizations. A partial list of stakeholders is included below and the complete list can be viewed in the appendix. An initial list of stakeholders was suggested by the client, and GRP conducted research into significant institutions in Greenfield to expand this list to include forty total stakeholders. Although businesses at the northern end of Deerfield Street were included on the initial list, the list should also have included businesses at the southern end of Deerfield Street, where a number of antique & furniture stores and automobile repair shops are located. To include a variety of opinions, the public workshop's strategy of assigning participants to different small groups each guided by a facilitator aimed to ensure that all voices would be heard equally, and members of the same organization or interest group would not dominate a discussion.

Though the public workshop was set as the primary method for stakeholders to provide input on development in the Deerfield Street neighborhood, stakeholders who could not attend that workshop were welcomed to provide feedback by email to the client or to the Studio Team. This feedback would be read by all Team members and incorporated into the Studio Project.

Local Government	Business Owners	Community Organizations
Council on Aging	Valley Mart	Community Action Pioneer Valley
Dept. of Energy & Sustainability	Animal Crackers	Just Roots
Historical Commission	Napa Auto Parts	Connecticut River Conservancy
Commission on Disability Access	Ruggeri's Beverage (Green River Liquors)	Complete Streets Committee
Cultural District Committee	The Recorder	Greening Greenfield
Housing Authority	GCTV	United Way
Public Safety Commission	Berkshire Gas	Salvation Army
Building Dept.	Art Space Community Arts Center	Elks Lodge
Redevelopment Authority	The Arbors Assisted Living	Greenfield Democratic Town Committee
City Councilors		YMCA
Greenfield Business Association		Green River House
John W. Olver Transit Center		Greenfield Senior Center
Franklin County CDC		Greenfield Community College Foundation
FRCOG		Opioid Task Force
Parks & Recreation Dept.		
Conservation Commission		
Franklin County Chamber of Commerce		

Workshop Visual Documentary

Throughout the afternoon that our workshop took place, photos were taken by Justin Risley, an undergraduate Journalism student at the University of Massachusetts, Amherst. Photos taken from the start to the close of our workshop, including photos of our team, attendees at work, and the team and attendees presenting can be found below.

Figure 21. Workshop participants arrive and explore study area map

Figure 22. Studio Team and Professor Ramsey-Musolf introduce workshop to participants

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Figure 23. Participants discuss study area assets and challenges as team associate takes notes

Figure 24. Participants mark assets and challenges on study area maps in small groups

Figure 25. Multiple generations of Greenfield residents participate in workshop activities

Figure 26. Participants complete visual preference surveys guided by facilitators

Figure 28. Vision mapping engages participants in conversation about what they want to see in the study area

Figure 27. Groups present maps to the workshop

Results

The results of our public engagement workshop include analysis of our Asset Mapping, Visual Preference Survey (VPS), and Vision Mapping activities. The sections below will analyze each of these tools in turn, beginning with the VPS and then turning to the Mapping activities, and then will synthesize key findings which will inform GRP's recommendations for the Deerfield Street neighborhood.

Workshop

Seventeen community members attended our public workshop, including local politicians, business owners, and neighborhood residents. Facets that affected turnout were the need for outreach to more community organizations and neighborhood residents, the need for earlier outreach before the event, and unfortunate rainy weather.

Asset Mapping

The Asset Mapping analysis will group the three categories—Positive Assets represented in green, On Our Radar represented in yellow, and Needs Attention represented in red—into themes or sites along the Deerfield Street corridor that regularly appeared in our Asset Mapping activities. To conduct this analysis, we created three digital maps aggregating each of the three categories from our four paper maps generated at the workshop onto their own digital map. Positive assets were aggregated onto their own map, On Our Radar a second, and Needs Attention priorities were given a third and final map. For the purposes of analysis, the Positive Contribution map will be analyzed first, and the On Our Radar and Needs Attention maps will be analyzed together. We chose to analyze these two maps together due to a spatial similarity in comments for each map.

Positive Contribution

Through our analysis of the positive assets maps we were able to identify three main themes that we were able to group our results into. The three key themes were: recreational assets, infrastructure, and Green River access. Additionally, we will positive assets which did not fall into these three categories but still contribute to the inventory of the study area.

The first and most prevalent theme was the recreational assets throughout the corridor and surrounding areas. The participants made note of both parks along the corridor and study area, the Green River Park and Energy Park. Within the two parks, participants made note of the dog park in the Green River Park and arts installments in Energy Park. One prominent comment was that the Green River Park and its dog park are easily accessible. This comment about readily accessible park space was not made in regards to Energy Park. Based on this analysis, one potential recommendation may be to better connect Energy Park with the Deerfield Street corridor.

The second theme that emerged from this map analysis is the presents of preferred infrastructure. The first example of such infrastructure was the benches across from the Arbors Assisted Living, which was marked by residents as a positive asset. Another infrastructure that was highlighted by participants was Brookie, the fish statue built along the corridor, within a small strip park. These two assets are both examples of passive recreation, which requires less physical participation and can be enjoyed through passing and observation. Based on this analysis, our client may want to consider adding more infrastructure – benches and sculptures – along the Deerfield street corridor to encourage passive recreation.

The third theme that emerged from our asset mapping activity was the Green River and its proximity to the corridor. During the positive asset mapping, participants referenced the Wiley and Russell Dam and its view of the Green River as one significant asset. Another significant feature that participants noted in this mapping activity was the upcoming pedestrian walkway along the Green River, which they were excited for because of its potential direct access to the river. This was accompanied by discussions in groups, which identified the potential uses of the green river; such as a river side restaurant. Based on this analysis, further utilization of the river through accessibility or incorporation in projects would be very well received.

Figure 29. Positive Assets from asset mapping activity

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Asset Map 2 — On Our Radar

- Stairway to Energy Park
- Underpass not welcoming (lighting)
- Financial assistance for F.W. Webb store
- Underserved; make mixed use (similar to Animal Crackers)
- Make more housing
- River walkway
- Sidewalk needs repair
- Better river access
- Restore access
- Use the school
- Need better parking at entrance to park
- Better entry sign
- Meadows & golf course
- Area needs work

Comments located exactly as given in public workshop

■ Available Parcels

Main St · Federal St · High St · Bank Row · Prospect St · Mill St · James St · Deerfield St · Hope St

N — 0.25 Miles

Figure 30. On our radar from asset mapping activity

Asset Map 3 — Needs Attention

- Unsafe location
- Gateway to neighborhood
- Hard to navigate to rest of the neighborhood
- Sidewalk repair needed
- Pedestrian safety
- Need housing
- Address underpass
- Parking lot overgrown
- No more stairway for kids and buses
- Dangerous intersection
- Houses need repair
- Wall needs repair
- Too low-density
- Sidewalks not bike friendly
- Golf course overgrown, underdeveloped
- Dangerous intersection
- Difficult to bike

Comments located exactly as given in public workshop

■ Available Parcels

Main St · Federal St · High St · Bank Row · Prospect St · Mill St · Deerfield St · Hope St

N — 0.25 Miles

Figure 31. Needs attention from asset mapping activity

On Our Radar and Needs Attention

The primary theme that emerged from our analysis of the On Our Radar and Needs Attention maps were lack of lighting in the underpass at the northern gateway to the neighborhood, lack of safety at the intersection of Bank Row and Deerfield Street, and underserved properties or properties at the intersection that make people feel unsafe due to dilapidated conditions. We believe the participants intent in using these terms were that underserved properties include those that may be abandoned and not maintained, and that these dilapidated conditions at the intersection may be seen as the old crosswalk lining, sidewalks, and crosswalk devices for pedestrians. These could include properties currently in need of repairs or properties that remain vacant. Similar comments were made at the southern entrance, where participants expressed concern over a dangerous intersection at Deerfield Street and Cheapside Street, unsafe biking conditions, and need for better signage at the entrance of Greenfield. The entrances are important regions to the Deerfield Street corridor, both of which can be improved by increased lighting and traffic calming measures.

A second theme that emerged in our analysis was the desire for improved infrastructure along the corridor. A comment consistently made in both maps was the need for improved or repaired sidewalks, both for pedestrian and bicycle users. A second concern raised in this exercise was the lack of available parking or inaccessible parking that already exists. A third and final concern pertaining to infrastructure was the safety of the stairwell across from the Green River Liquor's store, which is currently used by pedestrians of all ages to descend from Washington Street to Deerfield Street. Based on our engagement analysis, investment in infrastructure improvements – sidewalk

improvements and repair, increased parking or improvements to existing parking, and assessment and possible repair of the stairwell – would help to mitigate feelings of insecurity along the corridor and improve the user experience.

A third theme that emerged from this analysis was a consistent need for housing or housing improvements throughout the study area. Participants in our workshop clearly felt that additional housing could be place along Hope Street as well as Washington Street along our vacant parcels. Additionally, participants voiced and wrote that some properties in the study area are in need of repair. Finally, participants contribute that the southern half of the study area, near Hope Street, was an overall low density. This analysis supports our intention to propose housing development in the study area.

Asset Mapping Results Conclusion

The Asset Mapping analysis produced themes that should guide future growth and highlighted areas that are ready for growth. Our positive asset analysis demonstrated a participant preference towards both active and passive recreation, which we could encourage through the connection of Deerfield Street to the Green River and Energy Park. Improved connection to Energy Park can be encouraged through better lighting and development of the northern underpass at the entrance to the Deerfield Street corridor, which was designated an area of concern noted in our asset mapping activity. These improvements should be considered alongside infrastructure improvements to improve the user experience along the corridor and housing development to accommodate the needs of a growing population. These

recommendations are all supported by our asset mapping analysis and would improve perception of the corridor.

Through the On Our Radar and Needs Improvement analysis themes arose demonstrating a need for growth and redevelopment. One of the key concerns was a lack of housing density, with participants looking for growth in housing stock. This growth must be accompanied by growth in the street and street side infrastructure to improve accessibility for pedestrians, cyclists, and vehicles. Finally, participants expressed a clear need for improved gateway lighting and beautification to encourage a greater user experience. By carrying the themes of the Positive Assets analysis into these improvements, the city can ensure growth in an already appreciated direction.

Visual Preference Survey

At the workshop, each participant was given a Visual Preference Survey (VPS). The VPS contained five sheets: Street Feel, Commerce, Housing, Open Space, and Crosswalks. Each sheet had three to four images displaying different options for development on Deerfield Street. The Crosswalks sheet displayed one image of a potential traffic mitigation system superimposed onto a painted crosswalk on Deerfield Street. At the workshop, there were 18 participants who completed 18 surveys. On each sheet, each image option had their own Likert Scale ranging from Love It to No Way, so each image had their own percentage out of one hundred. For example, below for Street Feel, all of the image options were liked, but Mixed-Use had the highest number of likes. To describe how we stated our results for the VPS we combined Love It and Like It, left It's Okay as neutral, and

combined Not for Me and No Way. The results of the VPS by sheet are as follows.

Figure 32. VPS sheet on street feel

For Street Feel, the survey respondents were asked the following question: "How would you feel if Deerfield Street looked like each of the following?" with the following choices: Mixed-Use, Commercial, Dense Residential, or Less-Dense Residential. The top two preferences were Mixed-Use and Dense Residential. Regarding Mixed-Use, 76% of respondents liked the option, 12% were neutral, and 12% did not like it. Regarding Dense Residential, 53% of respondents liked the option, 29% were neutral, and 18% did not like the option.
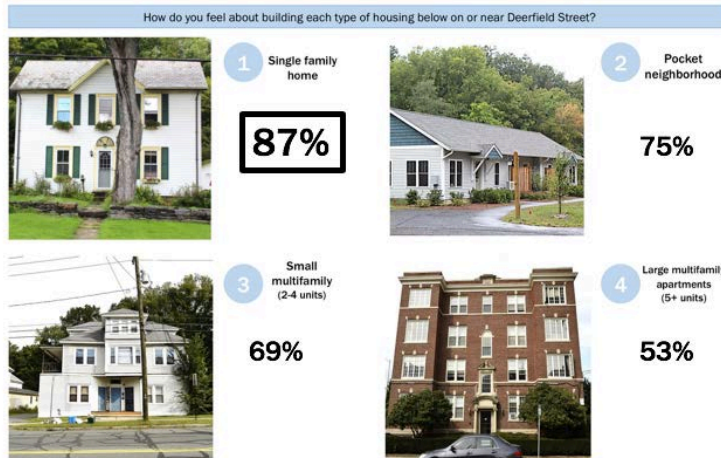
Figure 33. VPS sheet on housing

Figure 34. VPS sheet on commerce

For Housing, the survey respondents were asked the following question: "How do you feel about building each type of housing on or near Deerfield Street?" with the following choices: Single family homes, Pocket neighborhood, Small multifamily (3-4 units), or Large multifamily apartments (5+ units). The top two preferences were Single family home and Pocket neighborhood. Regarding Single family homes, 87% of respondents liked the option, 13% were neutral, and none were against it. Regarding Pocket neighborhoods, 75% of respondents liked the option, 6% were neutral, and 19% did not like the option.

For Commerce, the survey respondents were asked the following question: "How do you feel about building each type of commercial building below on or near Deerfield Street?" with the following choices: Plaza-style retail, Standalone storefront, Mixed use retail/housing. The top two preferences were Standalone storefront and Mixed-use retail/housing. Regarding Standalone storefronts, 77% of respondents like the option, 17% were neutral, and 6% did not like the option. Regarding Mixed-use retail/housing, 77% of respondents liked the option, 23% were neutral, and none were against it.

Figure 35. VPS sheet on parks

Figure 36. VPS sheet on crosswalks

For Parks, the survey respondents were asked the following question: "How do you feel about building each type of park or recreation area below on or near Deerfield Street?" with the following choices: Pedestrian walkway, Active recreation, Community garden, or Multipurpose combo. The top two preferences were Pedestrian walkway and Multi-purpose combo. Regarding Pedestrian walkways, 94% of respondents liked the option, none were neutral, and 6% did not like the option. Regarding Multipurpose combo, 93% of respondents liked the option, none were neutral, and 7% did not like the option.

For Crosswalks, the survey respondents were asked the following question: "How do you feel about building these traffic control devices on Deerfield Street?" with one photo of superimposed traffic control devices on an already existing crosswalk on Deerfield Street. 80% of respondents liked the option 20% were neutral, and none were against it.

Visual Preference Survey Results Conclusion

The results of the Visual Preference Survey showed distinctive public preferences for street feel, housing, commerce, parks, and crosswalks. Based on the desires of the participants at our public workshop, on Deerfield Street they would like to see a mixed-use street feel, single family homes and pocket neighborhoods, standalone storefronts and mixed-use retail/housing, a pedestrian walkway and multipurpose combinations, and traffic control devices such as RRFBs (Rectangular Rapid Flashing Beacons).

Vision Mapping

Vision mapping analysis was conducted by aggregating comments made on the four public workshop maps during the vision mapping portion of our event. The participants were asked to choose elements from the VPS that they would like to envision along the corridor and write them down on post-it notes, which were then placed on the specific location participants had in mind. Each category from the visual preference survey is identified below in its own map. Each map features a comment or multiple comments traced back to the location it was placed on an original workshop map. The original workshop maps were digitized and then organized by each of the VPS sections (Street Feel, Housing, Commerce, Parks, Crosswalks) and "Other" which were comments that did not necessarily fit into the specified VPS sections. Each map will be presented below, followed by a brief written summary of the results.
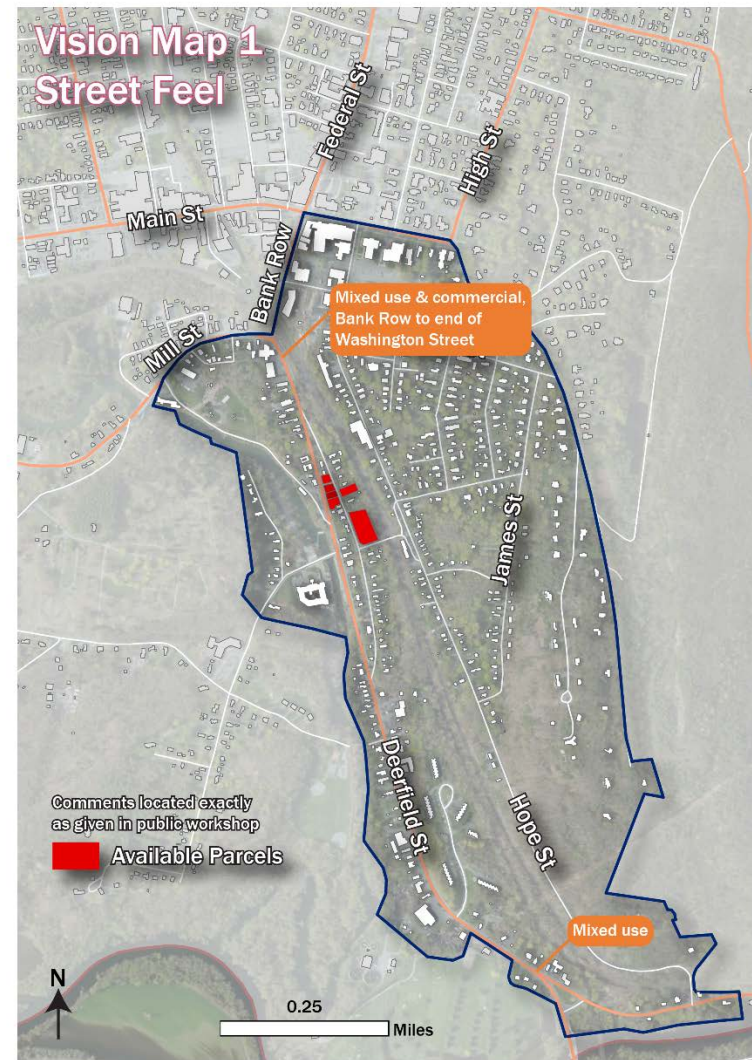
Figure 37. Street feel from vision mapping activity

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The most prevalent vision for Street Feel was the development of a mixed-use corridor. This was highlighted along the northern most point of the corridor, from the intersection of bank row to Green River Liquors. This was also highlighted as a point of interest at the southern-most point, at the intersection of Cheapside Street. These both represent entrances to the corridor, indicating a vision of mixed-use development at the entrances to the corridor, acting as an introduction to the area.
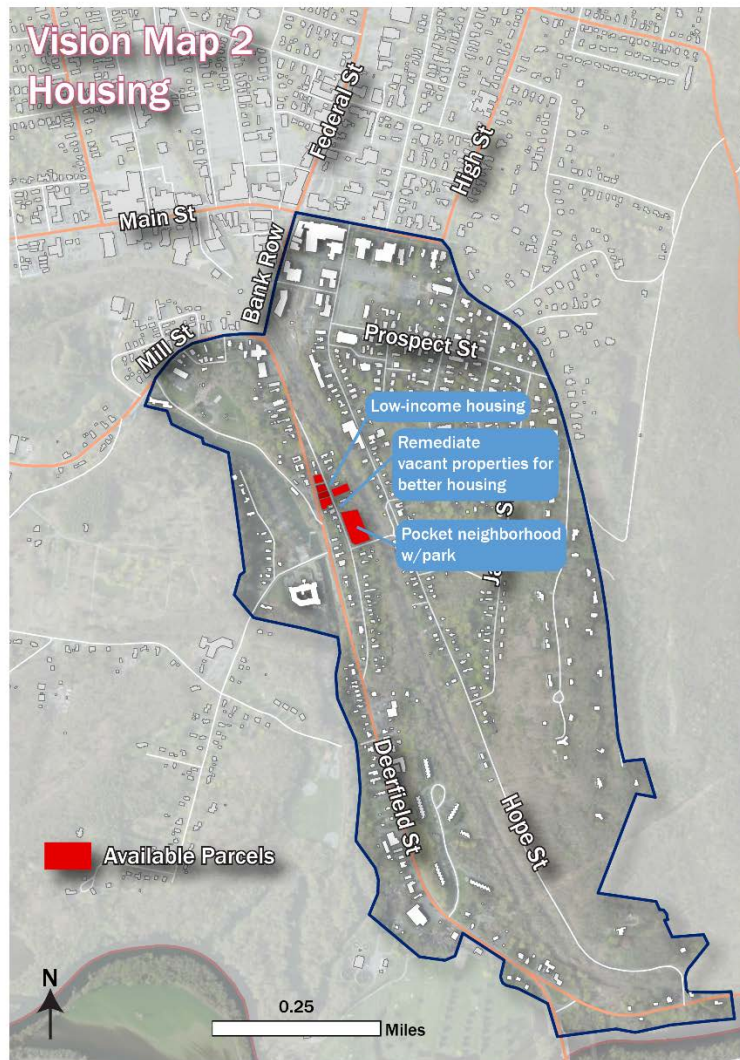
Figure 38. Housing map from vision mapping activity

Housing visioning was much more concentrated along the corridor, compared to the other two categories. Participants focused potential housing development in and around our client Identified vacant sites. In the largest of our parcels, at the intersection of Washington and Russel Street, participants envisioned another pocket neighborhood like Green River Commons. This potential development was identified alongside the presence of a park. Participants also identified that vacant parcels should be used to develop improved housing and low-income housing.

Figure 39. Commerce map from vision mapping activity
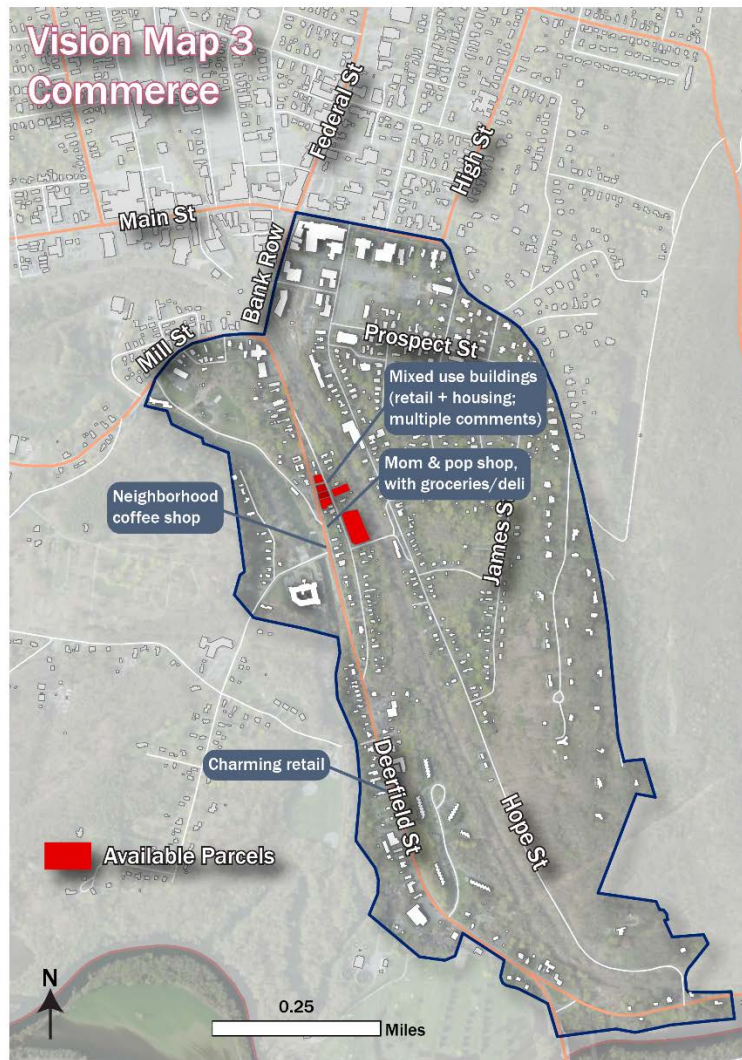
Similar to Vision Map 1, mixed-use development was also identified as a vision in commercial visioning. Participants identified the area of our vacant parcels as a desired location for mixed use development. Further south along the corridor, participants identified a want for more grocery or deli stores, as well as a neighborhood coffee shop within immediate walking distance of the Arbors. Even further along the corridor, participants envisioned a charming retail presence.

Figure 40. Parks map from vision mapping exercise

Visions for parks and green space were also well concentrated between two different locations. Participants identified the old golf course and the green river as two priority sites for park development. The golf course was identified as a potential site for a new full-sized park, with a dog park included in this area. The river was identified as a primary asset, with participants asking for a bike or pedestrian path for active recreation usage. This area was also identified as a potential site for a new community garden.
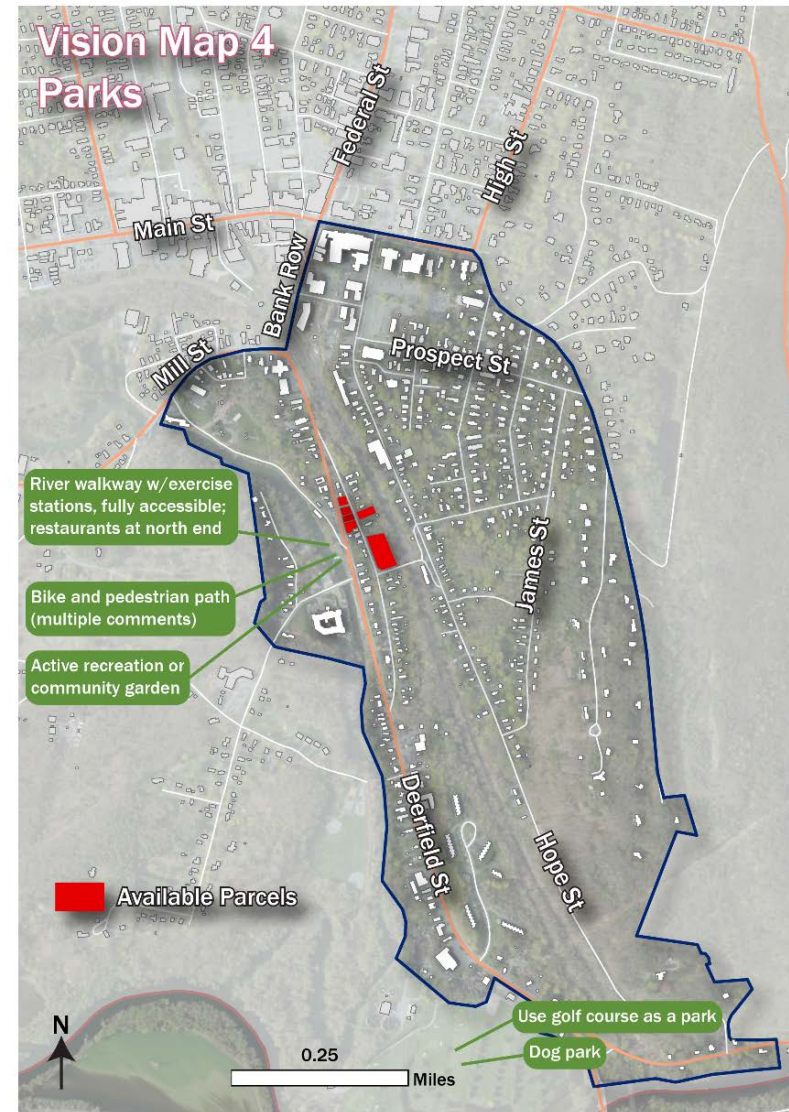
Figure 41. Traffic control map from vision mapping activity

When asked to envision traffic mitigation measures, participants identified two potential sites for RRFBs two potential sites for stop signs, and a general recommendation to slow traffic. The first site recommendation for RRFBs was located at the intersection of Deerfield Street and Washington Street. The second proposed location for RRFBs was at the base of the stairwell between our vacant parcels, across from green river liquors. These two sites were identified by participants as being the most heavily trafficked by crossing pedestrians and as such required the most effective traffic stopping measures. Further south of these sites were two recommended stop signs, at the entrance of the Arbors and the southern entrance to Washington Street.

Map 5
Traffic Control

Federal St
High St
Main St
Bank Row
Prospect St
Mill St
James St
Slow down traffic
Stop signs for constant traffic slowing
Deerfield St
Hope St

Comments located exactly as given in public workshop
Possible RRFBs
Available Parcels

N
0.25 Miles
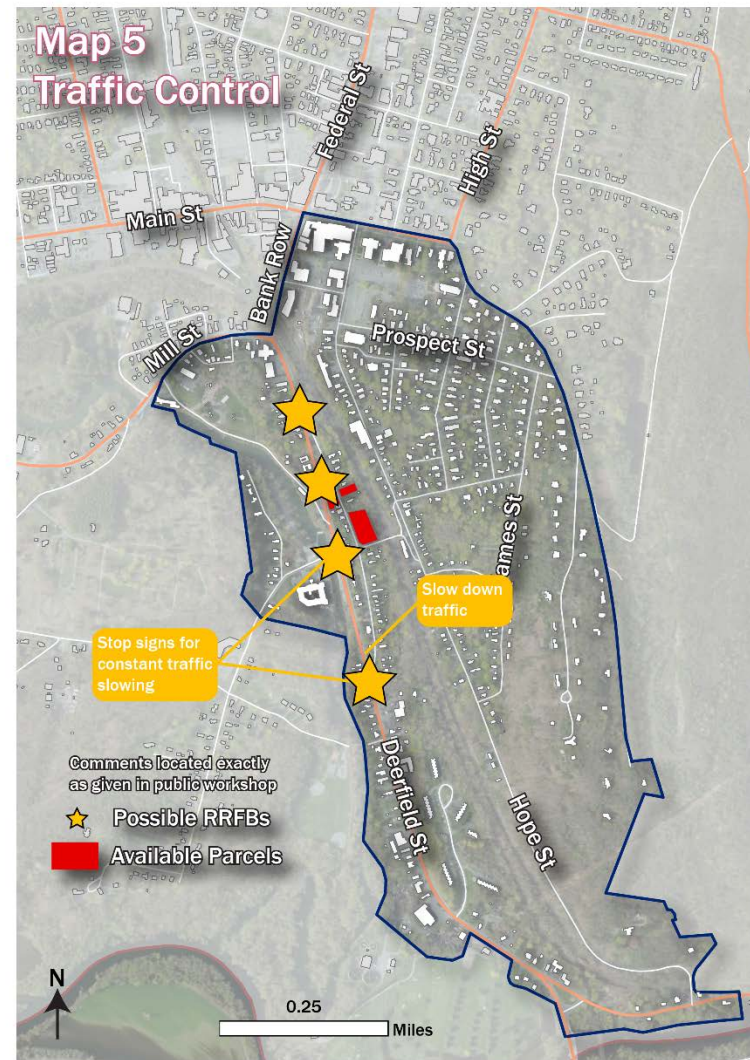
Figure 42. Other items from vision mapping activity

This map shows additional visioning comments that were not attached to a VPS category. Several comments were not directed towards specific locations and served as general comments on the neighborhood as a whole. These general comments are as follows: Increased number of trees, improve overall accessibility, neighborhood cleaning efforts (weeding and litter removal), landscaping for beautification, incentivizing rehabilitation across town and redevelopment of town owned parcels, incentivizing energy efficiency measures for homes and businesses, and street lights along Deerfield Street starting at the entrance to Bank Row. Additionally, there were three visioning comments made at specific sites within the study area. The first comment, moving north to south, was to consolidate Greenfield parking at the garage and consider redevelopment of public lots. The second vision was the installation of a traffic island at the southern intersection of Deerfield Street and Washington Street. The final vision was for a more beautified southern entrance at the Cheapside Street intersection.

Vision Map 6
Other Comments

Consolidate parking in garage; consider redevelopment of public & institutional surface parking lots

Incentivize rehabilitation everywhere, and redevelopment of city sites; use Phase 1 Assessment, free land, tax breaks, fill feasibility/cap

More trees

Fully accessible, walkable, bike-friendly neighborhood

Keep neighborhood clean (litter, weeds, etc.)

Landscape to beautify and screen businesses

Energy efficiency measures for homes and businesses

Street lights along Deerfield Street, from Deerfield entrance to Bank Row

Traffic island at southern end of Washington Street

Comments located exactly as given in public workshop, except for overall neighborhood comments

Available Parcels

Better-looking entrance to area

N

0.25 Miles

Vision Mapping Results Conclusion

The Vision Mapping exercise results showed us what the public would like to see on our specific vacant parcels, and what they would like to see along the Deerfield Street corridor in general. Participants would like to see a mixed-use street feel throughout the corridor, repurposed vacant property and low-income housing, recreation space to the West of Deerfield Street down to the vacant golf course, and a diversified stock of existing commercial businesses. Aside from the specified VPS categories, participants also noted a desire for beautification measures along the corridor and streetscape improvements.

Conclusion

The asset mapping activity demonstrated a clear appreciation of active and passive recreation opportunities in our Study area. This activity also demonstrated displeasure in the current walkability and infrastructure of the Study Area streetscape. Throughout our three public workshop methods, there was found to be an agreement on mixed-use development, more housing, parks, and the need to address traffic issues. Also, the challenges described in our client directive such as distressed housing, mix-use properties, and the use of our vacant parcels were discussed and commented on in our workshop by participants. Our VPS results highlighted the preference for mixed-use developments along the corridor, and the creation of recreation spaces along the river and on vacant properties. Our Vision Mapping activity also noted mixed-use development, a pedestrian walkway along the river and the desire for traffic control devices such as RRFBs.

The results of our public workshop methods will drive our recommendations for the City of Greenfield. Our Vision Plan includes neighborhood revitalization strategies and recommendations derived from the public workshop and literature review/precedent studies, and strategies and recommendations that address the five client-identified challenges: housing, priming the pump, flooding, land use mix, distressed properties.

Chapter 5: Literature Review

This chapter presents findings from an extensive review of academic literature and reporting from reputable planning and news organizations that relate to the five challenges of this project's Client Directive (a shortage of housing units; flooding from the Green River; proper use of publicly-owned vacant parcels; consideration of mixed-use properties in the neighborhood; and distressed housing properties) and important themes from GRP's public engagement process (development of new housing and commercial activity, streetscape improvements, and improved access for pedestrians and bicyclists). This review is divided into four main sections that condense these challenges and themes and explores how they might apply to the Deerfield Street neighborhood.

Section 1 addresses flood risks and management options; Section 2 discusses causes of high housing costs and potential methods for decreasing those costs; Section 3 explores challenges and opportunities for commercial revitalization; and Section 4 considers streetscape improvements, including better accessibility for walking and biking, beautification, and traffic safety under the umbrella of the complete streets concept. Although increasing park spaces and recreation in the neighborhood was also an important theme within GRP's public workshop, parks have not been included as a section in this review because the City of Greenfield has already embarked on developing the main recreational asset that workshop participants desired – a riverside pedestrian pathway – and much of the other public comments concerned improving access to existing parks, like Green River Park and Energy Park, which is addressed by Section 4: Streetscapes.

Understanding these issues in greater depth can provide guidance for the City's investment in the Deerfield Street neighborhood, as the Greenfield community considers this report as an initial neighborhood vision plan. Therefore, this literature review helps ensure that the recommendations of this report are grounded in evidence and careful study. Collectively, these sections will provide a comprehensive overview of the issues and opportunities underpinning potential development in the Deerfield Street neighborhood.

Section 1: Flooding

Flooding is an essential aspect of planning within the Deerfield Street neighborhood, given the role of the Green River in causing past flood events (such as the historic 1936 flood, when floodwaters rose to the second stories of homes on Deerfield Street, and Tropical Storm Irene in 2011) and projections for increased flooding in the Northeast US as climate change progresses (US Global Change Research Program, 2018). Floods are known as one of the most common and costly hazards (Birkland, Burby, Conrad, Cortner, & Michener, 2003), and have the potential to damage or destroy the building stock of an entire area; therefore, as the City of Greenfield is making decisions on land-use and investments in housing or commercial uses in the Deerfield Street neighborhood, it is prudent to consider the risks of flooding and the options available for flood management. It is worth noting that assessing flood risk is a difficult and complex process, and requires expert involvement; thus, this section reviews general flooding information only, and does not provide precise details on geographic extent or severity of flood risks.

In this section, Pryce and Chen (2011) provide an overview of how increased flooding may impact housing. Liu, Hertel, Diffenbaugh, Delgado, and Ashfaq (2015) discuss the role of

increased urban development on increasing potential for flood damage. Birkland et al. (2003) discuss the failures of traditional approaches to flood management and suggest alternatives. Cheng, Yang, Ryan, Yu, and Brabec (2016) examine the effectiveness of one such alternative, a natural landscape used to store floodwater. Lastly, Lopéz-Marrero and Tschakert (2011) use a case study to explore a community-based process for decision-making regarding flood management options. This collection of literature collectively illustrates the risks of flooding to development, the benefits and drawbacks of various management decisions, and a potential pathway for flood planning in the Deerfield Street neighborhood.

Although it is impossible to say exactly when or how badly flooding will affect an area, it is certain that flooding will pose risks to existing development. To explain some of the possible effects of flooding, Pryce and Chen (2011) discuss the likely specific impacts of increased flooding due to climate change on the housing market. Future increases to the severity and frequency of flooding are projected even if immediate action is taken to reduce the magnitude of climate change, meaning the number of properties at risk of flooding will inevitably increase. Pryce and Chen note that increased flooding will likely drop prices of homes in flood-prone areas and raise home prices in safer areas, effectively sorting low-income households into riskier locations. Drops in value diminish a principal means of wealth-building for many homeowners. Additionally, homes located in the federally-defined floodplain (areas determined to have a 1% chance of flooding in any given year) are required by US law to purchase flood insurance, but heavy insurance subsidies mask the true cost of living in the floodplain. However, increases in flood severity may prompt large increases in insurance premiums,

raising housing costs. Lastly, severe and repeated flooding may prompt home abandonment and migration away from unsafe areas, reducing housing supply and increasing demand for housing in lower-risk zones, which will also likely increase housing costs. Pryce and Chen argue that each of these risks can destabilize the housing market which may then disrupt the broader economy, as seen in the 2008 Great Recession (Schwartz, 2015).

Pryce and Chen's (2011) findings agree with other literature regarding increasing flood risks to homes and property, presented below (Liu et al., 2015; Birkland et al., 2003). The potential impacts of reduced supply and increased demand for housing suggest that Greenfield proactively plan for increasing the stock of housing in low-risk areas to avoid drops in housing supply after flood damages, especially given the already-low vacancy rate (roughly 4%; see the Demographics section of Chapter 1) in the census tract surrounding the Deerfield Street neighborhood.

Building on Pryce and Chen's (2011) findings of flood risks to housing, Liu et al. (2015) explore the role of non-climatic factors, like economic growth through increased building development, in determining increases in property damage from flooding. Using the US state of Indiana as a case study, Liu et al. determine the historic relationship between economic growth and flooding property damage in Indiana counties from 1995-2012 and extrapolate that relationship outwards to 2030, incorporating climate projections for future flooding increases. The study determined that increased development had a greater effect on the magnitude of annual property damages than increases in flood severity itself, and estimated that projected development may increase annual property damages by roughly 13-17% by

2030. Half of that increase was determined to be caused by projected growth in housing units.

Echoing the discussion by Pryce and Chen (2011), Liu et al.'s (2016) findings suggest that, despite the initial economic return from new development, allowing that development to locate in flood-prone areas will cause costs of damage to rise (in addition to the obvious risks to human health and wellbeing). Thus, prioritizing growth in the Deerfield Street neighborhood outside of risky areas may be a wiser long-term strategy.

Directing growth away from the floodplain may, in fact, be the only reliable means of reducing flood risk and damage. Birkland et al. (2003) discuss the past failures of traditional infrastructure (flood walls, dams, levees, etc.) and flood insurance to effectively reduce flood risk. Most notably, the US Army Corps of Engineers (USACE, the federal agency responsible for construction and management of most of the flood protection infrastructure in the US) has prioritized the use of flood walls, dams, and channels to control routine flooding throughout the 20th century, despite mounting evidence that these techniques lead to greater extremes in flood heights, fail repeatedly during extreme floods, worsen flood damages for communities downstream from protective infrastructure, and have overall been unsuccessful at reducing the dollar amounts of flood damage nationwide over time.

Birkland et al. (2003) claim that the combination of this infrastructural approach with federal subsidies for flood insurance (which is legally bound to offer insurance for floodplain properties) has created a false sense of security for landowners near protective infrastructure that's often considered infallible and has incentivized development in risky areas given the certainty of receiving insurance payouts after flood damage. Even for communities with land-use prohibitions on floodplain development (such as Greenfield), changes to land-use along waterways and the severity of flooding over time can result in areas outside federally-recognized floodplains being subject to the flood risks, but lacking insurance or protection. In place of these strategies, Birkland et al. recommend land-use practices that direct development to low-risk areas over time as the only method that reduces exposure to flood risk, accompanied by flood management strategies that restore natural edges to waterways and using available adjacent landscapes for floodwater storage, thus reducing flood severity, damage, and costs.

Birkland et al.'s findings complement Pryce and Chen's (2011) and Liu et al.'s (2016) discussions of flood risks to housing and development, and the wisdom of long-term strategies to promote development and growth in low-risk areas. However, Birkland et al. recognize that in areas with existing development, flood protection infrastructure may be necessary before difficult, costly, and politically unpopular relocation out of floodplains can take place. This may be true in Greenfield, where homes and businesses have long existed along the Green River despite its flood risk and residents may not be willing to leave an area they feel attached to. Bearing this tension in mind, it is notable that the USACE has recently adopted "nature-based strategies[1]" (NBS) to accompany traditional infrastructure for managing flood risk; NBS refers to solutions that use or imitate natural processes, like restoring a river's original banks rather than building a concrete levee (US Army Corps of Engineers, 2013).

Examining a specific instance of a nature-based solution, Cheng et al. (2016) explore the effectiveness of using undeveloped land for safely storing and absorbing floodwater. Cheng et al.

investigate an area just outside Boston, MA known as the Charles River Natural Valley Storage (NVS), a landscape of forest and wetlands of 3200 hectares (just over 12 square miles, or nearly 8,000 acres). This area has been preserved since the 1970s by the USACE for flood control purposes, reducing the severity of flooding in the nearby developed urban areas. Modelling the capacity of this landscape to absorb the projected increases in flood volumes due to climate change, the study determined that, although the NVS does not capture 100% of nearby floodwater, the landscape could completely offset future flood increases and retain as much floodwater as it does now if it were roughly doubled in size (an increase of roughly 3,900 hectares (15 square miles, or 9,600 acres).

This result demonstrates the capacity of natural landscapes to absorb flooding, but also reveals the great quantities of land that might be necessary to reduce risk to nearby developed areas. Cheng et al. stress that land-use adjustments must be made in urbanized areas themselves, which would convert paved surfaces that do not absorb water to "pervious" surfaces that allow water to be absorbed into the ground. These techniques are often known as low-impact development (LID), and other researchers have also discussed the necessity and effectiveness of LID to accompany landscape-scale flood storage approaches like the NVS. For example, Bhandari, Jobe, Thakur, Kalra, and Ahmad (2018) modelled use of LID in Ellicott City, Maryland and estimated that it reduced modelled flood volumes by up to 7.5%.

Clearly, multiple options for managing flooding exist, and each carry different political, economic, and environmental challenges (e.g., protecting existing communities vs. relocating to safer ground, and balancing preservation of natural landscapes with needs for new development). To address this complexity Lopéz-

Marrero and Tschakert (2011) suggest developing a diverse set of flood management options through a community engagement process, especially considering uncertain flood risks and varying stakeholder needs. Lopéz-Marrero and Tschakert conducted hazard planning with flood-prone coastal communities in Puerto Rico, including multi-stakeholder meetings between residents and emergency managers that used engagement tools like participatory mapping of flood risk areas and ranking of strategies to reduce flood impacts. Strategy ranking by residents and managers highlighted the abovementioned tension between infrastructural flood solutions like levees (costly but seen as effective by residents) and non-infrastructural solutions like preparedness planning or changing development patterns (seen as effective by managers but, for the latter, resisted by residents), and underscored the inherent uncertainty regarding which solutions will be most effective. Lopéz-Marrero and Tschakert noted that moving past this potential conflict of interest and ambiguity required continued collaboration between at-risk communities and emergency managers, and eventually the development of multiple possible solutions that could accommodate resident perceptions of infrastructural solutions and managerial emphases on cost-effective flood management (e.g., consideration of new levees alongside creation of local emergency preparedness plans).

Lopéz-Marrero and Tschakert's (2011) case study of Puerto Rico focused on a markedly different cultural and development context than Greenfield. However, their study examines the experience of communities considering various paths for flood management, a process Greenfield has already begun. Furthermore, the community-based climate planning process examined by Lopéz-Marrero and Tschakert is similar in nature to

the recent Massachusetts state Municipal Vulnerability Preparedness Program, which funds cities and towns to undergo community-wide visioning processes for climate change impacts, including flood risks (see Mass.gov, 2018). Thus, the Puerto Rico case study relates well to understanding a possible planning process for flooding in Greenfield which acknowledges increasing flood risks, the costs and benefits of various flood management techniques, and the essential role of wide stakeholder involvement in decision-making. A Massachusetts-specific example of this process available to Greenfield is presented in the flooding section of Chapter 7: Recommendations.

In summary, Pryce and Chen (2011) documented the potential impacts of flooding on housing markets, reinforcing the need for Greenfield to pursue new housing supply in safe areas to offset potential lost housing or dips in value for homes in flood-prone areas. Liu et al. (2015) discuss the increasing flood damages that can be expected from expanding development in floodplains, further supporting a strategy to direct growth toward safer parts of Greenfield. Birkland et al. (2003) explain the issues stemming from overreliance on traditional flood protection infrastructure and flood insurance, suggesting that Greenfield be cautious about using these strategies as they do not necessarily reduce the number of people or structures at risk from flooding. Cheng et al. (2016) explore the use of natural landscapes to absorb floodwaters, providing a precedent for use of the open land south and west of the Green River for capturing floodwater in Greenfield. Lastly, Lopéz-Marrero and Tschakert (2011) discuss a community-based planning method for addressing multiple flood management options, which could potentially be applied in Greenfield as the community considers development in the

Deerfield Street neighborhood. Together, these articles point out that although the flood risk in the area is an unavoidable reality, thoughtful planning and investment decisions can still balance growth with safety.

Section 2: Housing

Although flooding from the Green River may affect exactly which areas within the Deerfield Street neighborhood will be ideal for development over the long-term, expanding housing supply remains necessary to help reduce housing costs, as discussed by the Greenfield Housing Study (FRCOG, 2014; see Chapter 6: Precedent Studies). This section will explore the challenges and opportunities facing the expansion of new, high-quality housing for multiple income levels. This section is divided into two broad theme areas: a) the factors behind high housing costs, and b) solutions to lower housing costs.

In the first theme area, Doughtery (2017) explains the role of traditional housing preferences in limiting housing supply, while Desmond and Bell (2015) address the effects of zoning and changes in federal funding for housing programs on housing low-income populations. In the second theme area, Aurand (2010) examines the effects of housing density, housing type, and mixed land-use on housing availability, especially for low-income households. Gabbe (2015) explore the trends and potential for smaller-than-average apartments to add cheaper units to a city's housing supply. Spivak (2018, 2017) reveals the possibilities of new parking and sustainability standards to further reduce housing costs. Lastly, Saegert and Benitez (2005) discuss limited equity housing cooperatives as a means of decreasing costs of homeownership.

Collectively, these peer-reviewed literature and published news items reveal that, while historical obstacles work against expanding housing supply and reducing costs, new techniques in zoning, housing types and standards, and home finance show promise for overcoming barriers to achieving lower housing costs.

Factors behind High Housing Costs

Doughtery (2018) examines housing in California as a microcosm of one of the main issues obstructing increased housing supply in the United States: the unwillingness of local governments and homeowners in low-density neighborhoods of mostly single-family homes to approve denser, lower-cost multifamily housing, even if it conforms to local zoning regulations. Neighborhoods where single-family homes comprise 90% or more of existing housing stock occupy around half of the land area in many cities across the US, making these neighborhoods high priorities to densify housing.

However, even though multifamily units could greatly increase housing supply and decrease costs, proposals to build new multifamily units – even smaller units, like duplexes or small apartment buildings – often face fierce opposition from neighbors who fear drops in property values and neighborhood character, even if they abide by local height or size restrictions. To address the problem in California, Doughtery (2018) notes that state legislation was introduced to increase housing subsidies, speed housing project approval processes for cities that have not met state housing quantity goals, and allow the state to sue cities deemed most resistant to approving new housing development.

Although state action may be a key step to increase housing supply, Desmond and Bell (2015) note that local zoning and federal funding for housing also compound high housing costs. Zoning practices in residential neighborhoods, such as requiring special permits for multifamily housing, and having large minimum lot sizes, maximum allowable densities, large setbacks, and height and size restrictions can all effectively reduce the amount of land available for building and block multifamily developments, limiting potential for increased housing supply (see also Glaeser & Gyourko, 2003). These practices disproportionately impact low-income households, who would benefit most from the lower housing costs created by a larger housing supply. Additionally, Desmond and Bell find that there is no consensus on the effectiveness of federal housing vouchers (subsidies which low-income families use to pay for to private housing instead of occupying publicly-owned housing) for reducing housing costs among low-income households. Thus, even programs meant to lower costs and enable greater access to the existing housing supply (let alone programs to build new housing) may not be accomplishing their goal.

Dougherty (2018) and Desmond and Bell (2015) reveal several main factors behind the high costs of housing: cultural resistance to greater density, which is enshrined in zoning practice and ineffectively addressed by the main federal program intended to support increased access to existing housing. These findings apply readily to the Deerfield Street neighborhood: according to a housing study of Greenfield by the Franklin Regional Council of Governments, the regional planning organization for the county surrounding Greenfield, over half of the city's housing stock is composed of detached single-family homes (FRCOG, 2014), meaning much of the city's residential neighborhoods could potentially be densified over time. Some densification may be supported by Greenfield residents, as the data on visual

preferences for housing from GRP's public workshop suggests that participants held positive feelings towards pocket neighborhoods (small clusters of homes of small sizes) and small multifamily apartment buildings (2-4 units) that resembled single-family homes in appearance (see Chapter 4: Public Engagement). Pocket neighborhoods are already allowed in Greenfield's RA district as open space/cluster developments, providing an existing means of denser development.

However, the zoning district encompassing Deerfield Street (General Commercial, or GC) only allows residential uses by special permit from the Zoning Board of Appeals, meaning that proposals for new homes must go through a discretionary review process, slowing down development. The adjacent district (Urban Residential, or RA) which encompasses the area from Hope Street east to the edge of the study area, allows one- and two-family homes by right, but multifamily proposals must also go through the special permit process. The special permit process may present an obstacle to increased housing development, if it prevents developers from moving through the approval process in a timely manner. Therefore, the recommendations presented in Chapter 7 address amending these approval processes to make housing development easier.

Solutions to Lower Housing Costs

There are also other solutions that may facilitate expansion of the housing supply. For example, Aurand (2010) investigates whether greater density of housing units, variety of housing types, and mixed land-use can create increase the availability of units for very low-income populations (those making less than 50% of the area median income, or AMI). Also comparing the role of urban growth boundaries (restrictions to development outside city limits), Aurand examines census tracts in the metropolitan

regions of Portland, OR (which has a growth boundary) and Seattle, WA over a 20-year period, using three regression analyses to measure the relationship between the predicting variables of density of housing units, variety of housing type, and mixed land-use and the response variable of the number of units affordable to very low-income households (where 'affordable' means costing less than 30% of income). Aurand reports that: a) neighborhoods with greater housing density, variety of housing types, and mixed land-use do have greater numbers of units with reasonable costs for very low-income households, but also have a greater number of units beyond reach for very low-income households; and b) that urban growth boundaries did not affect the relationship between the three independent variables and the number of units available to very low-income households.

Aurand (2010) thus supports the potential for increased housing density, variety of housing type, and mixed land-use to increase affordability for low-income households. This finding directly relates to our client's goals of developing more housing of non-traditional types and examining mixed use buildings in our study area. Therefore, Aurand's findings provide evidence that adding more housing units close to downtown centers with commercial land-uses may help Greenfield increase housing supply, lowering costs in general and for very low-income households.

To supplement this finding, Gabbe (2015) examines new housing types that may contribute to increasing local housing supplies by fitting more units onto the same amount of land. The needs of younger adults and seniors who value proximity to urban amenities and services and do not have children at home and thus require less space have led to a demand for "micro-units," smaller-than-studio apartments as small as 250-350 square feet. Gabbe notes that these units carry lower rents or ownership costs

and use available land more efficiently than larger units, expanding housing supply and providing a viable entry into the housing market for lower-income households.

However, zoning restrictions can limit implementation of micro-units. Gabbe (2015) explores whether minimum size requirements on housing units obstruct development solutions for increasing housing supply, specifically micro-apartments, using San Francisco as a case study. Gabbe analyzes the city's planning code for various potential regulatory barriers to greater housing supply, including parking standards, open space requirements, and inclusionary zoning. In his study, Gabbe compares two hypothetical apartment buildings: one with micro-units (apartments of a much smaller size than average) and one with "conventional" units (apartments of an average size) to compare the possible effects of regulation. Echoing Desmond and Bell (2015), Gabbe determines that minimum size requirements prevent development of micro-apartments directly, but that requirements for parking, open space, and inclusionary zoning can also present obstacles to building micro-apartments. For example, several residential zones in San Francisco require 1 parking space per unit, meaning that micro-unit apartment buildings would have to build an unreasonable number of parking spaces, given that they create more units than an apartment building with average-sized apartments. Similarly, San Francisco requires 36 square feet of private open space per unit in high-density zones; thus, micro-unit apartment buildings must pay for the cost of building nearly twice as much open space as a conventional development. Gabbe recommends that cities review their codes to eliminate these barriers or cost multipliers for building micro-apartments, as these units could otherwise effectively increase housing supply and lower housing costs.

Expanding on the issue of parking requirements, Spivak (2018) discusses the trend among US cities and towns in reducing or eliminating minimum parking requirements for residential development. Spivak uses Minneapolis's recent "slashing" of multifamily parking requirements as an example, explaining how the city has experienced lower market-rate rents as a result of lowered construction costs. Spivak explains that the three primary factors driving this new reform are: the underutilization of excessive parking space, the shift in preferences away from cars, and the expected decrease in needed car space as urban residents rely more on ridesharing services (like Uber or Lyft) and autonomous vehicles. Additionally, Spivak identifies the magnitude of increased costs of excessive parking on housing construction and rental costs; as a single parking space can cost $5,000 to $35,000 to build, parking can add up to 17% to a unit's monthly rent. In conclusion, Spivak suggests that planners be "open to adjusting parking policies in zoning codes and comprehensive plans and, second, to be flexible in crafting new parking limits depending on the location or desired outcome, such as spurring affordable housing development".

Spivak (2017) emphasizes the success and emergence of eliminating parking minimums as a strategy in producing more "affordable" housing. The client-directed study area is within walking distance of Greenfield's downtown, which may deter auto use by residents who frequently visit this area. Less auto use may provide incentive for developers to include less parking and more units. Currently, the City's parking regulations require two parking spaces per dwelling unit and a minimum of two off-street parking spaces for Accessory Dwelling Units (ADUs), for use by the owner-occupants and tenants. In the General Commercial zone where the study sites are located, mixed use buildings

require two off-street parking spaces for each residential unit. These requirements may be excessive, but can be reduced through a special permit by the Board of Appeals in cases where there is "use of a common parking lot for separate uses having peak demands occurring at different times; age or other characteristics of occupants which reduce their auto usage; peculiarities of the use which make usual measures of demand invalid; proximity to and availability of municipal parking facilities providing overnight parking." Eliminating these parking minimums and the need for a special permit may incentivize housing development by lowering construction costs.

In a similar vein to reducing parking requirements, new sustainability standards also have the potential to lower housing costs. Spivak (2018) discusses Passive Houses, a sustainable building standard that relies on passive thermal heating and cooling. The Passive House standard is popular in Europe and has been on the rise recently in the United States, providing an alternative to traditional construction which uses mechanical systems to actively provide constant supplies of heat and air conditioning. Passive House construction prioritizes "enclosure," which means thicker windows, extra insulation, and exterior air sealing. Over the last decade, the construction of Passive Houses in the United States has increased from just a few one-family residences to hundreds of projects currently in the development pipeline. The standard is attractive to low-income housing developers because heating and cooling costs are very low, creating savings over time, and construction costs are comparable to traditional construction.

Spivak uses Elm Place, a newly constructed Vermont single room occupancy senior housing development, to illustrate how effective Passive House design can be for large multifamily housing projects. Elm Place is an example of cost- and energy-efficient multifamily housing. The three-story building, which contains 30 one-bedroom units, is projected to use just 20 percent of the power for utilities that a traditional building of comparable size would, and the heating bill for the entire building is expected to be the same amount as one of the towns older single-family homes. Thus, use of the Passive House standard has the potential to significantly increase efficiency and decrease housing costs for multifamily homes, reducing another barrier to their construction.

Lastly, alternative methods of financing homeownership may supplement changes to the zoning and building practices discussed above, further decreasing housing costs. Specifically, Saegert and Benitez (2005) examine research on limited equity housing cooperatives (LECs) and their potential niche in the United States housing market, along with their policy implications and development opportunities. LECs are characterized by collective ownership and limitations on share prices, in which members often collectively own the building and restrict the resale values of shares to keep them affordable. Saegert and Benitez analyze eleven U.S and Canadian studies and find that LECs provide high quality, safe, housing for low income families; contribute to stable, economically, and ethnically diverse neighborhoods; can fulfill economic and social needs more successfully than rental housing (especially for groups that present special needs or in regions where housing is expensive or distressed); offer stable housing costs in "hot" real estate markets and resistance to default in town markets while requiring similar or lower subsidies than other comparable rental housing; and they mirror most benefits of market-rate home ownership,

although LECs provide less opportunity for asset accumulation through home equity.

While LECs do not encourage asset accumulation (e.g. increase in financial assets held through earnings, savings and investment returns), other literature has noted the financial gain through income increases during LEC resident tenure. As residents' income increases, they will have added disposable income that may be used to build a savings net in place of what would be equity appreciation (Lawton, 2015). Thus, LECs provide a promising avenue to long-term home security at lower cost.

Conclusion to Section 2: Housing

In summary, Doughtery (2018) and Desmond and Bell (2015) show how historical zoning practices and preferences for low-density single-family neighborhoods have restricted current housing supply and kept costs high. However, several methods may be effective to develop new housing and reduce costs in Greenfield. Aurand (2010) demonstrates that increasing the density and type variety of housing near commercial land-uses can create a greater number of units for low-income households. Gabbe (2015) explores micro-units as a new housing type and finds that they can provide low-cost options for young adults and seniors. Spivak (2017; 2018) determines that new standards to reduce parking requirements and increase energy efficiency can also reduce housing costs, especially for multifamily developments. Lastly, Saegert and Benitez (2005) determine that limited-equity housing cooperatives can provide a stable means of low-cost homeownership. Collectively, these solutions offer a well-rounded set of opportunities to consider for reducing the costs of housing in Greenfield, satisfying a key component of GRP's client directive and public engagement process. This

literature will tie directly into the housing recommendations made in Chapter 7.

Section 3: Commercial Development

Accompanying housing as a critical piece of neighborhood revitalization visioning in GRP's public workshop is commercial development. The Deerfield Street neighborhood already has clusters of thriving antique stores, furniture stores, and automobile repair shops, especially in the southern portion of Deerfield Street; however, several businesses in the northern portion of the neighborhood are isolated from other commercial development or have recently closed. Participants in GRP's workshop indicated desires for new mixed-use commercial and residential development, and specific retail establishments, such as grocery stores, restaurants, and cafes along Deerfield Street or the Green River. This section provides an exploration of issues relating to this kind of development. Sutton (2010) explores the role of local business owners in stimulating broad neighborhood revitalization. Pothukuchi (2005) explores specific challenges and techniques to attract grocery stores back to urban areas. Freemark (2017) relates the difficulties of incorporating subsidized low-income housing into mixed-use developments. Lastly, Hughen and Read (2016) discuss the potential for form-based zoning, defined below, to incentivize private mixed-use developments. Together, these articles clarify that the kind of commercial development workshop participants envisioned can be achieved through creative planning, financing, and stakeholder involvement.

As an example of stakeholder involvement, Sutton (2010) details local business owners can spur overall neighborhood redevelopment. Sutton focuses on the Fort Greene neighborhood of Brooklyn, which, despite the vastly different

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context between New York City and Greenfield, has similar characteristics to the Deerfield Street neighborhood. Prior to the 1960s, Fort Greene was a mixed-income neighborhood home to a high proportion of laborers who worked in nearby advanced manufacturing facilities; closure of these facilities in the 1960s, along with the advent of suburbanization and urban disinvestment led to perception of the neighborhood as a poor, dangerous area of town. The Deerfield Street neighborhood was affected by similar forces after the closure of the local Tap and Die Corporation, an advanced manufacturing center which had employed many neighborhood residents. Sutton examines the role of local business owners in revitalizing the Fort Greene neighborhood, surveying owners who arrived between 1980-1999 and investigating the role of the merchant association these owners formed. Sutton concludes that, in the absence of wider city investment, these business owners and their Merchant's Association stimulated local private investment by reoccupying vacant storefronts and encouraging other business owners to do so; improving visual appearances by creating new displays, lighting, and street decoration, and funding beautification efforts; created access to missing services and goods, such as grocery stores and restaurants; added to neighborhood safety by monitoring sidewalk activity; and created a cultural identity for the area through community events, branding, and participating in neighborhood planning and visioning. These achievements strongly match the goals of the Deerfield Street Initiative, and many were explicitly mentioned in the public workshop as desires for the neighborhood.

Sutton's (2010) work fits into a broader narrative of the role of local businesses as community institutions, which provide services and goods but also improve relationships, neighborhood cohesion, and activation of public space that can help transform neighborhood perceptions (Simon, 2006; Sanchez-Jankowski, 2008). Thus, Sutton's findings highlight the role local business owners can play in re-investing in the Deerfield Street neighborhood. The involvement of key business entities in the Deerfield Street Initiative thus far, including the owner of Green River Liquors, a local realtor, and the former coordinator for the Greenfield Business Association, signals initial positive engagement from the business community.

Integrating new businesses into a neighborhood can be challenging, however. As an example, Pothukuchi (2005) discusses the difficulty of attracting grocery stores to urban neighborhoods (desire for a neighborhood grocery was consistently mentioned in GRP's public workshop). Following the advent of suburbanization, many grocery stores and supermarkets relocated to suburban areas for perceived higher spending ability of suburban residents, and the greater availability of land for larger stores and more parking, easier access to highways, and convenient truck loading facilities. As a result, Pothukuchi notes that urban residents (especially low-income residents) tend to spend more time traveling to grocery stores or pay more for groceries at urban convenience stores. The lack of groceries also reduces job opportunities and dollars spent in the local economy. However, Pothukuchi documents a change in the possibilities of the urban market, as urban markets have less competition for grocery stores; buying power is more densely concentrated in urban neighborhoods than suburban areas; and urban residents spend more of household income on retail items. Therefore, urban groceries represent strong possibilities for new retail. Pothukuchi also claims that, despite the rarity of local governmental initiatives to attract groceries, active planning –

including market demand studies, identification of sites and assistance programs for business establishment, and incorporation of groceries as a key element of economic development – can increase the likelihood of a grocery store locating in urban neighborhoods.

Pothukuchi's (2005) findings of the potential for urban groceries and supermarkets have been borne out by greater re-entry of groceries into low-income neighborhoods; however, this has brought about the potential for high-end chains to prompt higher-income residents to follow into lower-rent areas, spurring gentrification (Anguelovski, 2015). Therefore, when seeking commercial revitalization that supports the existing residents of a lower-income neighborhood like the Deerfield Street area, especially through specifically requested developments like grocery stores, it seems preferable to encourage local ownership of smaller-scale groceries of the kind discussed by Sutton (2010) instead of corporately-owned, non-local chain stores.

Developing new commercial uses in the form of mixed-use buildings, where housing exists above retail, can also pose difficulties – especially if subsidized low-income housing is desired. Freemark (2017) explores the phenomenon of mixed-use developments that use Low-Income Housing Tax Credits (LIHTCs), stated as the most commonly-used federal "affordable" housing subsidy, using Chicago as a case study. Freemark finds that, despite official support for mixed-use low-income developments among government officials and developers, completing mixed-use projects is difficult due to a lack of expertise on retail among low-income housing developers, retail development requiring a complicated mix of funding sources, and potential design conflicts between retail and residential uses, such as the placement of elevators to satisfy

accessibility requirements for residences. As a result, only 6% of buildings funded with LIHTCs in Chicago incorporated retail on the first floor; 29% of these first-floor retail establishments were chain-owned, and 12% were vacant. However, Freemark notes that other subsidy programs, such as the federal Choice Neighborhoods program, have a greater ability to support retail development, and may be a better option for mixed-use developments that incorporate low-income housing.

Freemark (2017) fills a notable gap in the literature regarding study of combined mixed-use buildings with low-income housing developments, as very little research has been performed thus far on these housing projects. Although projects with mixed-use, low-income housing were also mentioned as a desirable development in GRP's public workshop, Freeman's findings clarify the difficulty in funding and constructing these developments, and suggest that market-rate housing may be easier to achieve above retail uses, given the lower regulatory burden.

In this vein, Hughen and Read (2016) offer form-based zoning (also known as 'form-based code') as a potential solution for facilitating new mixed-use developments. An alternative to traditional zoning (which regulates development based on what land may be used for, though design standards may be used to regulate architectural appearance), form-based zoning regulates development purely according to its physical design, after a community undergoes a collective decision-making process for what its built environment should look like. As Hughen and Read note, form-based zoning allows developers to maintain flexibility in determining a market-driven mix of residential and commercial spaces for their properties. This flexibility increases value, as it allows developers to convert uses within properties back and

forth between residential and commercial without undergoing lengthy and uncertain permitting processes, as long as the physical form of the building adheres to the form-based zoning. Hughen and Reed use a 'real option' model, which determines the economic value of that flexibility, to test the potential increases in value of form-based zoning and determine that it can provide enough additional value to properties to encourage new development in areas with lower property values.

Hughen and Read's (2016) work supports other literature describing the benefits of form-based zoning, which are supposed to include greater predictability of the aesthetic quality of new development, greater certainty of development approval for new projects, and reduced barriers to creative mixed-use developments formerly prohibited by traditional zoning (Talen, 2013). Thus, Hughen and Read's (2016) findings support the use of creative planning tools like form-based zoning to stimulate new commercial activity, representing a potential avenue for the City of Greenfield to consider when considering how to spur greater private investment in the Deerfield Street neighborhood.

In conclusion, Sutton (2010) provides an example of the essential role of local business owners in seeking broad neighborhood transformation. Pothukuchi (2005) and Freemark (2017) demonstrate the challenges specifically associated with grocery and mixed-use buildings with low-income housing. Lastly, Hughen and Read (2016) discuss a potential alternative to make mixed-use commercial development more feasible for developers. Considered together, these works shed light on the difficulties and opportunities for commercial revitalization in the Deerfield Street neighborhood.

Section 4: Streetscapes

Expanding access to housing and spurring new commercial development are key goals for overall neighborhood revitalization. However, to multiply the effects of investment into housing and retail, the neighborhood's streetscapes should also receive aesthetic attention and investment. Streetscape upgrades can make a neighborhood safer from traffic accidents; more accessible and pleasant for use by pedestrians, bicyclists, and people with reduced mobility; and can add landscaping that promotes positive human health outcomes. This section will address each of these issues under the umbrella of the 'complete streets' concept.

It is essential to note that Greenfield has already adopted a citywide Complete Streets policy and a Complete Streets Prioritization Plan, which demonstrates the City's existing commitment to streetscapes. This section is therefore included due to the prevalence of streetscape-related comments in the public workshop (see Chapter 4: Public Engagement). In this section, LaPlante and McCann (2008) explain the concept of complete streets and its role in traffic engineering. Brown et al. (2016) examine the effect of a complete streets intervention on the prevalence of walking and bicycling in Salt Lake City, Utah. de Vries, van Dillen, Groenewegen, and Spreeuwenberg (2013) tie the impact of street landscaping to improved health outcomes. Lastly, Yu, Xu, Towne, and Iman (2018) relate the economic benefits of complete street designs on the local housing market. These articles demonstrate the multiple benefits of a complete streets in supporting overall neighborhood revitalization.

Complete streets, as LaPlante and McCann (2008) explain, refers to streets that are designed to meet the needs of all transportation modes: automobiles, bicyclists, and pedestrians of all abilities.

This concept represents a major shift in transportation planning and engineering, which traditionally has prioritized the needs of automobiles over other modes, resulting in streets – especially arterial roads like Deerfield Street, which are designed to keep high volumes of traffic moving quickly through an area – that may lack safe or pleasant sidewalks or bike lanes.

LaPlante and McCann note that a complete streets approach includes the needs of all transportation modes from the beginning to the end of the design and planning process. Complete streets techniques mentioned focus primarily on slowing down traffic to make crossing and bicycling safer, and include design approaches such as narrowing vehicle lanes from a conventional 12 feet (the width of Deerfield Street's lanes) to 11 or 10 feet; raised and landscaped medians to visually narrow the roadway, slowing drivers and providing a safe stopping point for crossing; adding "bulb-outs" at crosswalks, in which the sidewalk extends around parking lanes into the roadway, reducing long crossing distances. These safety approaches can help drivers reach safer 25-35mph speeds, which in turn translates to more pleasant walking and biking experiences as heavy traffic is no longer speeding past at 45mph or 50mph.[3] LaPlante and McCann's description of the complete streets approach thus provides a key overview of the concept that will inform the rest of the rest of the articles in this section.

As LaPlante and McCann (2008) discuss, a key aspect of improving facilities for pedestrians focuses on making it easier to cross the street. Large, busy arterial roads like Deerfield Street can be difficult to cross, especially without traffic signals, quickly turning the road into a barrier for pedestrian access. However, traffic signals are expensive to install. A lower-cost alternative is a device known as a rectangular rapid flashing beacon (RRFB).

These beacons are mounted on roadsides and feature a traditional pedestrian crossing sign paired with bright flashing lights that activate to slow traffic when a pedestrian pushes a button before crossing. Shurbutt and Van Houten (2010) investigated the effectiveness of RRFBs at making drivers more likely to yield. Comparing RRFBs at 22 sites in three US cities with low rates of drivers yielding (Washington, DC; St. Petersburg, Florida, and Mundelein, Illinois), the study found that installing a two-beacon system on average increased driver yield from 18% to 81% and doubled the number of drivers yielding as far away as 100 feet from the crosswalk. These effects were found to last at least 2 years and did not decrease over time.

Shurbutt and Van Houten's findings are similar to other examinations of the effectiveness of RRFBs (Fitzpatrick, Brewer, & Avelar, 2014). Deerfield Street has crosswalks at several points, but only one red light signal (located at Meridian Street), and participants in GRP's public workshop indicated that drivers often do not yield to pedestrians at other crosswalks in the neighborhood. Therefore, RRFBs may be a necessary and potentially effective method of traffic slowing on Deerfield Street, adding to a complete streets approach that improves access for pedestrians.

One of the main proposed benefits of the complete streets approach is that better facilities for walking and bicycling will lead to more walking and bicycling as healthy, active transportation modes. Brown et al. (2016) investigate this claim, studying active transportation among residents before and after completion of a set of complete streets interventions in Salt Lake City, Utah. These interventions included completion of a widened bike lane; narrowed vehicle lanes; widened and better-lit sidewalks; and extension of a light rail line. The corridor receiving these

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upgrades was fronted by commercial properties, multifamily rental properties, and an amusement park, a composition not drastically different from Deerfield Street. Brown et al. measured walking and bicycling habits before and after completion of the interventions and determined that the complete streets design changes inspired statistically significant increases in walking and some increases in bicycling activity.

As Brown et al. mention, virtually no other studies have examined the effectiveness of complete streets on active transportation. Brown et al.'s findings are therefore a key early measure of the role complete street designs can play in encouraging walking and bicycling. Deerfield Street residents' calls in the GRP public workshop for enhanced bicycle facilities and slower traffic suggest that if these interventions are applied in the neighborhood, they will be used. Deerfield Street already possesses a wide sidewalk along the riverfront with new street trees and lampposts, so traffic calming measures may the key missing piece to encourage residents to use this pleasant sidewalk.

Active transportation may not be complete streets' only means of encouraging public health outcomes. Complete streets often include enhanced landscaping through new street trees, sidewalk and median plantings, described by LaPlante and McCann (2008). This streetscape vegetation may improve health among neighborhood residents. de Vries, van Dillen, Groenewegen, and Spreeuwenberg (2013) examined the effects of landscaping and streetscape greenery (defined as any type of visible vegetation, from flower boxes to views of woodlands) on health, cross-referencing objective measures of street greenery in 80 neighborhoods in four cities in the Netherlands with 1600 surveys of residents in the surrounding neighborhoods that asked respondents to report their general health, any specific physical

and mental illnesses, stress levels, the perceived social cohesion and interpersonal trust in their neighborhood, and their physical activity levels. Additionally, the study conducted multilevel regressions comparing the relationship between greater amounts of vegetation and lower stress, improved social cohesion, and increased physical activity. The study found that, controlling for socio-economic characteristics of respondents, residents of neighborhoods with more streetscape greenery generally perceived themselves to be healthier, reported fewer specific illnesses, and displayed better mental health states than residents of neighborhoods with less streetscape greenery. The regression results indicated that lower stress and improved social cohesion were the main mechanisms by which increased vegetation benefitted health.

The findings of de Vries, van Dillen, Groenewegen, and Spreeuwenberg (2013) add to a collection of literature documenting positive relationships between green spaces and vegetation and better health outcomes (see Mitchell & Popham, 2007; and Takano, Nakamura, & Watanabe, 2002). Additionally, this study builds on a previous study which found that street vegetation specifically may be more influential on health than green spaces, such as local parks (van Dillen, de Vries, Groenewegen, and Spreeuwenberg, 2012). Thus, complete streets efforts in the Deerfield Street neighborhood may improve residents' health in addition to supporting more walking and bicycling.

In addition to the physical health benefits, complete streets interventions can support the economic health of a neighborhood. Employing a similar before-and-after-intervention design as Brown et al. (2016), Yu et al. (2018) measured the effect of complete street interventions on single-family property values

from 2000-2007 and the resilience of those values during the Great Recession, from 2007-2011, in Orlando, Florida. Yu et al. examined improvements to Edgewater Drive in Orlando, which prior to the interventions had a traffic volume of 20,000 vehicles per day and saw a crash occurrence nearly every 3 days and crash-related injuries nearly every 9 days. The road underwent a 'road diet,' a common term in complete streets upgrades that references slimming down vehicle lanes to slow traffic and add room for other transportation modes. The road was converted from four lanes to three, with one lane in each direction, a center turning lane, and bicycle lanes on both sides. The study found that, while controlling for variations in housing quality (such as size, number of bedrooms, age, etc.), after the complete streets interventions, homes within 800 meters of Edgewater Drive on average experienced roughly $31,000 more in home value appreciation than homes 800-2000 meters from Edgewater drive, and lost less value during the Recession than those further homes (average losses of 27.2% vs 31.5%). Yu et al. also compared homes near Edgewater Drive to similar homes near other roads similar to pre-intervention Edgewater Drive, and found that homes near Edgewater Drive saw an additional average $4,600 in home value appreciation and also lost less value during the Recession (average losses of 30.6% vs 32.2%). Thus, the complete streets upgrades performed better than conventional road designs at increasing single-family home values and sustaining them during economic downturns.

Previous research had shown that by improving pedestrian access to retail, complete streets can provide economic benefits for business visitation and long-term ripple effects on property values (Litman, 2015); however, few studies had examined the direct impacts of complete streets interventions on property

values. Yu et al.'s (2018) findings demonstrate the economic potential for complete streets to add to neighborhood revitalization by boosting property values. Applying these results to the Deerfield Street neighborhood, streetscape improvements are clearly an important complement to investments in housing and commercial development.

In summary, LaPlante and McCann (2008) defined the complete streets concept as a design approach that prioritizes the needs of all transportation modes equally. Brown et al. (2016) and de Vries, van Dillen, Groenewegen, and Spreeuwenberg (2013) determined that complete streets upgrades, such as enhanced sidewalks, bicycle lanes, and streetscape vegetation can improve human health through increased physical activity (by walking and biking), reduced stress, and greater social cohesion. Lastly, Yu et al. (2018) determined that complete streets interventions can also support a healthy housing market by enhancing property value increases and stabilizing value losses during recessions. Clearly, improvements to streetscapes can have a range of benefits for neighborhood development. Applying these techniques with special attention to the north and southern neighborhood entrances on Deerfield Street may be a particularly effective way to create better neighborhood access and perception, especially as these entrances were commented on as particularly unsafe or unpleasant streetscapes during GRP's public workshop.

Conclusion
This literature review has provided insight into the issues of flooding, housing, commercial development, and streetscape improvements and how they accompany the kind of neighborhood transformation for the Deerfield Street neighborhood under consideration by the City of Greenfield and the participants of GRP's public workshop. Two key findings

concerning the importance of community input on decision-making emerge from considering the four sections together.

Primarily, increased flooding from the Green River will likely play a strong role in shaping which parts of the neighborhood will be safest to pursue new housing supply and commercial development, especially as the City considers a long-term strategy for Deerfield Street, already adjacent to the federally-defined floodplain. Given how long many residents have lived or worked on Deerfield Street, decisions on how to direct future growth and manage existing properties vulnerable to flooding should be made in full collaboration with community members. The recommendations regarding flooding in Chapter 7 will reflect this collaborative approach.

Secondly, decreasing the cost of housing will require creatively increasing housing supply, potentially densifying parts of the Deerfield Street neighborhood. Pursuing greater density can be unpopular in established low-density residential areas. Therefore, working with residents to establish guidelines for new housing that fits neighborhood character while allowing for growth will likely help balance different stakeholders' values and needs. Considering the visual appearance of housing in the neighborhood also connects to workshop participants' desires for attractive mixed-use commercial development (Section 3) and streetscape improvements (Section 4), suggesting the usefulness of design guidelines or standards that apply to buildings and streets. Form-based zoning/code, mentioned above by Hughen and Read (2016) as a method to increase development incentives for mixed-use properties, may be a way to create community agreement on the visual appearance of new development.

To conclude, this literature review has considered the opportunities and challenges of pursuing new avenues of growth in the Deerfield Street neighborhood. The literature review accompanies analysis of data from GRP's public engagement data (Chapter 4) and important planning precedents (Chapter 6, the next chapter) in supporting the development of an array of recommendations for the Deerfield Street Initiative as an ongoing vision plan for neighborhood revitalization (Chapter 7).

[1] This concept is similar to that of green infrastructure, defined as an "an interconnected system composed of natural or man-made open space and landscape features that can provide multifunctional ecosystem services benefits" (Cheng, Yang, Ryan, Yu, & Brabec, 2016), such as flood control.

[2] Many articles will mention *affordability* as a main issue preventing households from accessing high-quality housing priced at their income level; while *affordability* has become a common term for this issue, it is worth noting that this language does not specify exactly what income level housing is/is not affordable for, and thus remains too vague for our purposes. Therefore, although readers will notice that the articles included here use *affordable/affordability* often, GRP prefers to use terms such as "low-income housing" or "market rate housing" that specify exactly what income level can "afford" any given housing.

[3] As noted earlier in this Report, Deerfield Street is technically a state highway with a 50mph speed limit until it reaches roughly halfway into the neighborhood at Washington Street, where it becomes a City road with a 30mph speed limit. However, public workshop participants noted traffic frequently does not slow down despite the reduced speed limit.

Chapter 6: Precedent Studies

Introduction

Chapter 6 examines planning documents relating to our Studio Project to ensure that our analysis and recommendations build on work already done for our client, and that our recommendations connect to Greenfield's long-term planning goals. These planning documents have been provided to the studio team by the client and the Franklin Regional Council of Governments. This chapter is organized by planning document, and the documents in this section include:

1. The Sustainable Greenfield Master Plan (2014)
2. Greenfield Complete Streets Prioritization Plan (2015)
3. Greenfield Open Space and Recreation Plan (2012)
4. FRCOG's Greenfield Housing Study (2014)
5. Restoring the Heart: A Community Vision for the Neighborhood of Aldenville (2017)
6. Previous University of Massachusetts, Amherst: LARP Activity
7. Comprehensive Plan, General Plan, Master Plan, or Specific Plan

Each of these documents provides valuable insight to inform this Studio Project's analysis and recommendations of the housing conditions and needs in the Deerfield Street neighborhood.

Sustainable Greenfield Master Plan (2014)

Identification of Problem Area

The Sustainable Greenfield Master Plan (SGM plan) serves as Greenfield's comprehensive master plan, used to guide development and practice for the City. The primary goal of this plan was to move Greenfield towards greater sustainability. Some of the practices that are addressed are downtown walkability, open space control and maintenance, and housing options within downtown. These goals are in line with what often is expected of a master plan and direct the City to develop further plans and implementation.

The SGM plan articulates a vision and sets forth a variety of goals for the City of Greenfield. Sustainable Greenfield vision is to provide a clear path towards achieving greater sustainability across all of Greenfield. The SGM plan operates on short, mid, and long-term time scales as well as a range of geographic scales, but overall the breadth of the Plan is substantial. The Implementation Plan section of Sustainable Greenfield organizes the goals and strategies in a format that is simple and straightforward, which makes it more manageable and easier to reference. Sustainable Greenfield is a Sustainable Master Plan, defined as such within the SGM plan, which means it prioritizes sustainability and seeks to incorporate it into every component. Every section includes a reference to sustainability, but to ensure that strategies meaningfully contribute to sustainable goals the Plan uses Sustainable Principles criteria, developed in cooperation with American Planning Association's Sustainability Principles, to evaluate every goal that it suggests. The Principles are promotion of multimodal systems, improved health and well-being of community members and visitors, reduction of fossil-fuel based energy consumption, equity of access or distribution of resources, improved resiliency, responsible coordination of regional efforts, improved economic resiliency and vitality, climate change mitigation, and natural resource protection (Page 4).

Greenfield's Central Commercial District currently needs significant attention. As of 2014, there was a 12% vacancy rate, which can be a detrimental number to any downtown landscape. The Sustainable Greenfield plan identified walkability into the downtown area as a goal. This broadens the focus area of both plans from downtown to the arterial and main streets that lead there. The Sustainable Greenfield plan also addresses Greenfield's impacts and interactions in a regional context.

Plan Development Timeline

Sustainable Greenfield began in 2012 and was published in 2014. Over this time, a comprehensive process of public engagement and in-depth analysis were performed. Following the completion of this plan, the city of Greenfield began taking implementation steps. One of the implementation strategies included the completion of the Greenfield Housing Study in November 2014.

Authors and Expertise

Sustainable Greenfield was authored by Vanasse Hangen Brustlin, Inc., or VHB – a private consulting firm that specializes in planning & design, engineering, and environmental assessment. The individual employees who contributed to this report are not named; however,

given the range of topics addressed, the authors likely had expertise in community planning, sustainability, economic development, housing, transportation, and energy & natural resources.

Plan Goals & Guidelines

Sustainable Greenfield is structured into seven thematic chapters, each one dealing with a specific area of future development for Greenfield. The chapters include: Land Use; Transportation; Economic Development: Housing; Natural, Historic, & Cultural Resources; Public Services, Facilities, & Energy; and Education. An Implementation Plan is then laid out for the strategies designed to achieve the goals of each theme. Sustainable Greenfield lays out a roadmap for the kind of city Greenfield wants to be in ten years and provides guidance for aligning smaller plans to fit that vision.

The purpose of the Implementation section of Sustainable Greenfield is to provide a detailed outline of the plan's goals, how they should be implemented, and who is responsible for their implementation. The section is broken down into the Plan's seven elements: land use, transportation, economic development, housing, natural, historic, and cultural resources, public facilities, services and energy, and education. Within each element a table outlines the related goals, and descriptions of strategies and implementation actions needed to implement them. An additional table details policy/program/plan/infrastructure action needed to complete each goal, best practices and resources for reference, additional elements the strategy addresses, time required for implementation (short, mid, long term), and lead department or stakeholder responsible for implementation. This table also includes funding information like the estimated cost, availability of implementation funding, and whether or not each strategy is new or part of another plan.

The final component of Sustainable Greenfield is the Sustainable Strategies Evaluation (see Figure 9 below for an example). This section uses the American Planning Association's Sustainability Principles (Page 4) to evaluate which of the Plan's strategies address the largest number of principles. The goal of this evaluation is to determine which strategies should be considered priorities for implementation. The nine American Planning Association Sustainability Principles used to create the criteria include: promotion of multimodal systems, improved health and well-being of community members and visitors, reduction of fossil-fuel based energy consumption, equity of access or distribution of resources, improved resiliency, responsible coordination of regional efforts, improved economic resiliency and vitality, climate change mitigation, and natural resource protection. Within each element, goals are evaluated using this criteria. The goals are with a maximum achievable score of 9. The scoring is discussed more in the 'Implementation Schedule' section of our analysis of the SGM plan.

Land Use Tools & Techniques

The primary tools and techniques recommended in Sustainable Greenfield include the adoption of the Community Preservation Act (CPA), the revision of zoning ordinances and regulations, and plan development for transportation, economic development, and historic preservation. The CPA is a self-imposed property tax program that redirects tax revenue towards funding for open space acquisition, resource center and programs for housing, and in preserving historic resources. Updating the zoning ordinances would protect open space

and natural resources, allow development by right in the downtown area and neighborhood centers as well as infill development, and increase the density of housing and population. Additionally, new plans are recommended for transportation, including a green infrastructure program, a downtown transportation improvement plan, and a walkability plan. For economic development, Sustainable Greenfield recommends a City-funded plan to market Greenfield as a cultural, tourism, and recreation destination; a historic preservation plan that encourages creative reuse of historic buildings; and to improve upon public services and facilities, a long-range physical plant capital improvement plan.

Sustainable Greenfield outlines implementation goals for its seven elements of land use, transportation, economic development, housing, natural, historic and cultural resources, public facilities, services and energy, and education, and lists strategies to achieve these goals accompanied by specific actions. The primary tools and techniques listed under the implementation actions for strategies among these elements include updating and revising zoning, creating new ordinances and codes, forming partnerships and committees, redeveloping to expand housing stock, and conducting assessments and inventories.

Zoning is a recommended tool in nearly all elements of the plan to achieve goals and strategies focused on increasing housing and density, improving residential and nonresidential uses in the city center to incentivize redevelopment, and to protect the City's valuable resources. For example, Goal 3, "Greenfield has a vibrant, dynamic, walkable downtown" (Page 90) has two different strategies, one including "strengthen downtown as a welcoming, attractive, and vibrant mixed-use urban space…" (Page 106). There are eleven implementation actions for this strategy and one is to revise the zoning ordinance to support an Adaptive Reuse Overlay District for downtown that would encourage the reuse of downtown space, therefore, strengthening this area to make Greenfield more vibrant and walkable. Adaptive Reuse means... Similarly, an infill development ordinance would also help eliminate obstacles to redevelopment of parcels in the downtown area by creating flexible minimum lot sizes and frontage requirements.

Developing and adopting codes such as The Massachusetts stretch energy code, Urban Forestry Code and a Sustainable Building Code[i] would increase sustainable development through Green Stormwater infrastructure, energy-efficient residential and commercial buildings and longer-term value of the housing stock through zero-net-energy-ready standards and minimized life-cycle energy costs for new construction. These codes, often in compliance with Massachusetts regulation, set standards for municipalities such as Greenfield.

Continuing and enhancing the public, private, and nonprofit partnerships with developers, training and career centers, local colleges and organizations, and businesses is recommended to achieve various goals throughout elements in land use, transportation, public facilities, services, and energy, natural, historic, and cultural resources, and economic development. In forming and enhancing these partnerships, Greenfield would achieve various strategies such as supporting and coordinating the City's cultural events and programs and reducing municipal energy use and carbon footprint. Committees, such as a Sustainable Greenfield Implementation Committee and a Bicycle Committee would support goals in each element and assist in larger strategies and goals to oversee future development and implementation of Sustainable Greenfield.

Redevelopment is a land-use and housing tool that can be used to expand and improve the City's housing stock while avoiding development in areas that may have ecological and agricultural value. Redevelopment is an approach where buildings are repurposed or remodeled to fit modern uses, as opposed to new development which requires new construction. In Greenfield, redevelopment could be used to preserve historic character or to improve the aesthetic character of neglected areas. Redevelopment is recommended around Greenfield's historic downtown and other previously developed areas to increase density and mixed-use development. The redevelopment recommendations and those for new zoning ordinances mutually support each other to achieve sustainability goals.

Regular assessments are recommended for transportation strategies for safer, more efficient and attractive travel corridors, and a reduction in negative impacts from vehicular traffic. These would be conducted by the planning department in collaboration with other departments. Such regular assessments are necessary to ensure continued success of implemented planning efforts. Inventories for natural resources, the urban tree canopy, and agricultural land are recommended to prioritize strategies in climate change adaptation and preservation.

Data

The consultants Vanasse Hangen Brustlin, Inc. (VHB) used data from the American Community Survey (ACS), United States Census Bureau, Massachusetts Department of Transportation (Mass DOT), MassGIS, Greenfield Public Schools, Franklin Regional Council of Governments (FRCOG), and the assessor's database. ACS data was widely used for economic and housing data (population change, income and poverty, employment, and education as well as housing occupancy and tenure, age of housing stock, and housing costs). Similarly, the US Census Bureau provided data for income statistics, housing projections, and population demographics. Mass DOT data provided data on city-wide crashes and high crash cluster locations. MassGIS provided data on land uses, transportation, and natural, cultural and historic resources. FRCOG provided data on hazardous intersections and the assessor's database assisted in mapping location and type of housing. Greenfield Public Schools Department provided data on student population and the Greenfield Public Schools Technology Plan. The primary research was conducted for the plan's transportation and education sections. VHB collected data of existing access points and driveway spacing, for example, in developing their transportation research. They also conducted interviews and conversations with those working with Greenfield Public Schools, such as Dr. Susan Hollins and Marie Breheny.

Design Principles

The aim of the original Sustainable Greenfield plan was to create a plan that was "rooted in a commitment to preserving the small-town heritage of Greenfield while embracing changes that will allow sustainable renewal of the City as the economic and cultural hub of the region" (Page 3). To this end, designs that preserve the architectural qualities and aesthetic open space of the City are promoted. Additionally, the plan emphasizes compact development building in the historic center and limiting sprawl. The Housing Study is more focused on housing needs and policy rather than design, but these policies do include upgrading distressed properties to better match

historic character and achieve greater energy efficiency. The City of Greenfield has a commitment to principles and practices of sustainability, and both plans aim to establish a more Sustainable Greenfield. Sustainable Greenfield will become a design tool to guide future operational, programmatic, and policy decisions.

Design principles discussed in Sustainable Greenfield aim to focus on walkability, parking, stormwater runoff, open space, and housing. They aim to have parcels provide access and connections to open spaces and areas that may be highly degraded. Designs that were of interest were trails along the Green River and expanding the river's riparian buffers. In regards to the downtown, they were interested in developing pocket parks and parklets, and promoting better pedestrian access, expanding biking and walking trails, providing continuous wildlife habitat and migration corridors, and protecting watershed resources. In terms of flooding, the Sustainable Greenfield Master Plan articulates that deleterious uses in the floodplains should be removed, and the corridors of the river enhanced.

Transportation design is a main focus of Sustainable Greenfield. The city would like to have welcoming gateways and safe, efficient, and attractive travel corridors (Pages 54-55). Smooth traffic flow is a key goal as well as sufficient parking. These goals align with bikeways and the support of pedestrian walking areas in the downtown area. Underutilized areas in the public realm such as alleys, rear entrances, and parking lots using Low Impact Principles from the 2012 Conway School of Landscape Design are also of note (Page 256). The Urban River Visions plan has a visualization for a path along the Green River incorporating bicycle boulevards designed by the Urban Bikeway Design Guide. A goal of transportation design will be to have minimal environmental impact by reducing impermeable (paved) surfaces for redevelopment projects where design allows, which will help in limiting stormwater runoff (Page 256). "Green" infrastructure is also explored in order to improve water quality by creating more planted medians, rain gardens, etc. Stormwater management will be encouraged by using more Low Impact Development (LID) design.

One of the city's main design goals is to maintain the historic downtown. They would like to see compact residential and commercial development and redevelopment focused in these areas, which calls for a mix of residential, commercial, civic, and open-space areas (VHB, 2014). Having these designs enable residents to have a one-quarter mile/five-minute walk to downtown would be key. The reduction of housing size minimums and establishment of maximum parking standards to encourage shared parking (VHB, 2014).

A more walkable downtown is hoping to lead to advancement in economic development. The city of Greenfield would like to encourage the reuse of all downtown space through revising the zoning ordinance to support an Adaptive Reuse Overlay District for the downtown area (VHB, 2014). They are also interested in updating zoning in order to enable denser housing within one mile of downtown, and continue downtown beautification efforts (VHB, 2014). This may be done through planting and supporting the implementation of healthy trees and flowers, benches and bike racks, flags, and artwork, preferably through public engagement with local community members and businesses (VHB, 2014). Building facade upgrades also call for the promotion of Low Impact Development techniques.

Incentives to homeowners would like to be given in order to reduce area of hardscapes and lawns and increase productive landscapes like food gardens and gardens for biodiversity (VHB, 2014). Policies such as the Urban Forestry Code, Green Stormwater Infrastructure Ordinance and the MA Climate Adaptation Report discuss design guidelines and plans for the city's beautification, creation of a diverse urban tree population, improvement of stormwater function and minimization of stormwater runoff (VHB, 2014). In terms of degraded housing, the city would like to develop an inventory and strategy to deal with the reuse of vacant or abandoned properties by possibly applying methods from the Center for Community Progress, and the reuse of vacant industrial and commercial properties in order to preserve historic and elements of the city and incorporate mixed uses (VHB, 2014).

With regards to housing, the city desires to encourage upper story apartments on and near Main Street and in other mixed-use neighborhoods, adopting a Neighborhood Pedestrian Zone to allow for more housing units on smaller lot size such as Cottage Housing, and the rehabilitation of unused or underutilized buildings and large homes into energy efficient, market-rate housing with multiple units (VHB, 2014). It has been noted multiple times in Sustainable Greenfield that revisions and flexibility within zoning laws must occur in order to follow through with these design plans and principles. Flexibility is desired within building codes in order to allow for smaller homes and apartments and in order to prevent low quality or incompatible structures in historic neighborhoods (VHB, 2014). The city wants to make it easy to replicate historic design and important site features. They would also like to create more self-sufficient neighborhoods through easy walking and biking connections to public transportation.

The City of Greenfield is eager to create a more welcoming atmosphere that highlights the scenic, rural, and agricultural landscapes of their city as well as their rich historic culture through effective design principles and planning.

Implementation Schedule
The Sustainable Greenfield plan has an in-depth implementation plan for its goals involving their seven key elements. For each element, there are goals listed, the strategy that will be used to fulfill the goal, a description of the strategy, and the implementation actions. The implementation schedule is categorized by short, mid, and long-term subcategories. A short-term project aims to be completed within a year, a mid-term project within 2 to 5 years, and a long-term project in greater than 5 years. Land Use and Education are comprised of mostly short and mid-term projects. Public Facilities, Services, and Energy are mostly comprised of mid and long-term projects. Transportation plans are comprised of mostly long-term projects, and Economic Development, Housing, and Natural, Historic, and Cultural Resources are a mixture of short, mid, and long-term timing.

Aside from the seven key elements, there are five Comprehensive Strategies within the Implementation Plan. These are the following: create a Sustainable Greenfield Implementation Committee, promote the results of Sustainable Greenfield monthly, use the Sustainable Master Plan as the 'Go-To' reference for all projects in the City, track, measure, and report progress of implementing the Sustainable Greenfield strategies, and lastly, identify and incorporate additional stakeholders into the implementation stage (VHB, 2014). The strategies

that addressed the most Sustainability Principles are considered priorities for implementation and are used as evaluation criteria. A strategy is given one point if it aligns with the principle, for a total of 9 points (VHB, 2014). The more points each strategy (one of the seven key elements) gets, the higher the strategy addressed the nine Sustainability Principles (VHB, 2014). The results were as follows:

Land Use: 10 strategies, total of 52 points

Transportation: 11 strategies, total of 68 points

Economic Development: 10 strategies, total of 45 points

Housing: 12 strategies, total of 64 points

Natural, Historic, and Cultural Resources: 9 strategies, total of 33 points

Public Facilities, Services, and Energy: 11 strategies, total of 43 points

Education: 10 strategies, total of 35 points

By summing each principle's points, one can notice a deficit in sustainability in the 'Natural, Historic, and Cultural Resources', 'Education', 'Public Facilities, Services, and Energy', and 'Economic Development' principles.

Public Engagement Process
The Sustainable Greenfield plan included a community engagement process so community members could contribute their vision and goals. Public engagement workshops were hosted in March and September of 2013, attended by almost 250 people total. An online public engagement tool called MindMixer was used, allowing people to contribute virtually. Between online and in-person engagement methods 650 ideas were generated. A website and Facebook page were also created to inform community members.

Plan's Relevance to Current Project
Sustainable Greenfield details the community's values, priorities, and visions, providing a relevant framework upon which GRP can use to inform our project and recommendations. The Plan's definition of sustainability and the incorporation of that paradigm into every element will help us develop a working definition of sustainability. The findings related to each of the seven elements provide a useful and current assessment of Greenfield's focus areas. This is an overview that gives us a broad foundational knowledge we can refer to throughout the project process. The Plan includes key demographic and land use information; having all of this information in one organized and reliable source will be convenient.

The Implementation Plan clearly communicates the goals and actions necessary for implementation in each of the seven element areas, which is a useful reference point for our project. We can use the Implementation plan to evaluate where Greenfield currently stands with regards to its implementation schedule and methods. It also provides relevant information about what kind of policy and infrastructure is necessary and/or possible within the context of Greenfield and which departments or stakeholders are responsible for taking action. This information can guide our recommendations to the City.

The Sustainable Strategies Evaluation provides criteria that we can use for our own recommendations because sustainability is a priority for the City of Greenfield and, by extension, our project. Sustainability can be an abstract concept, but this Evaluation sets up clear guidelines that we can use to make sure our ideas are aligned with the sustainability priorities of the City.

Greenfield Complete Streets Prioritization Plan (2015)

Identification of problem area

The City of Greenfield officially adopted a City-wide Complete Streets Policy in early 2016. Complete Streets is a nationwide movement launched by the National Complete Streets Coalition to design streets that enable safe access for all users including pedestrians, bicyclists, motorists and transit riders of all ages and abilities. In the City's Complete Streets Policy, they state that Complete Streets principles contribute toward the "safety, health, economic viability, and quality of life in a community by improving the pedestrian and vehicular environments in order to provide safe, accessible, efficient and comfortable means of travel between home, school, work, recreation, and retail destinations." The Complete Streets Prioritization Plan focuses on designing infrastructure that enables the safety of cyclists and pedestrians.

Authors & Expertise

The Complete Streets Prioritization Plan was created by the City of Greenfield in partnership with consultants Alta Planning and Design and Watson Active. From the City of Greenfield was Eric Twarog, AICP and Director of Planning and Development, Maureen Pollack, Assistant Planner and Conservation Agent, Nicolas Reitzel, Engineering Superintendent of the Department of Public Works, Alan Twarog, Assistant Engineer of the Department of Public works, Sam Urkiel, Engineering Technician of the Department of Public Works, and Alyssa Larose, Greenfield Resident. Alta Planning and Design, is a global firm specializing in active transportation planning, design, and implementation, with expertise in trails, Complete Streets, new mobility, wayfinding signage systems, traffic analysis, GIS modeling, encouragement activities, healthy community policies, and bike share programs. Their team primarily consisted of planners and Fellow of the American Society of Landscape Architects (FASLA) licensed landscape architects.

Plan goals and guidelines

The adoption of the Complete Streets Policy in 2016 was the first step in securing funding from the Massachusetts Department of Transportation (Mass DOT) Complete Streets Funding Program, and this Complete Streets Prioritization Plan identifies the projects that would use this funding for the application cycle of September 2017. To Identify these projects for funding, Greenfield, Alta and Watson created prioritization criteria which included, in order of highest priority: providing a significant safety improvement for all users; improving connections to existing sidewalks, trails, bike lanes, residential neighborhoods, and downtown; providing linkage to transit centers and bus stops; having low impact to vehicular and freight operations; existing within one quarter miles of a school; and having the support by greater than one person at a public forum or on the website.

In the early stages of the plan, there were 100+ projects identified. To showcase the steps taken to narrow down this number, this plan included map graphics for Opportunities and Challenges, All Project Maps, Priority Project Maps, and a Concept Graphics Map. Prior to the compilation of project ideas, the opportunities and challenges were identified first through field work and community input. The All

Project Map shows all 100+ project ideas which set the stage for their second public forum. The Priority Project Maps show each of the 15 projects that achieved a high score during the prioritization process in which they used the criteria mentioned above. These were chosen to seek funding through the Mass DOT Tier III funding application. The Concept Graphics Map contains the five projects identified as highest priority level. For these five projects, there is a detailed cost estimate.

Land use tools and techniques

The recommendations of this plan are categorized by traffic and safety, transit facilities, bicycle facilities, and pedestrian facilities. In traffic and safety, they included recommendations for street lighting, traffic calming measures, intersection improvements, pedestrian signal timing, pavement markings or signage that provides guidance for alternative modes, addition of or widening shoulders, additional regulatory signing, and curbing. For transit facilities, they recommended improving transit connections for pedestrians, transit signal prioritization, bus pull-out areas, railroad grade crossings improvements, transit-only or transit Contra-flow lanes, and transit shelters. For bicycle facilities, they recommended new shared use paths or improvement of shared use paths, designated bicycle lanes/separated bike lane/bike boulevards, shared lanes, advance stop facilities, bicycle parking on-street and at transit locations, provide bicycle-safe drainage grates, elimination of hazardous conditions on shared use paths, bicycle wayfinding signs and bike route signs. For pedestrian facilities, they recommended new sidewalks or sidewalk widening or repairs, new or improved crossing treatments at intersections and midblock, ADA/AAB compliant curb ramps, pedestrian buffer zones, pedestrian refuge islands, curb extensions at pedestrian crossings, crosswalks, accessible pedestrian signals, detectable warning surfaces, and pedestrian wayfinding signs.

Data

Greenfield, Alta, and Watson developed this plan with the date they collected by conducting field work within Greenfield to understand opportunities and challenges to implementing projects, and by reviewing the following existing planning documents:

- Franklin County Complete Streets Project (2012 + 2014)
- CDBG Priority Projects (2015)
- Most Hazardous Intersections in Franklin County (2011- 2013)
- Water Master Plan Update
- Urban River Visions Greenfield Action Plan (2007)
- Sustainable Greenfield (2014)
- Streetscape Enhancement and Ecological Parking Lot
- Design (2012)
- Greenfield Downtown Master Plan (2003)
- Community Branding & Wayfinding Program (2015)

- Transportation Improvement Program for Franklin Region
- (2016)
- Franklin County Regional Transportation Plan (2015)
- Franklin County Bikeway Plan Update (2009)
- Regional Transportation Equity Analysis for Franklin
- County (2015)
- Hillside Neighborhood Revitalization Plan (2008)
- Open Spaces and Recreation Plan (2012)
- Greenfield Renaissance Report (2009)

Design principles

The Complete Streets Prioritization plan includes a "Complete Streets Toolbox" that shows and describes the key infrastructure recommendations for cyclists and pedestrians. For Bicycle infrastructure, the toolbox includes a shared use path, traditional bike lane, and parking bike lane. The shared use path is the safest and most desirable facility type and would be additional to the off-street use paths that connect to the existing Greenfield Bike Path. The traditional bike lane is a designated, exclusive space for bicycles through the use of pavement markings and signage. These are typically located adjacent to motor vehicle traffic and travel in the same direction as motor vehicles. The parking protected bike lane are at street level and use many methods of physical protection from passing traffic.

For pedestrian facilities, the toolbox includes curb extension/Rectangular Rapid Flashing Beacons (RRFB), raised crosswalks, and green infrastructure. Curb extensions shorten crossing distance for pedestrians and increase sight lines for motorists by reducing parked car obstacles near crosswalks. The RRFBS are optional additions that increase motor vehicle yielding. Raised crosswalks are easier for mobility-impaired individuals due to the smaller change in grade compared to street-level crosswalks. The green infrastructure recommendations are "stormwater cleansing street tree pits" within the pedestrian environment. These reduce levels of pollutants downstream and enhances the aesthetic of the streetscape.

The traffic calming tools include pedestrian refuge islands, neckdowns, and diverters. The pedestrian refuge island limits pedestrian exposure at intersection by creating a two-stage crossing. They also act as "visual pinch points" which calm traffic. Neckdowns are aligned at the begging of a residential side street. They are typically used on low volume streets that experience a high amount of commuter cut-throughs at peak times. Diverters also reduce commuter cut through volumes on residential streets and encourage bicycling by allowing bicycles to enter.

Bicycle boulevards are recommended for improvements in local residential areas with areas of low traffic volume and speed and run parallel to a busier roadway. These are context-sensitive retrofits that are designed to increase bicycle and pedestrian use by reducing traffic volume and/or reducing traffic speed. In combination with bicycle boulevards, enhanced sharrows, green-backed sharrows, and chicanes are also recommended. These sharrows and chicanes provide awareness to motorists and reduce vehicle speeds.

Plan's relevance to current project

The Complete Streets Prioritization plan included nine projects in GRP's study area of the Deerfield Street neighborhood on Hope, Washington, and Deerfield Street in the total list of 100 projects. Within these, there is a project listed in the final list of fifteen projects located on Hope Street. It is the tenth listed project in the "Opinion of Probable Cost" described as "on-street bike facility". These fifteen final projects in the Opinion of Probable Cost were ranked by the City in the order in which it was submitted in the Mass DOT Tier III Prioritization funding submission document. The on-street bike facility pertains to bike boulevard style treatment with marked shared lanes and signage. This project will provide more connectivity of the north-south corridor for bikes and also provides a more comfortable alternative for north-south travelling bikes to avoid the underpass at Bank Row and Mill Street.

The other eight projects that were not included in the final list of fifteen, but are listed in the comprehensive list have the potential to be carried out by Mass DOT in the future, should funding become available. These projects include updating a crosswalk, creating an on-street bike facility, and improving sidewalks. The first project discussed in the comprehensive list pertaining to the Deerfield Street corridor is the updating of the crosswalk at the intersection of Petty Plain Road and the pedestrian bridge intersection with a traffic calming device to increase motorist yield behavior. The next listed project is creating an on-street bike facility from the Greenfield side of the bridge south of the Cheapside Street intersection to the southern end of the green triangle because this intersection is long and exposed with frequent turn movements that pose a risk to pedestrians and bicyclists. The other two projects are sidewalk improvements, with the one project located in front of businesses on the east side of the street from Cheapside Street to Mill Street to provide better sidewalk delineation, upgraded the ADA sidewalks and curb ramps. This is listed as a project because of the many businesses along the stretch that have vehicle parking that extends into the sidewalk and pedestrian zone. The last sidewalk project primarily focuses on relocating existing utility poles to the back of the sidewalks.

The absence of Deerfield Street/Route 5 projects on both the high priority and concept project lists provide our report with context into how the city views the needs of this corridor and how they may see this corridor exist in the future. A barrier and explanation we foresee from this report is the fourth on the prioritization criteria list, "Impact to Vehicular and Freight Operations: Project does not seriously limit roadway access for motor vehicles and trucks" which implies the possibility that Route 5, as a major truck route, will not be a potential site for future pedestrian-oriented infrastructure changes.

Public engagement process

The consultants developed an extensive list of project ideas by hosting two public forums and inviting input from meeting attendees and taking project ideas via email from community members. At the first public forum, project ideas were solicited and opportunities and

constraints were discussed. At the second public forum, the high scoring projects list was presented to the public, and any missing project ideas were solicited from the public. Following the second public meeting, the consultants and the City of Greenfield together came up with a list of five high priority projects to be studied in further detail.

Greenfield Open Space & Recreation Plan (2012)

Identification of problem area

The Open Space and Recreation Plan (OSR Plan) presents the goals and objectives of the City to preserve and improve Greenfield's open space and recreational resources. The OSR Plan includes a Seven-Year Action Plan that outlines the specific steps to complete in order to actualize the goals and objectives. Additionally, this report allows Greenfield to compete for funds provided by The Massachusetts Executive Office of Environmental Affairs (EOEA) and the Division of Conservation Services, including the Local Acquisitions for Natural Diversity (LAND) and the Parkland Acquisitions and Renovations for Communities (PARC) grants. The City can use these funds for land acquisition, maintenance and improvement of parks, playgrounds, conservation areas and other open spaces.

This updated plan was created primarily in response to the feedback the City received during their public engagement process in which the community expressed the desire for improving existing parks and playground while pursuing new locations for new recreational areas. Top priorities include locating potential sites for the skate park, an ice-skating area, and a dog park as well as prioritizing the maintenance of existing parks and open space areas. Other goals identified for the Seven-Year Action Plan include the expansion of community gardens, enhancing athletic fields, expanding the community bikeways and developing public access to the Green River for boaters and educational purposes. This plan identifies three key themes: improving park facilities through maintenance, better managing conservation lands, and better educating citizens on the open space and recreation sites throughout the City.

Who were the authors? And what was their expertise?

The OSR Plan was developed by the Open Space Committee, which included representatives from the Department of Planning and Development and the Town Boards of Conservation, Recreation, and Agricultural Commission. The Open Space Committee included the Recreation Director Christy Moore, Town Engineer Sara Campbell, Conservation Agent Laura Dinardo, Greenfield Historical Commission and Tree Committee member Marcia Starkey, Deerfield River Watershed Association member Pat Serrentino, North Quabbin Regional Landscape Partnership member Jay Rasku, Greenfield Resident Sean Pollock, Conservation Agent Ralph Kunkel, Consultant Alina Gross, and Tim Blagg, of the Greenfield Recorder and Greenfield Trails Council. Supporting staff included representatives of the City health department, Franklin County Land Trust, Department of Planning and Development.

Plan goals and guidelines

In the OSR Plan's statement of purpose, it states that it hopes to shape the future landscape of Greenfield by:

1) Surveying and documenting the existing conditions of Greenfield's open space, recreational facilities, and natural resources;

2) Developing short- and long-term goals, objectives, and action items;

3) Establishing a clear and realistic action plan for the next seven years.

Following the executive summary and introduction, this plan starts with a description of the community setting in Section 3, which includes the regional context, history of the community, population characteristics, and its growth and development pattern. The next section (4): Environmental Inventory and Analysis discussed geology, soils, and topography, landscape character, water resources, vegetation, fisheries and wildlife, scenic resources and unique environments, and environmental challenges. In section 5, the plan includes an inventory of lands of conservation and recreation interest. Section 6: Community Goals included a description of the public engagement process, and the plan's statement of open space and recreation goals. Section 7: Needs Analysis includes summaries of resource protection needs, the community's needs, and management needs. Section 8 contains Greenfield's goals and objectives which are outlined in section 9 of the Seven-Year Action plan. The Seven-Year Action Plan a schedule for these open space and recreation goals, objectives, and actions for the next seven years.

Data
The data utilized in the OSR Plan was collected from sources including records of town boards and departments, a Town-wide survey, MassGIS Data, and field inspections.

Plan's relevance to current project
The most pertinent aspect of the OSR Plan to our Studio report is the Green River, which is discussed for its water resources, wildlife habitat, opportunities for recreational activity, and flooding impacts.

In Section C, Water Resources, the River's most northern section is noted as a significant fish and wildlife corridor. The central area has historically contributed to agricultural purposes for its fertile soils deposited by periodic flooding. The OSR Plan also notes that the section of the River at Mead Street, located off of Deerfield Street, provides opportunity for recreational uses, as well as a greenway along the river that has been high priority for conservation and recreational purposes. This further supports the workshop commentary we received in creating this greenway and providing recreational uses near the Deerfield Street corridor. This also informs this report with more context of the City's vision for the Green River and how this will impact development on the corridor.

Water resources

The Green River serves as a regionally significant corridor for rare species and wildlife habitat as it contains large contiguous forest patches that serve as travel lanes for wildlife and also serves as priority habitats under the NHESP designation. These habitats are also desirable for

residential, recreational, and other competing uses, and this plan specifically identifies areas along the Green River Corridor as an example. To increase and protect these habitats the plan suggests working with local landowners to preserve land adjacent to various rivers through conservation restrictions or other means. This presents potentially conflicting values from the City if they choose to revitalize the Deerfield Street corridor with new and ongoing development adjacent to the Green River.

Identified in the Seven- Year Action Plan, the City wants to develop a "Green River Greenway trail system" through property acquisitions stretching from the Swimming and Recreation Area north to the Green River Pumping Station. As a complementary objective, they list linking open space sites with pedestrian and bicycle paths by developing the riverside bikeway to extend from the Greenfield Bike Path to Green River Park. To further promote the creation of green space along public ways, they list objectives to participate in the Mohawk Trail Scenic Byway Project and to work with the Mass Highway Department and the Greenfield Department of Public works on the beautification along the roadways.

In the Planned Actions and/or Recognized Need section of the plan, The Franklin County Conservation District recommended maximizing the nature study potential of the two Town-owned sites north of Green River Park. This would require developing trails and cleaning up the east bank of the Green River. Additionally, there is discussion of possible development of a boat launch site along the river; from here small boats or canoes could reach the Deerfield and Connecticut Rivers. The plan recommends increasing publicity about the existence of the park to all residents.

This plan included a prioritization of planting street trees, especially along the town's transportation corridors to promote a more pedestrian friendly environment as well as create wildlife habitat opportunities for songbirds and other species. The Town's zoning bylaw requires landscaping as part of new development and efforts need to continue to maintain and preserve street trees in town.

Flooding

While the Green River serves as a source of natural resources, wildlife habitat, and recreational opportunities, it also presents flood hazards. The City of Greenfield participates in the National Flood Insurance Program and the Town's Zoning Bylaw contains a Floodplain Overlay district that restricts development within floodplains. Historically, the Green River has caused major flooding that severely affected the study area and Deerfield Street in particular. To determine flood hazard areas, the town relies on FIRM (National Flood Insurance Rate Map) maps, and the electronic FEMA (Federal Emergency Management Agency) maps. These FEMA maps will aid GRP with the client directive of providing an overview of the flooding in the Deerfield Street corridor and the projections of the Deerfield River Watershed. Additionally, this will also inform our recommendations for land use and residential development as we study flood insurance and their influence on property investments.

Public Engagement Process

The public engagement process for this plan consisted of public meetings, open space surveys, and Americans with Disabilities Act (ADA) surveys The Committee posted public notices, distributed press releases, surveyed Greenfield residents on open space issues, and held public meetings on the Open Space and Recreation Plan to incorporate the vision of the people of Greenfield. The Committee held a public meeting on April 9, 2012 to give community members the opportunity to review the Draft Open Space and Recreation Plan and voice their final thoughts and feedback.

Open Space Surveys

The Department of Planning and Development, the Recreation Department, and the Committee developed an Open Space and Recreation Survey in October 2011. They distributed six thousand surveys through the local newspaper, The Recorder, and provided additional copies for drop-off/pick-up at the Greenfield Department of Development and Planning, the Recreation Department, the Town Clerk's office, the Greenfield Public Library, Stop & Shop Supermarket, Greenfields Market, Foster's Market, and the Big Y Supermarket. Online surveys were also available on the Department of Planning and Development Website and the Recreation Department Website. The Recreation Department's Facebook page was also used for survey advertisement and awareness. There were responses from 268 residents, making the survey response rate 4.4%.

Americans with Disabilities Act (ADA) Surveys

Section 504 Self-Evaluation Surveys were conducted for the 2000 Open Space and Recreation Plan. These surveys analyzed the major open space sites in Town and were completed by both town staff and community volunteers. The surveys indicated what accessibility improvements are needed at these locations. ADA improvements were vaguely listed as action items in the 2000 plan. Over the past twelve years, Greenfield has completed a more in-depth study of the ADA requirements in the parks and conservation areas. The necessary improvements needed were highlighted in the 2006 Plan and continue to be addressed in the 2012 Plan.

FRCOG Greenfield Housing Study (2014)

Identification of Problem Area

A specific plan developed in response to the SGM plan is the Greenfield Housing Study. Unlike its predecessor, the Housing Study addresses a lack of housing for the elderly, working age adults, and those households cost burdened by housing expenses. The report cites that a key challenge to Greenfield is a larger than average extremely low-income population, as shown in Figure 4. At this income level, homeownership may be difficult to obtain, which suggests that Greenfield needs additional low-income rental housing. Another affected group in need may be the middle-income earners, who may find shortages in available housing.

Authors & Expertise

The Greenfield Housing Study was authored by the Franklin Regional Council of Governments (FRCOG), a regional service organization which supports the towns of Franklin County. FRCOG manages twelve programs relating to issues such as economic development, land use planning, transportation planning, emergency preparedness, and public health. As the former county government, they have deep institutional knowledge of how their member towns have developed over time. The Greenfield Housing Study was prepared by experts in an advisory role, with the planners of FRCOG having an advanced level of familiarity with Greenfield.

Plan Goals & Guidelines

The Greenfield Housing Study is narrower in scope than Sustainable Greenfield, and is structured into two main sections: firstly, an analysis of housing issues in the city that focuses on affordability and population change; and secondly, a set of planning and zoning recommendations for how to address these issues. The purpose of the Greenfield Housing Study is to implement one of the strategies of Sustainable Greenfield, which was to conduct a detailed housing analysis to inform future policy. The recommendations made based on the analysis provide action steps for city leadership to consider. Thus, both the SGM plan and the Housing Study offer strategies for achieving the city's goals.

Land Use Tools & Techniques

The Greenfield Housing Study recommends that the City amend zoning regulations, provide housing type options, and preserve affordable housing stock in order to best serve the community's housing needs. Zoning changes include the adoption of an accessory dwelling unit ordinance, by-right designations for multifamily housing, amending ordinances to allow co-housing, and adding inclusionary zoning with density bonuses. To diversify housing stock, the Housing Study recommends increasing the rental housing stock, encouraging open space/cluster development, as well as encouraging upper story rental units in downtown. The Housing Study identifies tools for preserving low-income housing stock include tracking expiration dates of Affordable deed restrictions, supporting replacement of aging affordable housing stock, and implementing the Community Preservation Act (CPA). These tools are accompanied with identification of who should manage each tool or task.

Data

FRCOG conducted a housing affordability analysis to determine the supply of housing available to each income group – low, median, and high income—in Greenfield. First, FRCOG calculated the monthly housing costs for the target population, done for each of the income groups. Second, they calculated the number of rental units in each cost range using the 2008-2012 American Community Survey (ACS), which lists the number of rental units within predetermined ranges of gross rents. Lastly, FRCOG used ACS data on mortgage status and monthly owner costs to calculate the number of owner-occupied units in each cost range to determine the gross supply of units, and then the net supply of units.

Design Principles

The Greenfield Housing Study recommends designing around the changing demographics and cost of housing in the region. These design recommendations include upper-story rental units in downtown, open-space cluster development, co-housing development, and a mix of smaller and larger housing units.

Plan's Relevance to Current Project

The Greenfield Housing Study came out of Sustainable Greenfield's recommendation to conduct a thorough housing needs assessment. Since housing is the focus of our project, the Housing Study is highly relevant. It provides a concise overview of the City's demographics in relation to housing and takes a deeper look at issues like affordability, homelessness, population changes, and vacancies. Having an understanding of these key housing-related issues is important for directing our project. The three primary strategies the Study suggests to address the City's housing needs are changes to the zoning code, providing more housing type options, and preserving the stock of low-cost housing. Since these strategies have already been articulated, we can find ways to incorporate them into our project.

Sustainable Franklin County 2013

Sustainable Franklin County serves as a regional master plan to guide development within the Franklin county region. Began in 2010 and published in June of 2013, the plan was developed in collaboration with community organizations, municipal governments, and lead by Franklin County Regional Council of Governments (FRCOG). As stated in the plan, infrastructure, transit, and employment distribution are regular problems faced in Franklin County. The Sustainable Franklin County Plan is a continuation of a longstanding collaborative effort within the region to make the rural county a cohesive and successful place to live and work. In order to advance this effort, FRCOG developed a series of goals and recommendations to meet these goals which range from under five years in implementation to 20 years in implementation.

The recommendations of the plan are as follows: increase and improve housing stock with a focus on affordability, provide new means of alternative transportation, redevelopment of vacant sites for economic development, promotion energy conservation and efficiency, protection of natural resources, growth of the arts and cultures, infill development and concentration of growth to town centers, and improvement of infrastructure across the region, including broadband internet. While each of these goals vary in applicability to each municipality within Franklin County, FRCOG uses all of them as a benchmark for guiding planning efforts throughout the entire region. Each goal serves a purpose in the City of Greenfield; however, we will focus primarily on Chapter 10, the Land Use and Infrastructure section.

Land Use

The Plan identifies two Land Use problems facing Franklin County. The first being residential development patterns are fragmenting forests and farmlands and the second, that climate change may pose challenges to infill and redevelopment. Franklin County is a rural county, which relies on agriculture as an economic base in the area. Recent urban sprawl has begun separating the agricultural land and forests, creating less continuity in agricultural lands. This problem has been made worse by limitations in the ability to direct infill development towards town centers and designated development zones, due in part to climate change. To combat these problems, the plan established three Land Use goals: redevelopment of underutilized or vacant parcels and structures, locating new business in town centers and within range of transit services, and coordination of new development with existing infrastructure services.

In order to address these problems and meet these goals, the Plan makes several recommends for long- and short-term action. One of these recommendations is the redevelopment of vacant or under used parcels into mixed use developments. A second of these recommendations was to develop off-road pedestrian bike and pathways to encourage alternative transportation. Finally, a third recommendation was to direct new development closer to already existing town centers and nearer to transportation centers, away from agricultural areas. These three recommendations are the most relevant of the land use goals to our project.

These same three recommendations can be applied to our project and study area. Development of the pedestrian walkway along the Green River would encourage alternative means of transportation and could relieve some of the traffic along the corridor. Our vacant parcels could be developed into mixed-use, which would support the Sustainable Franklin county goal of guiding development towards urban centers. Development along our corridor, would also focus development within walking distance of the train station. These recommendations are all supported by the Franklin County Plan and our project could help to advance this plan.

Infrastructure

The Plan identifies the infrastructure problem facing the region being that water and sewer infrastructure may not support the recommended infill development in some areas. Because of its rural distances, Franklin County municipal systems are not always fully prepared for development. Lack of sewer or even basic broadband internet create an obstacle for development in the region and deter developers from initiating commercial and residential projects. To combat this problem and encourage development, the plan outlines several recommendations to improve the ability for development in designated areas. Three of these recommendations include the improvement of broadband internet access across the region, the maintenance and improvement of water and sewer infrastructure, and the protection or expansion of green infrastructure.

In the plan, these recommendations were focused in priority areas, of which Greenfield was one. In our Deerfield Street project, we know that at least one of our parcels does not currently hold sewer capabilities but is adjacent to and within accessible range of sewer lines. All of our parcels would be able to access power and broadband internet, making them ideal for development. Residential or commercial development along this area would serve to meet the infrastructure goals of the Sustainable Franklin County Plan by extending these infrastructure services to new portions of the corridor.

The Sustainable Franklin County plan provides a regional context and goals for development. Greenfield and the Deerfield Street corridor play important roles in this development plan. Given our project's location along a State Route 5, should consider the goals of this plan to guide our recommendations. Many of the recommendations already made in Sustainable Franklin County could even be reiterated or redeveloped in our recommendation section. This plan will no doubt help to guide our report, with regard to how Greenfield interacts in with the greater Franklin County region.

Restoring the Heart: A Community Vision for the Neighborhood of Aldenville (2017)

Identification of Problem Area

The City of Chicopee identified a desire to better understand how residents felt about their city and engaged 7 Peaks Planning to test a public engagement process, using Aldenville as a pilot neighborhood. *Restoring the Heart: A Community Vision for the Neighborhood of Aldenville* (RTH), completed by 7 Peaks Planning, addresses the problem of defining a community identity within the Aldenville neighborhood in Chicopee. This pilot study aimed to inform land use and urban design decisions for the neighborhood by ascertaining residents' views on the defining geographies, amenities, destinations, and challenges of Aldenville.

Aldenville is a neighborhood within the City of Chicopee. 7 Peaks Planning describes the neighborhood boundaries as "I-391 to the west, the Mass Pike to the south, and Memorial Drive to the east," with Pendleton Avenue as the northern boundary (7 Peaks Planning, 2017). Aldenville is geographically distinct from Chicopee Center, being physically separated by the Chicopee River and the aforementioned Massachusetts Turnpike. Historically, Aldenville developed as its own agricultural village which grew into a streetcar suburb for the nearby industrial centers of Chicopee Center, Chicopee Falls, and Holyoke. 7 Peaks Planning's public engagement process and planning recommendations focused specifically on Aldenville Commons, known as the core of the neighborhood at the intersection of Grattan Street, Dale Street, and McKinstry Avenue.

Who were the authors? What was their expertise?

The authors of 7 Peaks Planning consisted of seven Masters of Regional Planning students at the University of Massachusetts, Amherst, in the Department of Landscape Architecture and Regional Planning. These students are Nicholas Campbell, Eric Gemperline, Todd Horner, Sean O'Donnell, Sierra Pelletier, Seth Taylor, and Kaitlin Young. They created this plan during the fall semester of 2017 (September to December), as a collaborative student studio project for the Master's in Regional Planning program.

Plan Structure & Goals

According to their client's deliverables, there are seven chapters of 7 Peaks' report that focus on the goals of their plan. The first chapter introduces their project's intent and goals. The second chapter discusses the background and history of Chicopee. The third chapter delves into precedent studies and past studio reports. The team's public engagement methodology and processes encompass the fourth chapter and the fifth chapter analyzes these processes. 7 Peaks devised multiple land use intervention proposals based on their survey responses within chapter six, and the final chapter, chapter seven, concludes the report.

The three primary objectives for their public engagement are the following: 1. Develop an outreach process that includes community survey materials that could be reused for future engagement projects. 2. Experiment with non-traditional modes of community engagement

to maximize variety and volume of community response and data collection. 3. Analyze data collected from the outreach process to best inform the neighborhood visioning process and final Aldenville Vision Plan.

Regarding land use, the City of Chicopee outlined the following five goals for the 7 Peaks team: 1. Develop a comprehensive understanding and graphic representation of neighborhood destinations within Aldenville and create a more connected neighborhood concept. 2. Document, analyze, and discuss neighborhood opportunities and challenges through informed decisions based on the public engagement process that was conducted. 3. Broaden the potential for Aldenville to function as a destination for all City residents as well as visitors. 4. Document and prioritize destinations within Aldenville and propose land-use or urban design interventions to improve these destinations. 5. Utilize existing destinations as anchors to improve the larger neighborhood network of Aldenville.

Tools & Techniques

The client's primary directive, in addition to improved public engagement, was related to land use in Aldenville, and in Chicopee as a whole. Zoning and programmatic changes are recommended by 7 Peaks planning to restore the vitality of Aldenville Commons and its surroundings. 7 Peaks recommends that WHO zone the Aldenville Neighborhood as mixed use would encourage a variety of business types and housing options, including more sit-down restaurants and other retail to fill currently vacant spaces. To maintain the historical character of the neighborhood, a form-based code could be used. 7 Peaks recommends short term interventions that would allow Chicopee to test ideas for land use changes. These short-term interventions include temporary parklets, bike lanes, and art installations. 7 Peaks suggests more community events like the Downtown GetDown and the introduction of a special permitting process that would enable residents to book Aldenville Commons for events. The intent of this recommendation is to increase usage of the space and pedestrian traffic into the neighborhood.

7 Peaks also makes recommendations for mitigating traffic congestion, noise, and speed in order to decrease auto-centricity and improve pedestrian and bicycle safety. They suggest that the City of Chicopee should repaint crosswalks and implement traffic-calming bump outs, use Variable Message Signs to display warnings to motorists, and conduct a traffic study of McKinstry Avenue. 7 Peaks recommends improving walkability and the safety of the pedestrian infrastructure through widening (or adding) sidewalks and implementing High Intensity Activated Crosswalk (HAWK) systems at high-traffic crosswalks. Finally, they recommend the completion of the Field and Farm Path, which would link community assets, like the three municipal parks, McKinstry Farm, and local schools, by a pedestrian trail marked by wayfinding mechanisms and historical signage.

Data

Data used and needed for 7 Peaks' plan were precedent studies, stakeholder input, background history of the focus area, and public engagement data. The precedent studies addressed were previous plans in Chicopee, comparative plans and precedents, comprehensive,

master, village, and corridor plans. Background history and information includes demographic data of the focus area, and history of specific sites analyzed. The public engagement data consisted of their community survey and the analysis of this survey.

The survey was issued in two methods, online and in person. The online survey was a massive outreach effort asking respondents their opinions toward eleven categories. The paper surveys were distributed at community events and RiverMills senior center. The total response rate of the survey was 400 completed surveys.

Multiple maps are used including focus area, regional, and historic topographic maps. Photos of sites and numerous charts displaying data collected through past reports, census data, and 7 Peaks' own analysis are also included. The key data collected from the team's public engagement process are top ranked responses to each of their survey questions, and analysis of all responses.

Public Engagement Process

7 Peaks Planning utilized a community survey, which was intended to be modifiable for future reuse. The survey was distributed online, through paper submission and additionally in Spanish. One unique aspect of their engagement activity was the use of advertising material. 7 Peaks implemented a fortune cookie model advertising scheme. This creativity allowed them to reach a wider audience in an exciting way.

This marketing campaign was combined with community outreach at targeted events, such as Spooktacular and the Bellamy Craft Fair. The team utilized already planned community events, conducting paper surveys. These targeted parents on Halloween, older community members at the senior center, and other demographic groups. The campaign was branded under the title Create Our Chicopee. The final survey was released on October 13th, 2017 and gave users the opportunity to leave their emails in order to receive a copy of the final report in 2018.

Design Principles

The 7 Peaks Planning team recommended a series of form-based code policies, which could affect the physical appearance of the Aldenville neighborhood. Among these changes included the amendment of zoning district Residential B, allowing up to three family dwelling in a structure. Form Based Code was coupled with a recommendation to reduce frontage requirements. An additional recommendation was made to create a Mixed-Use Village District within the Aldenville neighborhood. A Mixed-Use Village District would allow for the development of mixed use in the space, creating a new look and aesthetic.

Implementation Schedule

(time periods of 6 months, 1-2 years, and 3-5 years) for their Chapter 6recommendations that focus on Land Use Sketch Overview, Safe Streets and the Aldenville Commons, and Pedestrian Network. For example, in the section on Pedestrian Networks, 7 Peaks recommended that City of Chicopee implement and increase wayfinding, signage, event programming, educational programs, agricultural preservation, connectivity to other networks, and to explore possibilities of a rail trail. To execute these recommendations, they suggested to conduct a

feasibility study, gauge public support, and explore state and federal funding opportunities within a six-month time period. In 1-2 years, it is recommended that they design and implement the wayfinding system, hold a citywide design contest, improve street infrastructure, and explore transferring development rights for agricultural preservation. And lastly, in the 3-5 year span, the city would install permanent signage, conduct public meetings to determine success of the path, explore additional connections and the development of a former railbed, and provide more recreational opportunities.

Relevance to Current Project

RTH is a recent LARP Studio project, completed by a group of students with essentially the same expertise and timeline as ours. Although our client is Greenfield and focus area is housing, 7 Peaks' scope of work and findings are highly relevant. One relevant recommendation from RTH was the use of HAWK systems in key locations to aid in traffic regulation. Similarly, the recommendation to implement form-based code could also be repurposed for this report. In both RTH and the Deerfield Street Initiative, form-based code would be a successful way of allowing more flexibility in usage and better ensuring aesthetic standards.

Previous University of Massachusetts, Amherst: LARP Activity

In addition to the precedent studies discussed in the previous section, the following reports originating from the Department of Landscape Architecture and Regional Planning at the University of Massachusetts, Amherst are summarized here.

Along the Chicopee River from the Mills to the Ludlow Bridge - Creating a Vision for Indian Orchard

This report was written by the Graduate Urban Design Studio Spring 2012 project with LARP Masters students, Ying Cao, Elizabeth Englebretson, Scott Fulford, Jing Huang, and Yiwei Huang. The three main studio project areas identified were Indian Orchard Mills, Main Street and the backs of the Chicopee River, and the Ludlow Bridge Gateway. There are specific design objectives attributed to each of these main project areas.

The site analysis and assessment section of the report has segments including history, assets and cultural attractions, regional and municipal public open space network, land use and public open space within the project area, street network and tree canopy, public transportation, existing and proposed connections, urban watershed and impervious surfaces, and community participation. They then go site by site and define the current conditions, and recommended improvements to the sites.

Lynch maps, historical study area photos and maps, current study area photos, zoning maps, and graphics of proposed design concepts. This report opens with the studio format, goals, and objectives. It then continues into a site analysis and assessment in order to have the readers under Indian Orchard. The report concludes with design proposals for the study area, and then an appendix that includes references and a bibliography.

The primary goal of this project is to unveil the unique assets and character of the area, to make these assets more accessible and legible to strengthen the identity of Indian Orchard as a lively place for its residents and people in the larger Springfield community with new opportunities for housing, recreation, working and commercial activities. The three methods they are using to achieve this primary goal is by creating a stronger sense of place throughout the project area, acknowledging the strong industrial heritage of the area, and improving connectivity to the existing public open spaces. Suggested solutions with the report include a bike/pedestrian path and connections from Main and Parker Street to the River, a rail trail bicycle path bridging the Chicopee River on historic line, increasing visibility of the River by clearing up heavy vegetation, and revamping the connection between Main street and the study sites near the River.

Their first objective for physical design includes having the area become more distinguishable but unified at the same time by incorporating potential design elements that hold the area together, land uses that should be reinforced to create more distinct areas, and recognizing

concurring planning tools. The second design objective is designing Main Street as the spine for the project area and beyond. The third design objective is designing the edge of the Chicopee River as a system that connects to the City of Chicopee in the west and to the city of Ludlow in the east. The fourth objective is to make the rich industrial heritage a stronger design element in the area and to connect with the art community through public art. The fifth design objective is to incorporate a system of trail and loops that encourage walking and cycling and tie into the nodal elements of the public open space system - parks, cemeteries, plazas, and potentially also vacant lots.

The proposed design improvements to the study sites are organized by site in the report. The sites I will note in relevance to our studio project are the following: Indian Orchard Mill, Parking Lot and Main Street, Indian Orchard Mill and Main Street Gateway, Main Street to Indian Leap, Main Street – Ludlow Bridge Gateway, Main Street – Indian Orchard Mills Gateway, Chicopee Riverfront, and Chicopee Riverfront and Indian Leap.

Indian Orchard Mill
Recommendations include a new visitor's center, a series of green infrastructure elements including infiltration gardens and bioswales near areas of parking and permeable pavement to combat storm water issues. Along the canal, they are proposing a green corridor to provide a walkable path and seating area with views of the River. They aim to create more efficient access points to the Chicopee River to enhance the indoor-outdoor relationship and a rail trial to strengthen these connections.

Parking lot and Main Street
Recommendations include wide walking/bike paths to prevent from the dangers of automobile accidents, an increased tree canopy framing the views as drivers enter the downtown area and serve as a buffer to Main Street traffic.

Indian Orchard Mill and Main Street Gateway
Recommendations include recognizing that the area around the Indian Orchard Mills is the western gateway into the neighborhood, creating a network of pedestrian crossings and bicycle lanes improving accessibility, and thereby creating a welcoming green gateway.

Main Street to Indian Leap
Recommendations include a three-phase design process to create infiltration terraces in the median and increased trees to be planted, more emphasis on pedestrian and cyclist routes, and additional crosswalks created to strengthen the connection of the south side of the neighborhood with the Chicopee Waterfront.

Main Street – Ludlow Bridge Gateway
Recommendations include revamping the intersection at Main Street and Ludlow Bridge serving as a gateway to the Indian Orchard neighborhood. This area was originally concrete and asphalt with vacant lots. A redesign would include improvements to the layout of the space and additions to green space to help create an entrance that is desirable and appropriate for the gateway.

Main Street – Indian Orchard Mills Gateway

Recommendations include defining the Indian Orchard Mills Gateway and a new park. There is an existing under-utilized park that will be transformed into an area of mixed commercial and community service uses. The goal is that the public park will reduce the number of impervious surfaces, and an inviting space for people to enter the trail or the Indian Orchard Mills.

Chicopee Riverfront

Recommendations include creating a path that begins on the old railway route along the water's edge, reusing old and sustainable new material to transform the corridor into a new bicycle/pedestrian trail, and a secondary pedestrian path on the lower level and closer to the water's edge that meanders between outlooks on the River and the forested areas inside. Trees and understory vegetation can create a distinct edge between the bicycle and pedestrian path, and a series of platforms can be placed along the path to allow residents and visitors to view and interact with the River.

Chicopee Riverfront & Indian Leap

Recommendations include a redesign of the Indian Leap Street, which serves as a main entrance from Main Street to Indian Leap, with sidewalks, streets, on-street parking spaces, and bicycle paths. A pedestrian path and bicycle path connecting to the Indian Orchard Mills along the riverfront park is also recommended. Further proposals include a handicapped accessible ramp and hiking path that connects to another deck along the river bank.

The relevance of this studio report to the Deerfield Street Neighborhood project includes redesign proposals involving gateways to Main Street, traffic, access to the river, and flooding. Gateways to Greenfield's Main Street could be improved by creating an efficient network of pedestrian crossings and bicycle lanes to improve accessibility to the Deerfield Street corridor. A more welcoming green gateway at the intersection of Mill Street, Bank Row, and Deerfield Street would define the corridor and increase activity around the Green River. This intersection could be redesigned with updated sidewalks, crossing systems, and bicycle paths. Proposals to mitigate traffic and danger to pedestrians related to traffic within the Deerfield Street corridor include wide walking/bike paths, and an increased tree canopy to frame the views as drivers enter the downtown area which would also serve as a buffer to Main Street traffic. Proposals to increase access to the river include providing a walkable path and seating area with views of the River, creating a path along the River's edge and transforming the surrounding area into a new bicycle/pedestrian trail. Proposals to mitigate flooding effects from the Green River are a series of infiltration garden, bioswales, and permeable pavement near areas of parking. Also, the construction of another public park within the Deerfield Street corridor would reduce the number of impervious surfaces.

Downtown Athol: A Revitalization Plan

Developed in 2014 by the Millers' River Consulting team, *Downtown Athol: A Revitalization Plan* seeks to help the town of Athol respond to the failings of its downtown neighborhood. Like many typical New England mill towns, Athol felt the decline that came with the exit of its

industrial economic base. This industrial decline resulted in closed mill buildings and struggling main streets across Massachusetts and in Athol. The Millers River Team were tasked in this plan to contribute unique and creative recommendations to revitalize the now declining downtown neighborhood.

At the time of the Plan's development, a new office park development was underway and posed particular challenges to the downtown neighborhood. The downtown area was already experiencing economic leakage, business leaving the area for other regions. This incoming development was expected to bring in 100,000square feet of commercial space, 600 new jobs, and was projected to bring in significant tax revenue. While this project would no doubt have a positive economic impact for the Town of Athol, the downtown may suffer from further leakage and declining business.

In order to determine what must be done, the Millers River team developed a public engagement process featuring two workshops. These workshops were conducted to identify themes and specific areas of concern from resident and businesses in the Town of Athol. The themes that emerged from this process and the teams background research included: land use and zoning confusion, appropriate location of commercial development, vacant lots and buildings, parks and open space, protections of open space, and the potential repurposing of a Job Lot commercial parcel.

One of the determined challenges downtown Athol's revitalization was confusing zoning which over regulated the land. This is a common challenge that zoning creates, over powering regulations that deter or even limit development. This was done in Athol through concepts such as floor-area-ratios, dwelling limits per acre, setbacks, and parking requirements. These regulations often limit the number of units that can be built in commercial and residential zones, resulting in failures of neighborhoods. To combat restrictive zoning, the Millers River Consulting team proposed the town implement Form Based Code.

Form Based Codes were proposed for the purpose of developing a predictable continuity within the built environment of the downtown neighborhood. Form Based Code seeks to regulate building style, height, and interaction with the public realms such as sidewalks and public ways. This approach is less restrictive in use and the interior make-up of the building. Overall this approach is much more developer friendly and easily interpreted through written and visual mediums.

The recommendation of Form Based Code is most successful in town or village centers. As such, Form Based Code would not work entirely in the Deerfield Street corridor, however some concepts could be redirected into zoning recommendations. Form Based Code works in part because of its relaxation on regulation in use and restrictions on development. To encourage development in the Deerfield Street corridor, we could recommend the relaxation of zoning regulation and parking requirements. This could be coupled with design standards in order to combat the risk of flooding due to the Green River.

A second recommendation made was the proposal for the town to adopt Mass 40R zoning. The Smart Growth Zoning Overly District Act incentivizes development of mixed-use or high-density residential development near transit centers or existing town centers. This district zoning provides payouts to communities for development, expedites permitting to incentivize developers, and allow the municipal control over design standards and style. While these districts may require extended periods of time and comprehensive public engagement to develop and implement, they serve to control and expedite development in towns after completion.

Mass 40R could also be used as a recommendation in our project, as it would allow for greater investment by the town moving forward. Given its proximity to the rail way and downtown Greenfield, the Deerfield Street corridor and the study area would make a prime location for such an overlay district. The funding kickbacks received from development in the zone would create a new funding source and allow the town to further reinvest in the area. This would also create an expedited process for developers and encourage development along the corridor. Based on its municipal re-funding implications and developer incentives, 40R Zoning could be a strong recommendation for the Deerfield Street Initiative.

A third and final recommendation made in the Revitalization Plan is the implementation of Adaptive Reuse Programs. These programs are intended to revitalize targeted areas with high vacancy rates. The programs work by encouraging redevelopment or reuse of existing vacant buildings, through expedited permitting, waivers of restrictions, and relief from parkin regulations. This ensures that old underused buildings can be repurposed without extended development processes or interruption of existing character. To repurpose vacant units and buildings along Deerfield Street, we should propose Adaptive Reuse Programs.

Adaptive Reuse Programming could be an ideal way to repurpose the vacant buildings within our study area. Within our study area are multiple vacant housing units and commercial buildings, which participants in our workshops commented were an eyesore and underserved the neighborhood. Adaptive Reuse Programs would allow developers to work within the restrictive zoning that exists along the Deerfield Street corridor. This would also allow for the fast tracking of a process to bring business to the corridor. Adaptive reuse programs would work well in our Corridor and help create new business opportunities in an area that needs private investment.

Community Land Trusts and Rental Housing: Assessing Obstacles to and Opportunities for Increasing Access

Maxwell Ciardullo received his Master's of Regional Planning from the University of Massachusetts Amherst. His thesis is titled "Community Land Trusts and Rental Housing: Assessing Obstacles to Opportunities for Increasing Access." In this paper, he researches Community Land Trusts (CLTs), an affordable housing model based in the principles of community control of land and housing, as well as the permanent affordability of home ownership. He outlines four recommendations to assist CLTs, specifically Original CLTs, in beginning to provide rental units or scaling up their rental program.

CLTs have a membership-based governance structure and limited-equity formula. These are positioned to target investment in communities of color and low-income, without perpetuating cycles of displacement. CLTs are focused on home ownership, but many have begun to include rental housing. CLTs interested in providing rental units tend to find limited sources of research guidance on the topic. The goals of this report are to evaluate the reasons CLTs do or do not provide rental housing, the obstacles to providing rental housing, the strategies they use to overcome those obstacles, and the resources available to them. In order to achieve these objectives, he assessed interviews with staff at 22 CLTs around the U.S. This report also aims to encourage planners to reevaluate housing policies biased toward home ownership, especially given the instability of the housing market and the increased demand for rental units. The results of this report indicate that CLTs begin providing rental units to meet the housing needs of low-income people who do not qualify for mortgages, and

when the resources available to them supports their strategy. Significant challenges faced by CLTS are taking on large rental projects early in their rental careers, and that they require much more technical assistance in developing and managing rental properties.

This thesis report opens with an introduction and explanation of his research design. This section includes background of the research focus, history and context, the community land trust mode, research goals, questions, and objectives, scope including limitations, delimitations and assumptions, and a research outline. The following sections include a literature review, research methodology, results and discussion, and then concludes with recommendations for CLTs, implications for planners, future research, and final thoughts.

Data used and needed for this thesis report were case studies, interviews with staff and members of a number of different collectively-owned housing models, essays, surveys, anecdotal histories of the BLCT and Rose City CLT, newspaper articles, and journal articles. Tables are included noting the data collected and analyzed, and his interview protocol documents.

There are four recommendations discussed to assist CLTs. The first two recommendations are for the national organizations that provide assistance to CLTs. The second two are directed at CLT staff and board members. The first recommendation is to provide CLTs with unbiased technical assistance regarding low-income housing tax-credit projects. The second is to provide CLTs with values-aligned property management assistance and training, including business models and best practices. The third is for CLTs to consider the relationship they want with their tenants and strategically plan their property management practice around this goal. The fourth final recommendation is for CLTs interested in, or already providing rental housing to market their organizations as flexible affordable housing developers designed to accommodate multiple tenures and assist interested members in moving up the tenure ladder.

In reference to our studio project, this thesis report is relevant in that the City of Greenfield has a high rate of renters in comparison to home-owners. CLTs are arranged to target investment in low-income communities without perpetuating cycles of displacement. Those CLTs that have begun to include rental housing would help aid housing in the City of Greenfield. With unbiased technical assistance, CLTs in Greenfield could be aided in their low-income tax-credit projects. This report's recommendations circle around a common theme of value-based overall management assistance and training for CLTs, and this may be just what the City needs in order to further low-income housing development within the Deerfield Street corridor.

Routes to the Renaissance for Pittsfield, MA

Routes to the Renaissance for Pittsfield, MA is a report produced by the Regional Planning Studio team (Armata et al.) in the fall of 2015. Armata et al. identify the Studio's principal problem as a need to update Pittsfield's outdated zoning ordinance to match the development style the City of Pittsfield wishes to adopt. Within this overall issue, there are seven sub-problems defined by the City for the Studio project to tackle: 1) the inconsistent zoning and uninspiring appearance of the main "gateways" (entrances) to the city; 2) a confusing table of permitted uses in the zoning ordinance; 3) lack of design guidelines to unify city architecture; 4) lack of a higher-quality signage regulation; 5) a site plan review process that could not consistently ensure development standards; 6) a prevalence of parcels split between two zoning districts; and 7) a need for pro forma analysis to determine the costs of multifamily housing development. This summary will focus on the land use and housing aspects of this Studio project, as they have the most relevance to the Deerfield Street Initiative.

The Planning Studio team addressed these seven issues through a land use lens, by recommending the creation of four overarching zoning districts for Pittsfield: gateway, downtown, business/industrial, and residential. Each recommended district would receive its own permitted uses, design guidelines, sign regulations, and site review process, partially addressing sub-problems 2-5. Sub-problem 1 was addressed through a gateway study, which included a Lynch analysis of each gateway. The recommended gateway district unified a design and zoning approach to ensure consistency but contained three sub-districts that would make district regulations more flexible. Each subdistrict – including gateway-commercial (GC), gateway-industrial (GI), and gateway-residential (GR) – had its own appropriate regulation (including public safety requirements, design guidelines, signage, and permitted usage) to protect or improve existing neighborhood character surrounding the five gateways into Pittsfield.

To address sub-problem 2, the Studio team recommended an overhaul of the permitted uses table. This revision would include defining all undefined uses, condensing similar zoning districts into the four mentioned above, and making the table itself more navigable with the appropriate regulations for each use mentioned in an adjacent column for reference. Sub-problem 5, characterized by a site plan review process which only applied to special uses (allowing many large-impact developments to proceed without a review), was resolved through recommendation of a threshold method, in which projects over a certain parcel size would trigger a site plan review. Different sizes would require review depending on which of the four overarching districts (gateway, downtown, business/industrial, residential) they were located in.

Armata et al. performed separate analyses, beyond recommendation of the four overarching districts, to develop solutions to sub-problems 6 and 7. For sub-problem 6, the authors used the Tyler Street corridor (a downtown street with many parcels split between commercial and residential zones, complicating permitting and land use decisions) as a pilot study for a recommended overlay district that rezoned split parcels. Parcels with frontage on Tyler Street would be rezoned as General Commercial (under existing zoning), while all others would be rezoned as Residential. For sub-problem 7, the studio team conducted a pro forma analysis of various multifamily housing types, determining that greater density of units per acre and reduced parking requirements per development were required to ensure multifamily buildings could recover their construction and maintenance costs through taxes.

The aspects of Routes to the Renaissance most relevant to the Deerfield Street Initiative are the gateway study and the revision of the permitted uses table as it applies to gateway areas. The Deerfield Street neighborhood forms the southern gateway into Greenfield, and a gateway district with its own design guidelines, pedestrian safety features, and permitted uses would allow the City of Greenfield to pursue its planning goals within the neighborhood. Through revising permitted uses the City could ensure that given types of housing (whether single-family, two-family, or multifamily) are permitted by right, rather than special permit. Through pedestrian safety requirements and design guidelines, the City could ensure safety and walkability features, like physical barriers between the sidewalk and road, to mitigate the high traffic volume on Deerfield Street; and ensure that new housing or mixed-use construction meets design guidelines for matching neighborhood character while also pushing for the development types the City has expressed interest in, whether small footprint/energy efficient homes or pocket neighborhoods.

Chapter 7: Recommendations

Introduction

The following section presents our recommendations to address each of the five challenges identified by our client. These challenges include Housing, Priming the Pump, Land-Use Mix, Flooding, and Distressed Properties. Our recommendations will be grouped into and presented in these five categories. Additionally, we put forth a set of overall neighborhood revitalization recommendations. Each of our recommendations provides a detailed description of how it addresses the Client-identified challenge, a description of how the recommendation could be implemented, and whether it could be undertaken in the next 6 months, 1-2 years, or 3-5 years. Finally, GRP will provide a full timeline of recommendations in order to demonstrate the implementation schedule and responsible parties.

Figure 43. Combined map of recommendations

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Flooding

Recommendations

As discussed in the Geography section of Chapter 1 and in Chapter 5: Literature Review, flooding poses a major risk to existing and future development in the Deerfield Street neighborhood. The federally-defined 100-year floodplain, which is the area determined to have a 1% chance of flooding in any given year, already includes many properties on Deerfield Street and climate projections indicate that flooding will worsen over time as climate change continues (US Global Change Research Program, 2018). Additionally, the 100-year floodplain map currently in use in Greenfield may need to be updated, as it was last updated by the Federal Emergency Management Agency (FEMA) in 1980. Director of Greenfield's Planning and Development, Eric Twarog, AICP, has indicated that updated floodplain maps may be received from FEMA in the foreseeable future, though an exact timeline is unclear.

Given current and likely future flood risk, GRP recognizes two possible pathways forward to manage flood risk in the area:

1. Pursue infrastructural solutions that allow development to remain where it is currently (such as floodproofing buildings; this can be considered Greenfield's current approach)
2. Pursue land-use solutions that shift development density over time to safer areas, such as the section of the neighborhood on the east side of Washington Street and Hope Street

Each pathway is discussed in more detail below.

Infrastructural Solutions

As discussed in Chapter 5: Literature Review, approaches to controlling river floods in the 20th century focused on walling the river with concrete channels and levees (high walls of earth or other material next to the riverbank) or building dams. The Green River has already been "channelized," meaning concrete walls have been built to turn the waterway into a controlled canal-like structure. Additionally, there is likely not enough width between the river's edge and the rear of private properties to consider additional infrastructures like levees, as they require a large amount of space in addition to being costly (FEMA, 2007).

While these infrastructural approaches may have seen some success in reducing routine floods, over the long-term they have been noted to increase the heights of extreme flood events, and pass on the worst flooding damages to communities downstream of wherever they were implemented. In addition, structures like these can be insufficient to protect against historic flood events, when extremely high floods can reach over the top of infrastructure and cause damage (Birkland et al., 2003). Therefore, they do not guarantee that nearby property and livelihoods will be protected.

A second component of the infrastructural approach is known as floodproofing, in which physical adjustments to buildings are made to increase their resistance to flood damage ("Floodproofing," 2018). Many of the structures currently in the 100-year floodplain in the Deerfield Street neighborhood were built before adoption of Greenfield's Floodplain Overlay District, a zoning district which corresponds to the 1980 100-year floodplain map and prohibits any new, permanent building in the

floodplain (recreational and temporary structures are permitted) (Greenfield Zoning Ordinance, 2018).

The Overlay District allows structures to remain in the floodplain if they existed legally before adoption of the Overlay District, and allows structures damaged by floods to be rebuilt through the Zoning Board of Appeals' special permit process if the structure is professionally certified not to increase flood levels. A rebuilt structure it must also comply with Massachusetts state building requirements for floodplain areas (which generally require: the lowest floor of structures to be elevated above the 100-year flood level, or that the lowest floor not be designed for inhabitation; use of flood-resistant construction materials; and elevation of mechanical/electrical equipment) (Ninth Edition of Massachusetts State Building Code 780, 2017).

Thus, current regulations allow rebuilding in the floodplain. This option carries the advantage of supporting residents in remaining in place, as they may have lived in the area for a long time and might not wish to leave. However, it carries the disadvantage of not reducing the number of people or structures at risk from experiencing flooding in the first place.

If Greenfield wishes to continue allowing existing structures to remain in the floodplain, it may be worth seeking funding to help private property owners increase their buildings' resistance to flooding even further. Here are several possibilities for the City to consider:

- Enrolling in the Community Rating System to decrease the cost of flood insurance for property owners, which would reduce insurance premiums if Greenfield can meet

program requirements (see the https://www.fema.gov/national-flood-insurance-program-community-rating-system webpage) *(6 months)*

- Using FEMA's Hazard Mitigation, Flood Mitigation Assistance, or Pre-Disaster Mitigation grant programs to extend grants to property owners to fund floodproofing of their properties and reduce potential damages from flooding. *(1-2 years)*
    - Hazard Mitigation: https://www.fema.gov/hazard-mitigation-grant-program
    - Flood Mitigation Assistance: https://www.fema.gov/flood-mitigation-assistance-grant-program
    - Pre-Disaster Mitigation: https://www.fema.gov/pre-disaster-mitigation-grant-program
    - Private floodproofing: https://www.fema.gov/floodproofing webpage.

Land-Use Solutions

If it is decided that flood risks are too great or too repetitive to continue rebuilding structures and allowing development within or near current and future flood-prone areas, to reduce the number of homes and businesses at risk from flooding (see Birkland et al., 2003) Greenfield could consider shifting the residential and commercial center of the Deerfield Street neighborhood eastward, up the natural hill that slopes away from Deerfield Street. This recommendation would involve several steps:

1. Beginning a community engagement process to create agreement on redirecting growth (see the Municipal Vulnerability Preparedness program below) *(6 months)*
2. Not pursuing the grant programs mentioned above
3. Ceasing the approval of special permits to rebuild damaged properties within flood-prone areas *(1-2 years)*
4. Considering use of FEMA's Hazard Mitigation Grant Program to fund buyouts for property owners within the floodplain, providing owners with fair compensation *(3-5 years)*
5. Designating safe areas nearby for increased housing and commercial development, to offset any decreases in housing units or retail establishments
    a. The 40R Smart Growth Overlay District may be an effective way to direct new development and receive state funding; see the associated 40R recommendation in the Housing section of this chapter *(1-2 years)*
6. Converting land-uses within or near flood-prone areas to recreational uses, which experience less risk from flooding *(3-5 years)*

Figure 44 displays the current floodplain (shown in red) and where increased development may be more suitable (shown in green), based purely on topography.

GRP recognizes that redirecting density over time is a difficult pathway to pursue, as for many community members it may involve moving away from an area that carries longstanding emotional attachment.

To manage this process, GRP recommends that Greenfield consider undertaking the Massachusetts Municipal Vulnerability
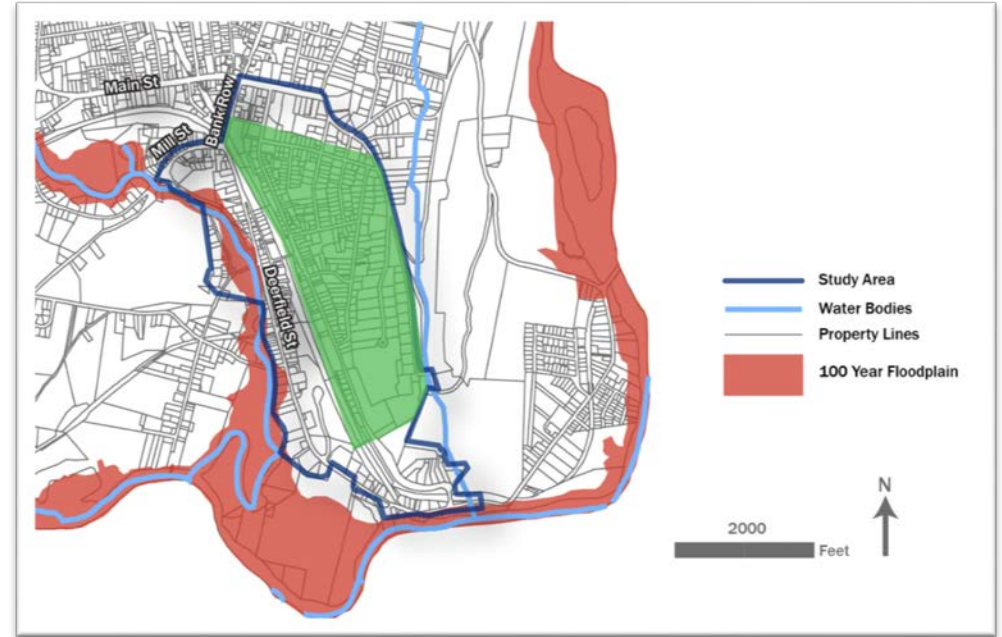
Figure 44. depiction of current floodplain and potential location of increased development

Preparedness (MVP) program. This program provides cities and towns with funding to undergo a community-based planning process, in which any and all stakeholders are invited to use a facilitated process to collaboratively discuss natural risks, such as flooding, and come to consensus on the ideal solutions to those risks. The process is managed by a state-certified MVP provider (usually a private consultant or non-profit). Once a municipality has completed the MVP program, it becomes eligible for further risk reduction funding from the Massachusetts Executive Office of Energy and Environmental Affairs (EEA). For more information on the MVP program, see the

(https://www.mass.gov/municipal-vulnerability-preparedness-mvp-program).

Many communities near Greenfield have successfully undergone this program already, such as Northampton, Deerfield, and Montague. Their reports from the process can be viewed at https://www.mass.gov/service-details/2017-2018-mvp-planning-reports.

The MVP program is helpful for collectively addressing different viewpoints, values, and goals for risk reduction, and as such it is recommended for this land-use-based flooding solution pathway. However, the program can also easily be used to seek funding and community agreement on flooding and other risks if Greenfield decides to pursue the infrastructural solution pathway and allow development to remain in place.

Implementation

Each of the solutions described above would be primarily pursued by the City of Greenfield, and likely by multiple departments, such as Planning, Community Development, Public Works, and Building.

Infrastructural Solutions

Pursuing the Community Rating System could begin in the next 6 months, while seeking FEMA grants may need a longer timeline of 1-2 years, considering the need to first update Greenfield's Multi-Hazard Mitigation Plan (expires in 2019; an update is already funded and underway).

Land-Use Solutions

GRP recommends pursuing the MVP program, or a similar community engagement process, to build support and buy-in for this flood management option within the next 6 months as a

priority. After this process is complete, the other steps (ceasing special permit approval, applying for FEMA Hazard Mitigation funds, and creating a Smart Growth Overlay District) could unfold on a longer 1-2-year or 3-5-year timeline, to allow for updating of the Multi-Hazard Mitigation Plan and to accommodate time needed for grant application and disbursement, to allow for updating of the Multi-Hazard Mitigation Plan and to accommodate time needed for grant application and disbursement.

Figure 46. Current conditions adjacent to Green River Liquors

Figure 45. Rendering of proposed pedestrian path at this site

Housing
Recommendations
40R Smart Growth Overlay District

Our client-identified challenge related to housing is expanding the existing housing supply, especially for low-income populations. Based on our review of precedent studies, such as the Greenfield Housing Study, we determined new housing is needed to help maintain current rental prices and ease pressure on the existing supply since vacancy rates are currently low. We believe Greenfield should prioritize creating housing options for the area's extremely low income population. As discussed in Chapter 5: Literature Review, limitations placed on residential density through zoning often contributes to the high cost of housing (Dougherty, 2018). In Greenfield, the majority of zoning districts prohibit the construction of multi-unit residences without a special permit. This creates a barrier to increasing residential density.

We recommend the adoption a 40R Smart Growth Overlay District, which incentivizes infill development and the production of housing that feature "smart growth" characteristics. This refers to compact development at 8-20 units per acre, with at least 20% of new units affordable to a household earning 80% of the AMI. To qualify, Greenfield would have to create "as-of-right" overly zoning that meets the 8 unit per acre density minimum and 20% affordable housing unit minimum, although the City could choose to pursue higher standards for density and affordability (CHAPA, 2018).

Smart Growth Overlay Districts are designed to be implemented in areas that are within a half mile of commercial centers or transportation stations in order to encourage pedestrian and transit uses. The Deerfield Street neighborhood's location within walking distance of downtown Greenfield and the Olver Transit Pavilion makes it a good fit for the 40R Overlay. The exact location of the Overlay District within the Study Area would be determined based on further analysis, but the Eastern side of the study area, where flood risk is reduced, could be a suitable location.

A 40R Smart Growth Overlay District includes a one-time Zoning Incentive Payment to the City of $10,000-600,000 for adoption of the overlay, with the exact amount based on the number of additional as-of-right units allowed. Additionally, there is a $3,000 payment in cash to the municipality for every new unit constructed in the Overlay District (CHAPA, 2018).

Implementation

To create a 40R Smart Growth Overlay District in the Study Area, a preliminary application form with proposed District boundaries and zoning text must be completed to determine the eligibility. Before the application is submitted, the City is required to hold a public hearing to address neighborhood concerns. This application process determines if the location is eligible based primarily on the underlying zoning of the area, existing residential density, and infrastructure. Following State approval, the city council would need at least a two-thirds vote of approval before the Overlay District could be officially adopted.

Figure 47. current conditions at single Deerfield Street Parcel

Figure 48. Rendering of a Residence at this site

Priming the Pump

GRP was directed to look into the viability of developing mixed and low-income residential units on the publicly-owned parcels in the Deerfield Street neighborhood.

To address the challenge of priming the pump within the Deerfield Street neighborhood, GRP conducted a pro forma analysis to understand development potential and restraints on the publicly-owned parcels our client identified. A pro forma is a calculation method that presents projected costs of a project through a model of cash flow analysis. Planners and developers use a pro forma analysis to determine the feasibility of a potential development, essentially seeking an answer to the question "does it pencil?" The pro forma considers all of the financial inputs necessary to develop a property, as well as the costs associated with maintenance over a specific period of time in order to determine what the property owner would need to charge in rent or sale price for each unit. To inform our process with the most context-specific information possible, we met with local real estate agents and our client, MJ Adams, to discuss costs that would be associated with this development. We also sourced data from the HUD Allowances for Tenant-Furnished Utilities and Other Services for the city of Greenfield to gather average utility costs.

Pro Forma Analysis

We conducted this pro forma analysis to determine the viability of a multi-family residential development on the publicly-owned parcel at 29 Washington Street.

The selected parcel on Washington Street is located within the General Commercial (GC) zoning district. According to Greenfield's zoning ordinance, residential uses in this zone must comply with the requirements for the Urban Residential (RA) zoning district. A two-family dwelling would be allowed on this site with a special permit from the Zoning Board of Appeals.

The multi-family development that this pro forma is modeled for includes two units with four bedrooms in each unit. It is located on of .26 acres (11,142 square feet) of vacant land and has a residential area of 1,507 square feet. However, we factored in the future residential area as 2,600 square feet to account for minimum lot area, minimum landscaped open space, and 4 parking spaces. This parcel's land is valued at $33,900 and has a total value of $38,600. For this model, since Greenfield owns the parcel, the purchase price is non-existent, factored in at $0. Greenfield's current property tax is at 2.5%, which would be $5,000 per year based on the total assessed value of the land and future structure.

Because this parcel is vacant, we assumed the "renovation" cost used in the model is actually the construction cost, due to the fact this will be a brand-new development. According to our client, the average construction cost in Greenfield is $150 per square foot. To calculate total construction cost we multiplied the size of the intended units (1,300 square feet each) by two to determine the total number of square feet. We then multiplied the total number of square feet (2,600) by $150, which amounts to a total construction cost of $390,000.

We have added legal and other personal fees to the final sale of the property, which brings the total initial cost to $422,997. To purchase this with a loan to cover the initial costs, we have included both the loans and the interest costs. GRP has split the loan amount into two loans ($150,000 and $50,000) with a 5% interest rate for each.

This leaves $223,000 to be financed through grants. We have split this as well, into $60,000 and $163,000. This private equity, combined with the loans and interest, would cover the cost of this development.

GRP conducted a pro forma using the Franklin County fair market rents (FMR), specifically focusing on the "Very Low-Income Limit" (VLI). The FMR is typically used to determine the payment standard amounts for the HUD Section 8/Housing Choice Voucher Program. Fair market rent guidelines establish that households should spend no more than 30% of their income on housing costs. The average annual income for a 5-person household at the VLI level is $59,900, with a monthly income of $4,991. 30% of the monthly income is $1,497, so the fair market rent should reflect this figure. As such, the rental rate for each unit was factored into the model at $1,500.

Figure 49 depicts the first step of the Pro Forma analysis, where all funding sources, debts, operations costs and escalation rates, and sources of revenue are entered into the model.

Figure 50 shows the valuation of the project over a ten year period. This presents annual rental revenue, expenses like property management, taxes, and utilities, and loan payments, and the free cash flow (FCF) that remains. At the 10-year mark, total annual revenue for this development would be $36,147. After expenses, annual net operating income would be $22,731. With $15,839 in annual loan payments, the total FCF is $6,874.

Source		423,000
Equity		**223,000**
	Grant_1	60,000
	Grant_2	163,000
Debt		200,000
	Tranche_1	150,000
	Tranche_2	50,000
Uses		422,997
	Purchase Price	-
	Construction	390,000
	Legal	3,500
	Bank	2,000
	Personal	1,500
IDC		24,700
Tax Escrow		297
Finance Cost		4,500
Surplus/(Deficit)		3

DSCR Min	1.13
Cash-on-Cash Min	0.90%

Operations	Units	I/P
Unit 1- Four Bedroom	Per Month	1,500
Unit 2- Four Bedroom	Per Month	1,500
Vacancy1		4.00%
Vacancy2		4.00%
Rental Escl	Annual	0.50%
Management	Per Net Rev	3.00%
Repairs	Per Net Rev	3.00%
Janitor	Per Year	2,400
Heat	Per Year	1,720
Electricity	Per Year	1,244
Water	Per Year	396
Propery Tax	Per Year	5,000
Insurance	Per Year	2,600
Expense Escl	Annual	2.00%

Finance		I/P
Loan 1		
Principal		150,000
Term (Years)		20
Interest Rate		5.00%
Structure		1
Origination Fee		1.00%
Loan 2		
Principal		50,000
Term(Years)		20
Interest Rate		5.00%
Structure		1
Origination Fee		1.00%

Valuation		I/P
Capitalization Rate	Cap_Rate	10.90%
Sales Expense	Sales_Exp	0.00%
Discount Rate	Discount_Rate	10.00%

Figure 49. Pro Forma Analysis Inputs

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Valuation:

	Year	1	2	3	4	5	6	7	8	9	10
Revenue											
Rental		36,000	36,180	36,361	36,543	36,725	36,909	37,094	37,279	37,465	37,653
Vacancy		(1,440)	(1,447)	(1,454)	(1,462)	(1,469)	(1,476)	(1,484)	(1,491)	(1,499)	(1,506)
Total Revenue		34,560	34,733	34,906	35,081	35,256	35,433	35,610	35,788	35,967	36,147
Expenses											
Management		(1,037)	(1,042)	(1,047)	(1,052)	(1,058)	(1,063)	(1,068)	(1,074)	(1,079)	(1,084)
Repairs		(1,037)	(1,042)	(1,047)	(1,052)	(1,058)	(1,063)	(1,068)	(1,074)	(1,079)	(1,084)
Janitor		(2,422)	(2,471)	(2,521)	(2,572)	(2,624)	(2,677)	(2,731)	(2,786)	(2,842)	(2,899)
Heat		(1,736)	(1,771)	(1,807)	(1,843)	(1,880)	(1,918)	(1,957)	(1,996)	(2,037)	(2,078)
Electricity		(1,255)	(1,281)	(1,307)	(1,333)	(1,360)	(1,387)	(1,415)	(1,444)	(1,473)	(1,503)
Water		(400)	(408)	(416)	(424)	(433)	(442)	(451)	(460)	(469)	(478)
Property Tax		(5,046)	(5,148)	(5,252)	(5,358)	(5,466)	(5,576)	(5,689)	(5,804)	(5,921)	(6,040)
Insurance		(2,624)	(2,677)	(2,731)	(2,786)	(2,842)	(2,900)	(2,958)	(3,018)	(3,079)	(3,141)
Total Expenses		(15,557)	(15,839)	(16,127)	(16,421)	(16,721)	(17,026)	(17,337)	(17,655)	(17,979)	(18,309)
Net Operating Income		19,003	18,894	18,779	18,660	18,536	18,407	18,273	18,133	17,988	17,838
Debt											
Loan 1		(11,879)	(11,879)	(11,879)	(11,879)	(11,879)	(11,879)	(11,879)	(11,879)	(11,879)	(11,879)
Loan 2		(3,960)	(3,960)	(3,960)	(3,960)	(3,960)	(3,960)	(3,960)	(3,960)	(3,960)	(3,960)
Total Debt		(15,839)	(15,839)	(15,839)	(15,839)	(15,839)	(15,839)	(15,839)	(15,839)	(15,839)	(15,839)
		-	-	-	-	-	-	-	-	-	-
Reversion FCF											
Operating FCF		-	-	-	-	-	-	-	-	-	-
		3,164	3,055	2,940	2,821	2,697	2,568	2,434	2,294	2,149	1,999
Total FCF	(223,000)	3,164	3,055	2,940	2,821	2,697	2,568	2,434	2,294	2,149	1,999
DSCR		1.20	1.19	1.19	1.18	1.17	1.16	1.15	1.14	1.14	1.13
	Minimum	1.13									
Cash-on-Cash		1.42%	1.37%	1.32%	1.27%	1.21%	1.15%	1.09%	1.03%	0.96%	0.90%
	Minimum	0.90%									

PV Reversion	-	0.00%
PV Operating	16,662	100.00%
Total	16,662	100.00%
CF0	(223,000)	
NPV	(206,338)	

Figure 50. Projected Valuation over a 10-year period

The pro forma model shows that for this two-unit residential development, at a rental rate of $1,500 per unit per month, a developer would net a profit of $1,999 a year. While this might not sound like a lot for traditional for-profit real estate development, it does suggest that the construction, maintenance, and operation of a comparable project would not operate at a loss. Non-profit affordable housing developers or a housing authority often take on projects like this one, and the city would likely secure a developer through a Request for Proposals (RFP) process.

In addition to identifying the appropriate development funding sources and/or financial assistance for low-income tenants, there are other considerations for residential development. Greenfield's zoning ordinance requires a minimum of two parking spaces per unit, which would amount to four spaces for this development. The developer will have to factor in the potential requirement for open space and parking and how this will affect the size and design of the building and its surroundings. In addition to these, the city of Greenfield has adopted the Stretch Energy Code that sets energy performance standards of new development using the HERS (Home Energy Rating System) index rating, which could impact the projected cost of utilities. Flooding does not have to be a major consideration as this parcel is located on a FEMA floodplain C of low risk.

Recommendations

Based on this pro forma analysis, GRP recommends Greenfield pursues the development of housing on publicly-owned parcels in the Deerfield Street neighborhood. In order to attract private developers, additional funding sources would need to be secured in order to incentivize the development of housing units that would be affordable for low-income renters. The other publicly-owned parcels in our study area require further analysis to determine their potential for mixed or residential uses with special attention given to flood risk.

Figure 52. Current conditions at 29 Washington street

Figure 51. Rendering of a residence at 29 Washington street

Land-Use Mix

Recommendations

Commercial Adaptive Reuse

In order to preserve the existing commercial property stock along the Deerfield street neighborhood, we are recommending the development of an Adaptive Commercial Reuse Program. Adaptive reuse programs utilize the already existing stock of properties and encourage new usages within them, such as residential or commercial usages. This preservation helps to maintain the existing cultural character of a neighborhood and provides increased employment opportunities by reactivating previously closed businesses. This method also encourages business creation by grandfathering nonconforming structures where redevelopment may not be possible under current zoning (Conboy et al. 2014). The program we are proposing would further incentivize adaptive reuse with a stipulation for commercial properties.

New usages within existing buildings would be encouraged by incentivizing allowed commercial usages at lower cost to the business owner. Incentivizing can occur through waivers of permitting fees or an expedited permitting process. One of the primary hurdles that stands in the way of development is an inability for developers to meet a speedy or affordable timeline (McIntyre, 2018). By expediting and decreasing the costs associated with locating within these existing structures, the Client can encourage business creation at a pace preferable to the potential business owner. While fee waivers may sound costly for the client, the program ultimately results in new business creation, which creates increased tax revenue where there previously was none.

Implementation

The first step necessary in the development of this program is the designation of a permit granting authority. We would recommend that the Department of Community and Economic Development provide oversight of this program. Under this program the department would be charged with ensuring that all applicants to the Commercial Adaptive Reuse program meet the health and safety requirements of their proposed usage and that their business fits with the mission of this program. Additionally, this department would be required to complete and file the application in a timely manner. To ensure this level of efficiency, the department would need to develop a thorough yet easy to understand application.

In the case of uses not normally allowed in a zoning district, the applicants would need to appear before the Zoning Board of Appeals (ZBA). When a Commercial Adaptive Reuse application comes before the ZBA, there would need to be a standardized one meeting process for all applications to be processed within. This ensures that all nonconforming uses are adequately reviewed, and the public is given opportunity to weigh in on proposed reuse, but the process is still expedited to encourage reuse. The speed at which these applications are processed could be a major factor in a developer or business owner's willingness to locate within an already vacant building and meeting their timeline will increases the successfulness of this program. We estimate that this application process could be developed within the next six months and the program could take effect in under a year.

Recommendations
Design Standards

As discussed in Chapter 4: Public Engagement, participants in GRP's public workshop indicated preferences for mixed-use buildings, like those on Greenfield's Main Street. In addition to a Commercial Adaptive Reuse Program, which targets *existing* buildings, architectural design standards could be considered for *new* mixed-use buildings to ensure that they match the visual character desired by neighborhood residents (see also the form-based code recommendation later in this chapter).

Implementation

Design standards could be considered for development within the next 6 months or 1-2 years, to ensure that they are created in time before new development proposals are made for the neighborhood that might not conform to residents' visual preferences.

Figure 53. Current conditions at city-owned contiguous parcels

Figure 54. Rendering of a Mixed-use Development at this site

Distressed Properties

Recommendation

Massachusetts Abandoned Housing Initiative

The client-identified challenge of distressed properties is to fix buildings in disrepair in the Deerfield Street Corridor. There is a noticeable presence of vacant or distressed properties. This can detract from overall neighborhood character and can be caused by expensive repair costs or distant landlords. Our recommendation is to make use of the Massachusetts Abandoned Housing Initiative (AHI) from the state Attorney General's Office (AGO) to help secure renovation of distressed properties or pursue receivership.

The AGO uses the enforcement authority of the State Sanitary Code to turn properties around by seeking out owners of abandoned properties and encouraging them to repair the property ("Abandoned Housing Initiative," 2018). If they refuse to repair their property, the attorneys of the AGO will petition a relevant local court to appoint a receiver, who will oversee the process to bring the residential property up to code. At that point, a tax lien is also placed on the property which requires the original owner to pay all renovation costs and any unpaid property taxes. If these costs are not paid, the property can enter the foreclosure process, in which the original buyer, the receiver, or another entity may purchase the property at auction. This program is available to all communities in the state and has been used in 130 communities so far.

Implementation

In the City of Greenfield, if there is no court-maintained list of qualified and approved receivers, judges will often choose the individual that petitions for the initiative to propose another

individual or organization to be the receiver (Mass.gov). If you believe that you are qualified to serve as a receiver you must complete a brief questionnaire available on the Mass.gov website and submit it to the AHI team (Mass.gov). The first step the City must take after identifying a receiver, is to schedule an introductory meeting with AHI where they can refer up to ten initial properties for inspection (Mass.gov). If a property does end up in receivership, there are numerous factors that affect how long the process will take to complete, but receiverships generally last between six to 18 months (Mass.gov).

Neighborhood Revitalization

To support the feedback and suggestions from the public workshop, we recommend that the City take steps toward revitalizing the Deerfield Street neighborhood by improving the overall safety and connectivity of the streets as well as the visibility and accessibility of the Green River. Additionally, neighborhood development could benefit from guidance by a form-based code, which contributes to overall community character.

Recommendations

Streetscape Improvements

As discussed in Chapter 6: Precedent Studies, the City of Greenfield has recently applied for Complete Streets MassDOT Tier three funding for fifteen projects. The City created a list of 100 total project ideas, with nine of these pertaining to GRP's study area of Deerfield, Washington, and Hope Streets. Within these, a project located on Hope Street was prioritized for bike boulevard treatments and would provide safer connectivity into the downtown area of Greenfield. The remaining eight projects in the study area were not included in the final priority list.

The remaining eight projects pertain to intersections, sidewalks, and safety including sidewalk improvements, new crosswalk devices, and on street bike facilities. After receiving community feedback during public engagement events and analyzing the workshop activity results, GRP believes it would be beneficial for the City to prioritize these eight projects for the next application cycle. These would enhance the streetscape for pedestrians and cyclists along the corridor, contributing to an overall safer experience that participants expressed were a concern.

Traffic Calming

Within the category of intersection projects are traffic calming devices, such as a rectangular rapid flashing beacon (RRFB) (also discussed in Chapter 5: Literature Review). These are user-activated crosswalk treatments that utilize alternating flashing light to yield drivers. This is listed as a project for Deerfield Street at the Petty Plain Road intersection that would help connect the East and West sides of the street and provide a safer streetscape for pedestrians by slowing down traffic. Traffic calming devices would also provide better access to the Green River Park that participants expressed was a community asset.

In addition to the Deerfield Street and Petty Plain Road intersection, workshop participants identified three other locations they perceived to be dangerous where traffic calming devices should be installed. These are shown on the maps in Chapter 4: Vision Mapping Results. The crosswalks are located at the northern and southern intersections of Deerfield and Washington Street, and at the contiguous vacant parcels and Green River Liquors. By connecting Deerfield Street roads with accessible sidewalks and traffic calming devices, residents and pedestrians would be able to travel safely along the corridor and potentially to the Green River pedestrian pathway.

Green River Accessibility

Over the course of our public engagement process, Greenfield residents emphasized their admiration for the Green River. Participants of our public workshop quickly identified the Green River as a community asset and during the vision mapping exercise (Also shown in Chapter 4: Vision Mapping) they noted that they would like to see a pedestrian and bike path along the Green River. GRP recommends prioritizing this project and supporting this with appropriate wayfinding systems and connectivity to the rest of the corridor.

Form-Based Code/Zoning

As discussed in Chapter 4: Public Engagement and Chapter 5: Literature Review, many of the goals for development from participants of the public workshop and the Client Directive revolved around increasing housing stock, commercial establishments, and streetscape quality within the Deerfield Street neighborhood, in a manner that's visually consistent with a mixed-use, walkable neighborhood vision. One potential avenue for accomplishing an attractive aesthetic for overall development (including housing, retail, and streetscapes) is form-based code/zoning.

Form-based code regulates new development based on its physical characteristics, whereas traditional zoning controls what land may be used for. Form-based code usually involves a community engagement process to generate agreement on the desired visual character of the built environment, and often results in adjustments to create more compact, walkable areas (Mammoser, 2016). These tools frequently include elements like build-to lines or maximum setbacks for buildings to bring buildings closer to the sidewalk, placing parking in the rear of buildings, minimum heights to encourage density, and architectural requirements that create visual interest (like large first-floor windows for retail). The advantages of form-based code have been defined as more predictability in the appearance of new development, as these codes often allow new developments by right if proposals meet code requirements; this advantage is supposed to assure that the community receives the kind of development it wants, and speed up the development process itself by avoiding lengthy or uncertain review procedures that can scare off developers (Mammoser, 2016). Form-based code can apply to all buildings, and the focus on appearance

rather than use can make development of attractive mixed-use structures easier; it can also apply to streetscapes to determine how local governments should approach street design and decoration. Thus, form-based code could unite Greenfield's visual preferences for new housing (including multifamily homes and pocket neighborhoods designed to resemble traditional single-family homes), retail (mixed-use buildings, such as those on Main Street) and streetscapes (pedestrian- and bike-friendly sidewalks), as discussed in Chapter 4: Public Engagement, into a single cohesive regulatory document.

Additionally, form-based code has precedent in Greenfield already, as it was discussed as a possibility in the *Sustainable Greenfield Master Plan* (VHB, 2014). It has also been recommended by the previous Landscape Architecture and Regional Planning (LARP) Studio Project for the City of Chicopee, *Restoring the Heart: A Community Vision for the Neighborhood of Aldenville* (7 Peaks Planning, 2017). Form-based code was also recommended to support infill development in the Turners Falls village of Montague by Jennifer Stromsten (Stromsten, 2014).

Form-based code has noted disadvantages, including a reputation for a lengthy community engagement process, a need for expensive consultants to develop the code, and a difficult transition from traditional zoning (Arendt, 2015). Precedents do exist for simple codes with more reasonable costs: Beacon, New York, a former industrial town of roughly 14,000 people, developed a form-based code for $40,000, a small sum in comparison with Miami's $3M price tag for its code (Arendt, 2015). However, if this process is decided to be too cumbersome, it is noted that several design standards can be easily integrated into existing zoning: maximum front setbacks on central streets (like Deerfield Street), minimum height requirements in places

needing more density, reduced on-site parking requirements, and a wider mix of permitted uses (Mammoser, 2016). These design standards fit well with the housing-related zoning recommendations contained in the Housing section of this chapter.

Implementation

GRP recommends that form-based code be considered, either in the Deerfield Street neighborhood as a pilot district or citywide, and estimates that this process could begin in the next 6 months.

Recommended Overall Timeline

The following timeline outlines our recommendations by the challenges they address. The left most column will name the recommendation that is being described in each row. The middle column will describe the expected timeline for development and implementation of the recommendation, with each challenge's recommendations being ordered by implementation time. Finally, the third column will describe who is responsible for overseeing or enacting the recommendation. These recommendations will require collaborative implementation by government, private entities, and citizen action.

Recommendation	Implementation Timeline	Responsible Parties
Neighborhood-Wide		
Consider form-based code or similar design standards	6 months	Planning Department
Housing		
40R Smart Growth Overlay District	3-5 years	Community and Economic Development Department
Adjust Zoning	3-5 years	Planning Department
Priming the Pump		
Encourage development of residential units at 29 Washington Street	6 months	Community and Economic Development Department
Explore the feasibility of residential development at other publicly-owned parcels in study area	1-2 years	Community and Economic Development Department
Land-Use Mix		
Commercial Adaptive Reuse Program	6 months	Community and Economic Development Department, Zoning Board of Appeals
Consider design standards for mixed-use buildings	1-2 years	Planning Department
Flooding		
Community Rating System to reduce flood insurance costs to property owners	6 months	Planning Department
FEMA Hazard Mitigation, Flood Mitigation Assistance, or Pre-Disaster Mitigation grants for floodproofing buildings	1-2 years	Planning Department, Community and Economic Development Department
Land-use solutions: community engagement process (MVP program)	6 months	Community and Economic Development Department
Land-use solutions: Cease approval of special permits for floodplain rebuilding	1-2 years	Zoning Board of Appeals, Building Department, Planning Department
Use of FEMA Hazard Mitigation grants for	3-5 years	Community and Economic Development Department

potential buyouts		
Designate flood-safe areas for increased development (see 40R Smart Growth Overlay District in Housing section)	1-2 years	Planning Department, Community and Economic Development Department
Convert non-conforming floodplain uses to recreational uses	3-5 years	Community and Economic Development Department, Public Works Department, Building Department
Distressed Properties		
MA Abandoned Housing Initiative	6 months	Community and Economic Development Department The proposed receiver Greenfield's assigned Assistant Attorney General

Conclusion

GRP's recommendations were developed based on an analysis of the public engagement process and research of precedent studies. With regard to housing in the Deerfield Street Neighborhood, GRP recommends a 40R Smart Growth Overlay District and adjustments to current zoning that would promote denser transit-oriented development in proximity to downtown. In terms of residential development on specific parcels in the Deerfield Street Neighborhood, the pro forma analysis conducted explored the viability of a multifamily residential development on the publicly-owned parcel at 29 Washington Street.

It is also recommended that the City initiated a commercial adaptive reuse program while considering design standards for sized-use buildings. With flooding a concern for the area, recommendations include numerous infrastructure and land use solutions to address this challenge, such as community engagement processes and FEMA hazard mitigation techniques. To combat distressed properties, utilization of the state abandoned housing initiative is recommended. GRP hopes that these recommendations aid in the continued investment into the Deerfield Street neighborhood.

Chapter 8: Conclusion

The Neighborhood Vision Plan GRP calls the Deerfield Street Initiative is a culmination of research, recommendations for regulation and development, and suggestions for future and ongoing studies of our project sites. The five challenges outlined by our client as housing, flooding, priming the pump, land use, and distressed properties all outline the possibilities and opportunities for investment on the Deerfield Street Corridor. We understood housing history, needs and impacts on our study area through analyzing national housing trends, state legislation, and past and current housing stock in Greenfield, MA.

Our public engagement processes encompassing a public workshop held in the downtown of the City of Greenfield was successfully attended by residents, business owners, and local politicians. Here we gained extensive knowledge and solicited opinions and insight from stakeholders in the City. After analyzing our data gathered from this workshop, we were able to accompany these findings with an extensive literature review and numerous precedent studies to build upon our recommendations for our client. Our recommendations followed the outline of the client's five identified challenges of the study area. We defined our recommendations for the city, and then suggested possible implementation methods and timelines for each recommendation given.

The Deerfield Street corridor is the southern gateway to downtown Greenfield and is a major point of access to the city. With the natural aesthetic of the Green River, availability of vacant parcels for development, and the beginning of new infrastructure such as updated sidewalks and lighting on the street, the future of Deerfield Street is brimming with deep investment. We hope that our research this semester through our Studio project will aid the City of Greenfield and our client M.J. Adams in the continued investment, development, and enjoyment of the Deerfield Street corridor.

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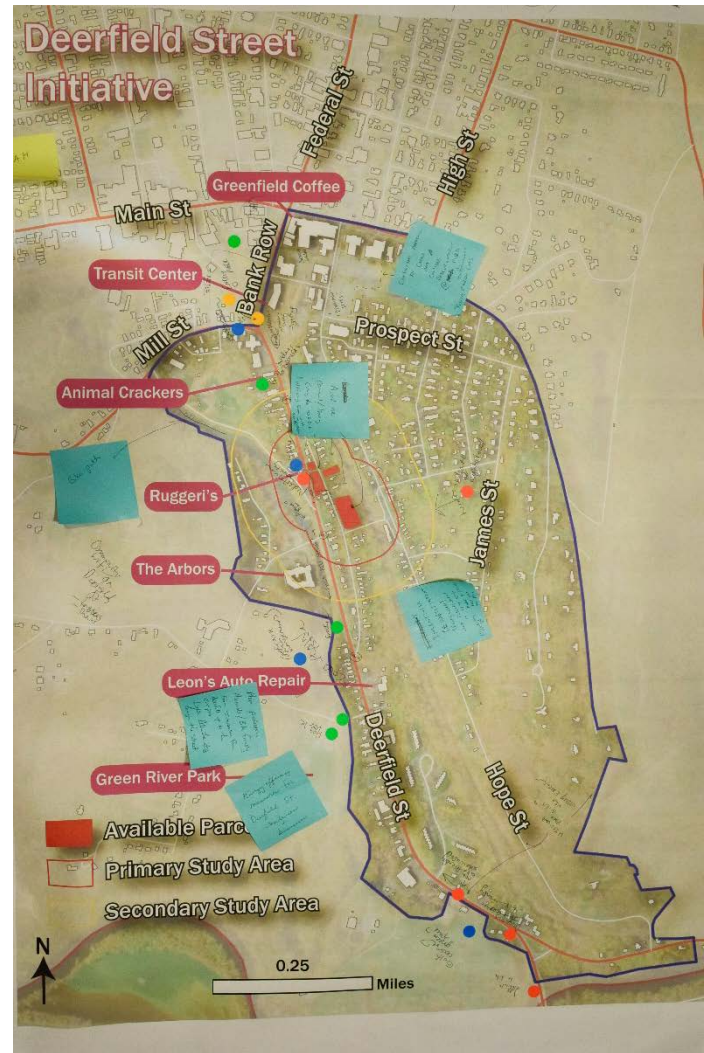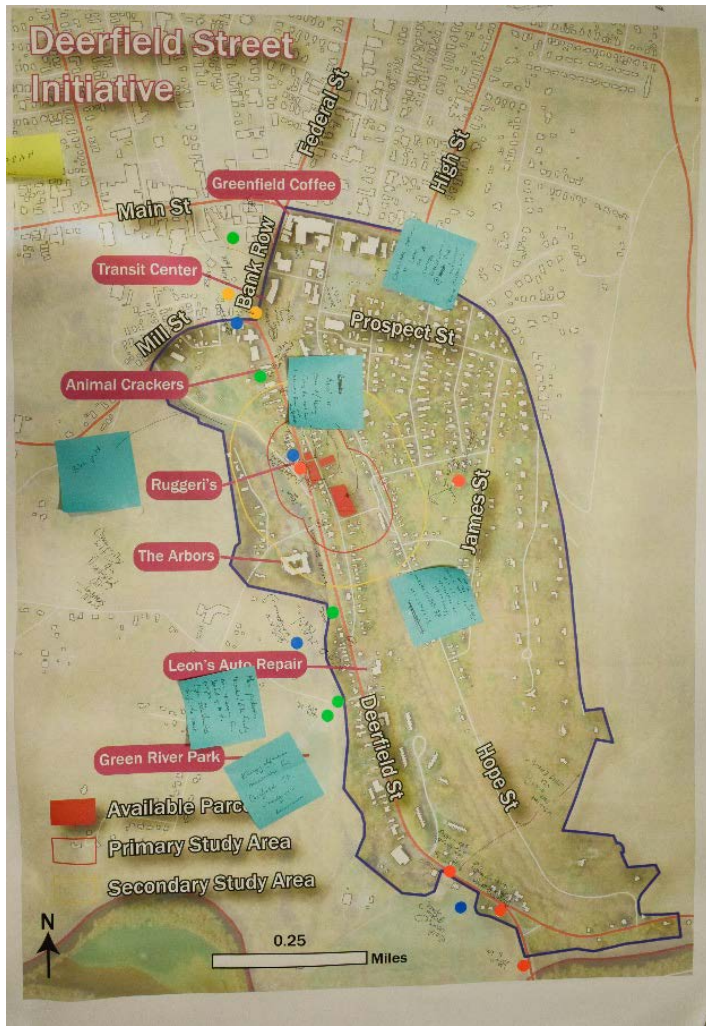
Appendix

Appendix 1: Workshop Map Template
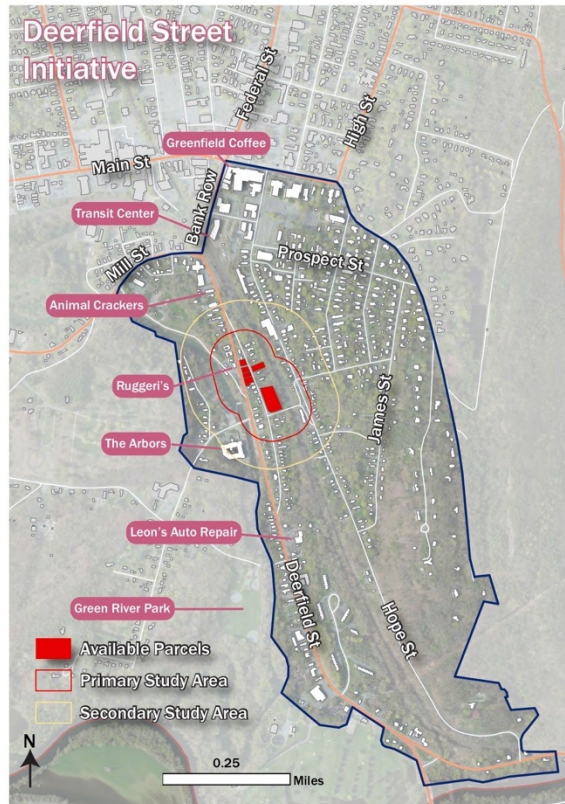
Appendix 2: Completed Workshop Map Images

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Appendix 3: Complete Stakeholder Outreach List

Local Government	Businesses	Community Organizations
Council on Aging	Valley Mart	Community Action Pioneer Valley
Dept. of Energy & Sustainability	Animal Crackers	Just Roots
Historical Commission	Napa Auto Parts	Connecticut River Conservancy
Commission on Disability Access	Ruggeri's Beverage (Green River Liquors)	Complete Streets Committee
Cultural District Committee	The Recorder	Greening Greenfield
Housing Authority	Greenfield Community Television	United Way
Public Safety Commission	Berkshire Gas	Salvation Army
Building Dept.	Art Space Community Arts Center	Elks Lodge
Redevelopment Authority	The Arbors Assisted Living	Greenfield Democratic Town Committee
City Council		YMCA
Greenfield Business Association		Green River House
John W. Olver Transit Center		Greenfield Senior Center
Franklin County CDC		Greenfield Community College Foundation
Parks & Recreation Dept.		Opioid Task Force
Conservation Commission		
Franklin County Chamber of Commerce		
Franklin Regional Council of Governments		