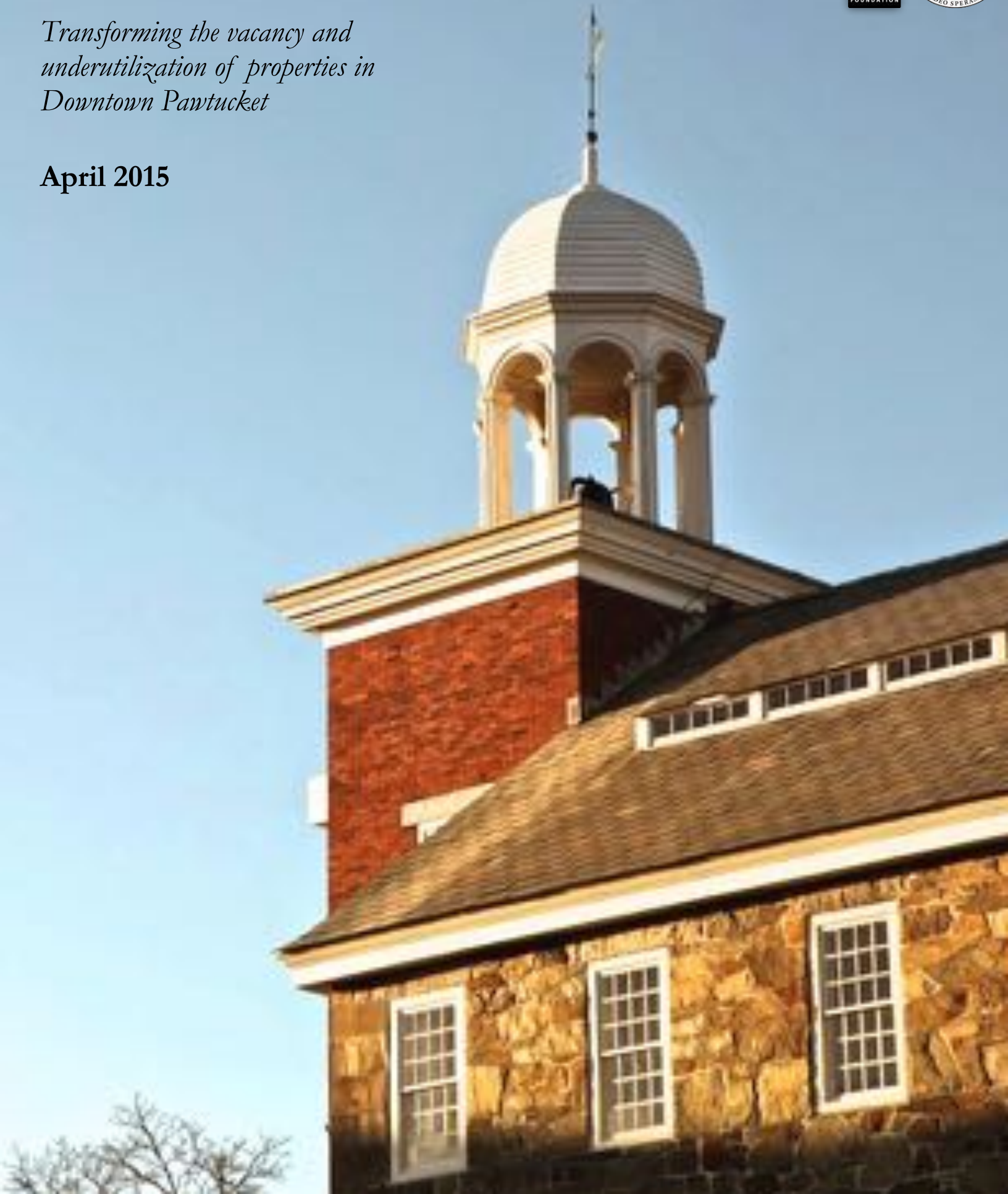


# Rebuilding Pawtucket's Foundation

*Transforming the vacancy and  
underutilization of properties in  
Downtown Pawtucket*

April 2015





## **Preface**

This report this prepared by the Capstone team from Taubman Center for Public Policy and American Institutions at Brown University. This report is devoted to the Pawtucket Foundation.

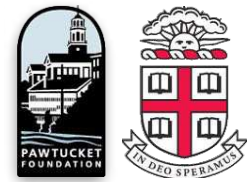
## **Capstone Team**

Geyang Chai

Kyle Lynch

Iris Lan Pei

Siqi Yao



### Opening Remarks

We are excited to present the following report and recommendations to the Pawtucket Foundation and Mayor Donald Grebien. Over the past eight months, our Taubman Center team has been developing this capstone presentation on behalf of our client, the Pawtucket Foundation. Our goal was to create a set of baseline data and recommendation that the Foundation could use to inform future initiatives, while providing clearer insight to the development of downtown Pawtucket. Each team member was fortunate to work directly with Aaron Hertzberg and Joe Sandmann of the Foundation as well as a number of administration officials in Pawtucket city hall. This is a critical period of development for the city, with many opportunities for progress available. We thank the Foundation and Mayor Grebien for including the Taubman Center in this project, and allowing our team to contribute to such an important process.

Our report seeks to review the history and current status of development in downtown Pawtucket, while providing a series of actionable recommendations for the city to pursue. Utilizing a number of academic studies that portray best practices and economic development trends in similar cities across the country, we have constructed our final recommendations to be relevant and within the capabilities of Pawtucket. Additionally, having spoken with numerous stakeholders city-wide, we





have developed a “toolkit” for the Pawtucket Foundation to use for years to come as a way to create impactful and accurate data analysis products. Included within this report is a detailed example that was designed using data that was hand-collected by our team as we traveled the streets of downtown Pawtucket.



## Introduction

The Pawtucket Foundation is an advocate for the business and not-for-profit sectors of Pawtucket. A core focus of the Foundation is the development and overall growth of the downtown, riverfront and gateway areas of the city. Describing itself as a “civic entrepreneur,” the Foundation seeks to efficiently use and share resources, harness information and provide talent that will aid in the development of the city.



The Foundation highlights the following six core values to guide its work: Collaboration, Creativity, Vision, Sustainability, Quality of Place and Excellence<sup>1</sup>. These values were an important introductory lesson for our team as we began working with Aaron and Joe. Understanding not just what, but *how* the Foundation sought to positively impact future development in the city ensured that our team's work would closely align with the Foundation's mission. The first three core values of Collaboration, Creativity and Vision are especially pertinent this report. Our team enjoyed strong *collaboration* with a number of key stakeholders, sought *creative* solutions to the challenges facing the city and share the Foundation's *vision* for a vibrant downtown Pawtucket.

In recent years, the Foundation has completed a number of critical projects. Over \$2m was allocated to the preliminary engineering of a commuter rail station as a result of the Foundation's advocacy<sup>2</sup>. A comprehensive real estate market analysis was completed to supplement the riverfront predevelopment process<sup>3</sup>. The Foundation has also continued to collaborate with the city and local land owners to implement efficient zoning changes and streamline permitting processes.

We anticipate seeing how future Pawtucket Foundation initiatives will be impacted by this study. It is clear from recent successes and interviews with stakeholders across the city that the Foundation exists as a critical bridge between multiple other stakeholders in Pawtucket.

### **Pawtucket's Past and Present**

Pawtucket, the fourth largest city in the state, played a critical role not only in the early development of Rhode Island, but also in the country. The famous Slater Mill, built in 1793, served as the birthplace of the industrial revolution in the United States. Textile and iron works were an

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<sup>1</sup> Hertzberg, A. (2012, September). Mission Briefing. Retrieved February 12, 2015, from [http://www.pawtucketfoundation.org/Portals/0/Uploads/Documents/TPF\\_Mission\\_Briefing.pdf](http://www.pawtucketfoundation.org/Portals/0/Uploads/Documents/TPF_Mission_Briefing.pdf)

<sup>2</sup> About the Project. (2015, February 4). Retrieved March 10, 2015, from <http://projects.vhb.com/pawtucketcommuterrail/default.asp>

<sup>3</sup> Pawtucket-Central Falls Riverfront Market Analysis. (2012, September 1). Retrieved March 6, 2015, from [http://www.pawtucketfoundation.org/Portals/0/Uploads/Documents/Pawtucket Central Falls Riverfront Corridor Market Analysis\\_ Pawtucket Foundation\\_FXM Associates.pdf](http://www.pawtucketfoundation.org/Portals/0/Uploads/Documents/Pawtucket_Central_Falls_Riverfront_Corridor_Market_Analysis_Pawtucket_Foundation_FXM_Associates.pdf)

**Rebuilding Pawtucket's Foundation**

*Transforming the vacancy and underutilization of properties in Downtown Pawtucket*



important economic driver for the city until manufacturing began to slow during the Great Depression. Pawtucket maintained a more vibrant manufacturing presence than most in the following decades thanks to a number of specialized industries – such as jewelry and silverware – emerging.<sup>4</sup>



However, as the national economy began to shift further away from a core manufacturing structure in the 1990's, Pawtucket has struggled to transition. This is unsurprising, as even the largest American cities had to make chart a new course in the twenty-first century economy. Current macro-economic conditions require that cities both large and small work to develop their unique strengths and characteristics to serve as a catalyst for the local economy and development. The current challenge – and future opportunity – for the city is that this core development focus has yet to be determined.

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<sup>4</sup> Brief History. (2015). Retrieved March 27, 2015, from <http://www.pawtucketpreservation.com/pawtucket.html>

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Today, Pawtucket does maintain a number of assets that will play an important role in the overall development of downtown and the surrounding area. Hasbro Inc., a worldwide toy company is headquartered in the city, and serves as one of the largest employers alongside Memorial Hospital of Rhode Island. Additionally, the Gamm Theatre, Hope Artists Village, and most recently BreakTime Bowling serve as popular shopping and entertainment attractions.

Indeed, the arts serve as a unique feature of the city, and an avenue for potential growth. With the official title of the “Creative City,” Pawtucket has put the Gamm Theatre and other arts and entertainment facilities at the forefront.<sup>5</sup> In 1999, the Rhode Island General Assembly



enacted a law creating the Arts & Entertainment District – a 307 acre stretch that covers downtown and a majority of the riverfront. The inclusion of live/work zoning amendments has allowed for this new arts economy to replace a portion of the old manufacturing economy figuratively and literally – old mills are now prime redevelopment zones.

The city has completed comprehensive studies similar to our report in the past. In 2010, former Mayor James Doyle produced the “Blueprint to Prosperity: Downtown Business Development in Pawtucket” (The Blueprint). Completed by a Downtown Task Force, this report included proposed numerous action items put forward by members of the business and not-for-

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<sup>5</sup> Arts Entertainment District. (2015). Retrieved March 25, 2015, from <http://www.experiencepawtucket.org/bWorkbPawtucket/ArtsEntertainmentDistrict/tabid/212/Default.aspx>

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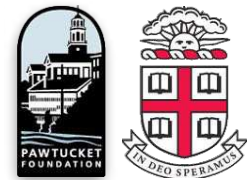
*Transforming the vacancy and underutilization of properties in Downtown Pawtucket*



profit community.<sup>6</sup> Basic concerns, such as pedestrian challenges, vacant space use and parking updates that our group quickly considered studying in our earliest review of the project are also found here.

Traffic design improvements, a comprehensive zoning review and addressing vacant land through a Tax Increment Finance district were all covered in the Blueprint. During, and following our data analysis we came to many of the same potential solutions to the economic challenges that downtown Pawtucket is facing. Our recommendations section will expand upon the Blueprint's - and other analyses - earlier findings using more recent information as well as noting how future data

<sup>6</sup> Doyle, M. (2010, April 27). Blueprint to Prosperity: Downtown Business Development in Pawtucket. Retrieved April 6, 2015, from [http://www.pawtucketfoundation.org/Portals/0/Uploads/Documents/2020report\\_apr2010.pdf](http://www.pawtucketfoundation.org/Portals/0/Uploads/Documents/2020report_apr2010.pdf)



collection improvements by the city can supplement both our team's toolkit and reports such as the Blueprint.

Our toolkit and included data analysis aims to provide a path that can turn ideas found in reports like the Blueprint from mere proposals into immediately actionable tasks by making data more visually appealing and impactful from the start. Our goal is to merge the current strengths of the city with the “story” found within the data to produce sound, actionable recommendations.

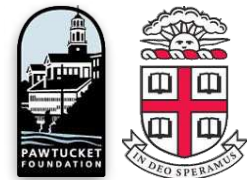
### Scope of Study

Beginning with the Foundation's response to the Taubman Center's request for proposals, our team worked with Prof. Allen and Aaron to design a scope of study to steer the project. This was a critical development that allowed our team and the Foundation to agree upon clearly defined outcomes, as well as a number of benchmarks to be met along the process. Throughout the project our team referenced both a signed memorandum of understanding and the initial RFP response to ensure that each step moved further towards creating an impactful product for our client. The



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following description from the Foundation's RFP response clearly lays out the core goal of the project:

“As the Pawtucket Foundation works to stimulate development activity using contemporary planning techniques, a lack of sufficient local data, infrastructure and analysis exists to benchmark progress, gather and respond to feedback from businesses and residents and understand and act on qualitative revitalization indicators.”

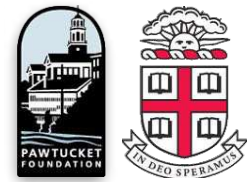
To satisfy this goal, our team has collected, analyzed and produced a selected series of data. Of particular focus is census tract 152, which includes the entirety of downtown Pawtucket where the Foundation has worked to promote a “growth district.”<sup>7</sup> The riverfront area combines with Main Street to make this section of the city robust with potential for future development. The riverfront area is already host to the city's annual Arts Festival, and helps encourage the public to access the area - particularly around the Slater Mill historical site. Four additional census tracts that surround tract 152 were also analyzed so that larger-scale developmental impacts could be considered.<sup>8</sup>

Here, we can also discuss the “challenge” that our project is designed to tackle for the Pawtucket Foundation. As Aaron notes in the above quote, there is a lack of sufficient data and analysis available to better inform development projects or even overall economic progress/decline downtown. Without an understanding of what is missing from the city's current data collection, the city and Foundation are limited in what revitalization efforts should be proposed and eventually implemented. Within this report, we highlight where other cities have excelled in data collection standards, as well as outlining our toolkit that can be used to effectively manipulate this data once it has been obtained.

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<sup>7</sup> FY 15-17 Strategic Plan. (2015). Retrieved March 10, 2015, from <http://www.pawtucketfoundation.org/WhatWeDo/StrategicPlanVision/tabid/184/Default.aspx>

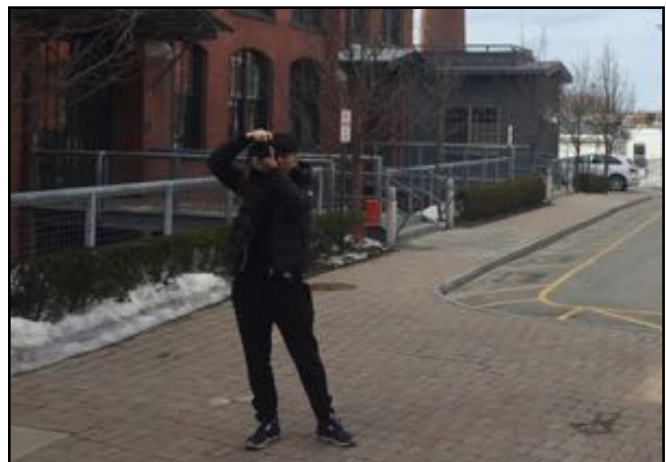
<sup>8</sup> 2010 Census Reference Map: Providence County. (2010). Retrieved April 2, 2015, from [http://www2.census.gov/geo/maps/dc10map/tract/st44\\_r/c44007\\_providence/DC10CT\\_C44007\\_002.pdf](http://www2.census.gov/geo/maps/dc10map/tract/st44_r/c44007_providence/DC10CT_C44007_002.pdf)



## Boots On the Ground

In addition to the significant time we spent studying the history and economics of the city, we felt it was important to walk, observe, listen, and spend meaningful time on the streets of Pawtucket. Specifically within census tract 152, our team made it a priority to reach every street in the downtown area on foot. This helped reinforce to us that Pawtucket is a beautiful city with a dedication to its history and a clear sense of art. As a team, we thought that although we could not conduct a comprehensive survey given our size and time limitations - our report would have been incomplete had we not spent time connecting with the land and buildings we were studying and collecting new data for use in our toolkit.

Despite the many engaging aspects of downtown and the waterfront area, we all noticed the sense of stagnation and lack of new development when walking through the main streets of Pawtucket. Many empty buildings, open office spaces, and shops were clearly visible on street. There are very few pedestrians walking on street and this city seems





not as active as comparable sized Rhode Island cities such as Cranston or Warwick.

It was difficult for the team to see just how many challenges lay ahead for the city - with numerous vacant buildings and struggling businesses. We spent time visiting the China Inn, one of the most successful and oldest businesses in downtown. The restaurant looks fantastic, but even with its history it has been negatively impacted by the surrounding vacancies and poor infrastructure. This was one of the team's earliest experiences with the city's confusing traffic patterns, which become apparent even when traveling on foot.

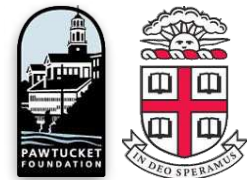
The first trip to Pawtucket gave an impression of isolation and a lack of investment in downtown. This city is not active as we had expected, even after reading about and discussing its characteristics with stakeholders. Spending time connecting with the city in this way did motivate the team, however. We each agreed that we have to do something for the city and Foundation that can have an early impact and can also have benefits into the future. Even at this early point, we knew that the vacancy issue was very obvious and would have to be a focal point of our report.

When the big manufacturers moved out in past decades, they left behind buildings became today's empty spaces and renovation projects that fail to launch due to excessive entry-level costs. This is not a revolutionary observation - both the city and the Pawtucket Foundation have highlighted in many reports dating back to 2000 that vacancy was and remains a key issue for downtown. To avoid merely duplicating the observations and recommendations found in these past analyses - such as the 2011 City of Pawtucket Comprehensive Plan<sup>9</sup> - we made a concerted effort to find new and relevant case studies that could connect Pawtucket to similar post-industrial cities across the country.

The Comprehensive Plan is a helpful document, and one that is the most relevant to our efforts collecting data downtown. The Plan reviews development and provides recommendations

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<sup>9</sup> Comprehensive Community Plan - Update 2011. (2011). Retrieved March 18, 2015, from [http://www.pawtucketri.com/documents/planning/chapter\\_1\\_land\\_use.pdf](http://www.pawtucketri.com/documents/planning/chapter_1_land_use.pdf)



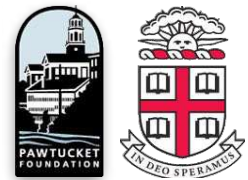
for the City's land use and infrastructure improvements - including detailed maps highlighting disruptive one-way streets. It also covers housing, open space, and economic development in the past few years.

The Comprehensive Plan helped us in different ways. First, gained an understanding of what the local government had done over the past two administrations. Specifically, we were able to understand what data the city was (or just as importantly - was not) relying upon to inform projects. Second, there are important historical



data included within the Plan, which we were able to include in our own historical data products included in this report.

One of the key findings we made through the Plan was that the vacancy rate almost doubled from 2000 to 2008 citywide. We note earlier that vacancy was a known issue, but seeing such an eye-catching figure lead us to consider collecting our own data on vacancy. Why? Because the comprehensive plan is only updated through 2010, we needed to find the new current data in order to make more accurate recommendations for addressing the issue.



During our earliest weekly meetings with Professor Bill Allen, we discussed potential plans to collect some first-hand vacancy data in city of Pawtucket. Accurate, current data on vacancy was

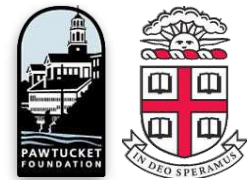


not readily available online, and our discussions with the Foundation confirmed that this was a difficult indicator for the city to consistently update. Alongside a number of helpful case studies on vacancy, a good set

of current data observations collected by the team became an additional work product we wanted to provide as part of this report. This hand collected data and the analysis that we were able to perform with it will be reviewed in detail in a later section.

### **Zoning Overview**

It is important to consider the fundamental impact of zoning when beginning an analysis of a city's economic and structural development. This is true for Pawtucket, where our team realized early on in our work that understanding the local zoning process would be key to developing actionable recommendations. Barney Heath, Planning Director for the city, was instrumental in providing guidance to our team on all relevant zoning issues in downtown Pawtucket. Mr. Heath and Sue Mara also provided insight on the team's early thoughts on the recommendations that you will find in the conclusion of this report. Their thoughts on temporary use spaces and Tax Increment Finance districts within the city were notable.

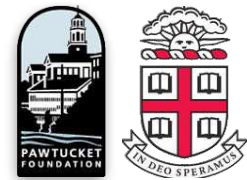


A summary of recent zoning changes in Pawtucket must begin with the Downtown Development Design Plan, published in May 2011.<sup>10</sup> This document represents a series of significant proposed changes to downtown zoning in order to encourage high-density development, as well as providing a clear, regular process for developers to understand. At the same time, these proposed changes from Thurlow-Small, the consultant on the plan, address parking related issues that are related to zoning and space-use around Main St.

Thurlow-Small highlights a key point early on in the “Downtown Guidance” section of the plan – that an overreliance on special use permits and variances lead to a confusing and unpredictable regulatory environment for developers. With an increase in residential and commercial

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<sup>10</sup> Pawtucket Downtown Design Plan. (2011, May 26). Retrieved April 28, 2015, from <http://projects.vhb.com/pawtucketcommuterrail/pdf/2011PawtucketDowntownDesignPlan.pdf>



development in the early part of the last decade that did not easily fit into the pre-existing zoning structure, special use permits and variances became much more common.

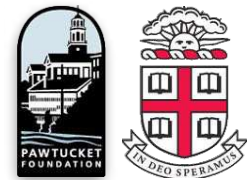
The city followed through and made a handful of important changes to the zoning regulations in the wake of the Downtown Development Plan publication. The most visible of these changes was the elimination of parking requirements for all CD, or commercial development areas. Secondly, “by right” mixed use development was implemented downtown. This allows landowners the “right” to choose the specific use, such as commercial or residential. This regulatory change helps to minimize the use of confusing special-use permits and variances that caused difficulty previously.

Ultimately, the Downtown Development Plan serves as a critical component of recent thinking and efforts related to downtown (and surrounding area) improvements.<sup>11</sup> Though not every recommendation by ThurlowSmall has been enacted, the changes noted above that the administration was able to make were meaningful. The report also addresses a number of indirect zoning issues, such as improved traffic flows, signage and considerations for the proposed MBTA station. You will notice that the Plan has influenced many of the initiatives we have noted throughout the report that were taken up by the Foundation and the city.

Before finalizing the main review of zoning in downtown Pawtucket, it is important to note an important related effort that Barney Heath and other members of the administration are currently working on. Perhaps most interesting is the city’s participation in the state pilot program for “E- Permitting.” This online platform for permit applications and subsequent processing of successful development proposals has the potential to be a great asset to Pawtucket. Online permitting allows for an easily accessible, consistent and easy to understand process that developers

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<sup>11</sup> Kenny-Kirwan, D. (2011, February 22). Downtown Design Well-Received. Retrieved March 13, 2015, from <http://www.pawtuckettimes.com/content/downtown-design-well-received>



will appreciate. This is simply good practice, and a development that our team anticipates being a strong tool moving forward.

### **Integration of Additional Previous Studies**

With our data analysis including statistics from as far back as 2000, we felt it was appropriate to also include economic and development studies from that timeframe in this report. The Pawtucket Redevelopment Plan of 2000 is a notable market analysis that was the first in a series of comprehensive recommendation sets to follow from the city and the Foundation. Prepared by Harral-Michalowski Associates<sup>12</sup> and Lambert Advisory, it serves as a baseline for economic development activities completed in the past decades in and around the Downtown area.

The report reveals that if the City of Pawtucket were to make little or no investment in downtown and essentially not implement any broader planning effort, there will continue to be reinvestment in the area. This reinvestment activity appears less helpful upon further inspection, however. The authors note that the type of reinvestment will most likely consist of uses that do *not* promote economic revitalization. Moving forward in future years, the Redevelopment Plan asserts a positive outlook: “with a strategic plan supported by the PRA’s investment and focus, the level and value of interest in downtown can be enhanced.”

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<sup>12</sup> <http://www.pawtucketri.com/departments/planning/compplan.php>

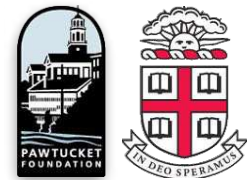
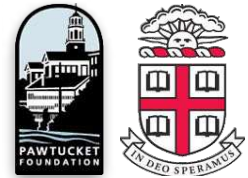
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Table 1 - Summary of Key Strategies Covered in the Redevelopment Plan

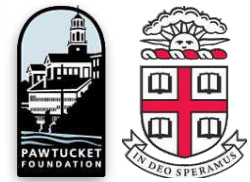
Focus	Strategy	Example	Impact
Mill Development	Mill buildings redevelopment projects	Streetscape improvements around the \$22M Slater Mill development	Strengthen the character and perceived safety of the neighborhood
Residential Density Development	Several	The Parkin Yarn building (now Bayley St. Lofts) was redeveloped into 25 loft condominiums	Create additional demand for convenience retail, more street life and creating a safer neighborhood
Commercial Vacant Properties Development	Fill in the vacant commercial with frontage on Main Street	The core of Main Street has focused specialty retail and restaurants on the first follow of properties. Three specialty food venues have opened shop: Kafe Lila, Village Restaurant, and the Cup N Saucer.	Attract more businesses and more residents. Get more parcel value and gain more tax.
Attract Art-related Businesses	Arts and Entertainment District Plan	Riverfront Lofts on Exchange Ct created 59 Live/work spaces for artisans and others. The Pawtucket Arts Festival has grown into one of the largest regional events attracting over 30,000 attendants into Pawtucket each year.	Develop business, serve as an integral cultural amenity that can attract residential and service-oriented businesses, thus to get lower vacancy rate, higher property value and more tax.
Zoning Improvement	Integrate existing off-street parking into a comprehensive parking system with coordinated access, design, signage and management.	Main street parking at the front door.	Attract more business and residents
Public Infrastructure Enhancement (Transportation)	Attractive pedestrian sidewalks, safer crossing, streetscape furniture, bicycle racks, burying overhead utilities, civic art, landscaping and new buildings on surface lots	Multi-modal transportation center constructed on the lot near City Hall. This facility will also provide parking as well as transfer with RIPTA	Better transportation

(This chart is summarized from the Redevelopment Plan 2000)



We believe that the Pawtucket Redevelopment Plan of 2000 is important not just because it is the earliest economic development platform within our scope of study, but because it addresses many of the core topics that will be continuously studied in later years. The table above includes issues such as zoning, transportation and vacant land challenges. We have already noted a number of Foundation and city studies that highlight these challenges or offer solutions, and will include others later in this report. We acknowledge these works to note their continued relevance, as well as to differentiate our unique data products and final recommendations from this prior analysis.





## Case Studies

Due to the complexity of modern American cities, it can often be difficult to find two cities that are similar enough to make confident comparisons. Throughout our work, we sought areas that share similar characters — population, income, industries and so on — that could be used as reference points or examples of best practices. There is a robust collection of research available on economic development and economic indicators in major U.S. cities, but not all of these broad-based analyses are compatible with areas such as Pawtucket or New England - where there has been a very specific type of post-industrial decline and set of challenges. We often discover intriguing case studies from places such as Chicago or Los Angeles, but the circumstances found in these vastly different cities (both regionally and in terms of scale) are not very compatible with Pawtucket or other parts of Rhode Island.

Within this section, we will highlight the most pertinent of those articles and connect them to our analysis of Pawtucket. Most impactful, however, is the case study that not only addresses relevant economic factors, but also is taken from a city with a similar profile to Pawtucket both qualitatively and quantitatively.

The following table can give a general view of all these related cases and their similarity with Pawtucket. Most of these cities share similar problems: loss of staple industries, population decrease, vacancy and disinvestment in the past decade. In addition, they have similar assets. As Pawtucket treasures Seekonk River, Fall River treasures Three Mile River and Louisville treasures Tennessee River. We found some small cities especially such as Fall River and Galesburg, which have less than 100,000 city population like Pawtucket do. As for Chicago, St. Louis and Los Angeles, we will discuss the strategies they use later but will not list them into this table.

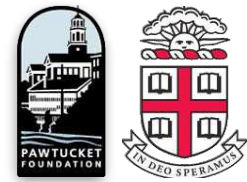
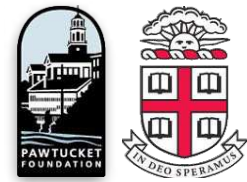


Table 2 - Summary of Key Characters of Case Study Cities

City	Pawtucket	Fall River	Louisville	Galesburg
Location	Rhode Island	Massachusetts	Kentucky	Illinois
City population (2012)	71,170	88,945	597,337	31,745
Land area (square mile)	8.68	33.13	62.12	17.8
Population density	8199	2685	9616	1783
Unemployment (2014 mean)	8.98%	10.20%	7.51%	7.47%
Total sales tax rate	7%	6.25%	6%	8.5%
Median household income per year (08-12 ACS)	\$40383	\$34437	\$44111	\$33109
Population below poverty line	18.7%	23.2%	18.2%	
Industry	Transfer from manufactory	Transfer from manufactory	Manufacturing, heavy industries, entertainment	Manufacturing, railroad industry, etc.
Notable company headquarters	Hasbro (5000 employee, \$4160 million per year)	Quaker Fabric (1000 employees, \$138 million per year)	Humana (52000, 44 B) Yum Brands (539000, 13.6 B)	
Assets	Riverside; gateway city; art culture	Riverside; gateway city;	Riverside; gateway city;	Rail hub; institutional presence
Challenges	Loss of staple industries; population loss; vacant property	Loss of staple industries; low population density; vacant property	Loss of staple industries; population loss	Low population density; lack of huge companies
Strategy		Density building; data improvement; TIF	Waterfront Area; entertainment activities; vision build	SSA; upper floor commercial; entertainment activities



### **(1) Fall River**

We will begin with one such example from Fall River, Massachusetts. In “Maintain, Demolish, Re-purpose: Policy design for vacant land management using decision models” we have an impact study of vacant land in a Massachusetts city that shares a similar profile to Pawtucket. <sup>13</sup>Indeed, the rise of both cities can be traced back to the beginning of the Industrial Revolution following the emergence of Slater Mill in 1793. The textile industry would become dominant in Fall River as well as Pawtucket. Furthermore, both cities enjoyed a major river within its boundaries that served to drive the local economy and boost expansion. Both cities passed into the following century as they continued to adapt to industrial development and early city building – Fall River was incorporated in 1803, Pawtucket in 1884. Oddly enough, in a 1861 U.S Supreme Court decision a number of boundary disputes in the area were settled, including merging a portion of Pawtucket, MA permanently into Pawtucket, RI as well as moving a section of Tiverton into Fall River.

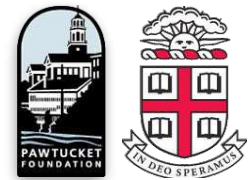
A mere twenty-three miles apart, both cities share a common quantitative profile as well. Many basic census-related features are similar, with one standout exception being total area in square miles. Fall River (40 sq. miles) is much less dense than Pawtucket (9 sq. miles) – a notable feature that suggests a density-building focus for the city, and a topic that will be revisited later in this report.

- **The impact of vacant land**

Authors Johnson and Hollander point to the impact of vacant land on Fall River, and propose “decision models” for administrators to follow when attempting to address the issue. Unfortunately, though the decision models proposed within are interesting, they are designed to help navigate the political process and conflicting community interests. For our report, we will largely be acknowledging, but setting aside this factor and focusing specifically on data outcomes. This is due

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<sup>13</sup> Johnson, M. P., Hollander, J., & Hallulli, A. (2014). Maintain, demolish, re-purpose: Policy design for vacant land management using decision models. *Cities*, 40, 151-162.



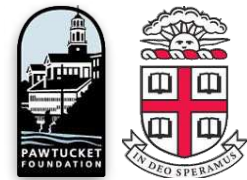
to the importance of Johnson and Hollander's thoughts on vacancy in urban cities. In describing the data-driven process by which Fall River analyzed its vacancy problem, we can take away a few lessons for Pawtucket from "Maintain, Demolish, Re-purpose."

"There is little research evidence known to us that links quality of life directly to the level and type of neighborhood-level investments. However, emerging research has documented negative social impacts of proximity to vacant land."

In describing the challenges of municipal shrinkage planning, the authors note they believe "vacancy rates are a useful and intuitive proxy for quality of life." Essentially, in neighborhoods with



long-term prospects for growth it is assumed that neighborhood satisfaction has an inverse relationship with the percentage of vacant units. Though this seems like a basic observation, it is important that the authors highlight vacancy as a core issue facing shrinking or challenged cities such as Fall River and Pawtucket.



A second important take-away from “Maintain, Demolish, Re-Purpose” is the metric that was utilized to identify so-called “complex-shrinking cities.”<sup>14</sup> Wolff originally designed this metric in a previous study in 2010. Incorporating factors such as: population decline, out-migration, job growth, unemployment rate, property taxes and purchasing power – cities that perform poorly on multiple figures are designated as complex-shrinking. Looking at all Massachusetts’s gateway cities, Fall River measured being in high distress in five out of six factors.

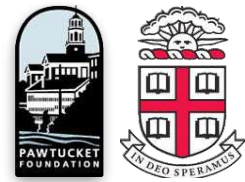
In summary, Johnson and Hollander’s work is relevant because it underscores the need for Pawtucket to establish a robust data collection practice. Going beyond basic employment and tax assessor’s data, the authors emphasized additional data, including: population decline, out-migration and job growth. These are the factors found in Wolff’s “complex shrinkage” metric, and allowed the authors to learn that the greatest declines in population were occurring just outside of Fall River’s central business district.<sup>15</sup>

Providing similarly detailed data in Pawtucket will allow for better informed development and investment decisions. Lastly, the authors’ use of GIS software to map the Fall River data serves as a strong example for expanded use in Pawtucket. The clear and easy to read GIS maps – marked at the neighborhood level – allowed the authors to show not only population decline rates, but also the rate of investment in each section of the city. This provides a long-term value when competing interests begin to emerge over the use and development of various vacant lots.

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<sup>14</sup> Wolff, M. (2010). Urban shrinkage in Europe. Chair of Spatial Planning-TU Dresden, Working Paper, (2010-06).

<sup>15</sup> *ibid*



- TIF<sup>16</sup>

Another strategy our “sister city” Fall River used is TIF. The literature review reveals a number of conflicting accounts of the impact that TIFs can have on a city or region. Some, such as Man in 1999 asserts that TIF adopters “did so because their neighbors were adopting them – that



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<sup>16</sup> Tax increment financing (TIFs) is a high profile and growing form of economic development tool. Put simply, TIFs are a mechanism for earmarking property taxes to spur desirable growth. These have existed since the 1970s, but did not come into common, widespread practice until the mid- 1980s and early 1990s. TIFs are a distinct form of economic development tool from the more traditional tax abatements and other special deals used to attract companies or developers. In “Do Tax Increment Finance Districts Spur Social and Economic Growth?” authors Swenson and Eathington provide a thorough description of how TIFs would ideally be used to encourage growth: “An area that has been blighted or is otherwise in need of an economic boost is designated, usually by a city, to be a TIF district. The taxable value of that district is then frozen to the value it was on the day of the declaration. As the district develops commercially, the incremental value of taxes that would have been collected by all of the taxing authorities is retained by the city to pay off the costs of readying the district for development. Over time, when all of the public investment costs are paid off, the incremental taxable values are then released back to all of the taxing jurisdictions who are then able to capture the new taxable value increment for their general funds”. Source: Swenson, D., & Eathington, L. (2002). Do Tax Increment Finance Districts Spur Social and Economic Growth.



they did so to remain regionally, spatially competitive”<sup>17</sup>. Dye and Merriman state in their study, also from 1999, that “the growth that did occur in the TIF districts appeared to come at the expense of growth elsewhere – that the TIF had a regional pecuniary effect both within the sponsoring city and the region”<sup>18</sup>.

Recently – in November 2014 – the city’s Tax Increment Financing Board unanimously voted to approve a fifteen-year agreement with Internet retailer Amazon.com. Focusing in on a sixty-acre plot in Fall River (also covering thirty acres in Freetown), Amazon plans to develop a million-square foot “fulfillment center,” with the company making an initial investment of \$200m to establish the facility<sup>19</sup>. The approved agreement is centered on a fifteen-year tax exemption on both real and personal property taxes. This exemption is structured to wind down over time: from 2018-2022 taxes are 100% exempt, 75% from 2022-2024, 50% from 2025-2028 and finally 25% from 2029-2032. The early estimates point to this tax exemption being worth perhaps up to \$100m. As described earlier, TIF deals “freeze the base value of the land at the time of an agreement, and here that results in Amazon.com paying taxes on the sixty acres valued at \$9.5m – roughly \$95 thousand annually to the city”<sup>20</sup>. This is the only tax Amazon.com will pay to the city for the first four years of the agreement.

What is the short and long-term impact on Fall River? Amazon estimates that it will hire one thousand employees at an average annual salary of \$35,000 with benefits. Additionally, a few hundred more part-time support employees would also be expected throughout the years of the

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<sup>17</sup> Man, Joyce Y. “Fiscal Pressure, Tax Competition and the Adoption of Tax Increment Financing,” *Urban Studies*, 36:7, 1999, pp. 1151-1167.

<sup>18</sup> Dye, Richard F. and Merriman, David F. “The Effects of Tax Increment Financing on Economic Development,” *Journal of Urban Economics*, 47, 2000, pp. 306-328.

<sup>19</sup> Goode, J. (2014, November 6). Fall River tax financing board OKs 15-year TIF agreement with Amazon.com. Retrieved April 3, 2015, from <http://www.heraldnews.com/article/20141106/NEWS/141107237/11667/NEWS/?Start=2>

<sup>20</sup> *ibid*



agreement. The city also sees a significant parcel of land being developed and used in an effective way that creates jobs for local residents.

While it is not estimated what indirect economic impact the Amazon facility would have, it is certain that related parts of the economy would be positively impacted by this addition. However, it should be noted that indirect benefits are one of the most debated features of TIF districts, and can often only be accurately measured years after a project is completed. This is a consideration that should be kept in mind regarding the potential establishment of a TIF project or study commission in Pawtucket.

There are also protections for Fall River built into the agreement. The promised one thousand full-time jobs must be reached by 2019, and the company would be required to pay the city all of the exempted taxes should it leave the facility or fall short of the employment milestone. There are risks, to be sure, but the Amazon agreement provides an example of how a smaller city similar to Pawtucket can leverage TIF districts into a major, economy-boosting development. And though Amazon (no. 35 in the Fortune 500) represents an exceptional opportunity that Pawtucket is unlikely to replicate – its identity as a much more density-ready city means it can find impact on a smaller scale project.

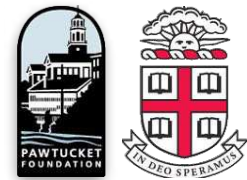
## **(2) St. Louis and Los Angeles**

### **• Temporary use for vacant land**

A second article cites the importance of permanent, long-term planning for vacant land, as well as the lack thereof. “Rethinking Urban Transformation: Temporary Uses for Vacant Land” advocates for cities like Pawtucket allowing non-permanent activity on vacant land.<sup>21</sup> Though the traditional approach to economic and structural development focuses on fully formed and planned projects that create permanent structures or other developments, authors Nemeth and Langhorst

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<sup>21</sup> Németh, J., & Langhorst, J. (2014). Rethinking urban transformation: Temporary uses for vacant land. *Cities*, 40, 143-150.



argue that cities lose value and community input during this typically lengthy planning process. Example stories from St. Louis, where a small forest has emerged on an open space, to weekly farmers markets coming together in various California cities are used to frame the article. Though these are considerable larger and more developed cities than Pawtucket, the common threads among them have nothing to do with scale or wealth – simply that there was vacant land and an allowance for temporary use. With little to no up front cost to the city and other stakeholders, opening up vacant land to temporary use while long-term permanent project are developed could have benefits for Pawtucket.

- **Coincidence with the Foundation's current efforts**

It is important to note that this strategy coincides nicely with the Foundation's current efforts to expand bicycle use, tree planting and other general pedestrian benefits via the Main Street Streetscape Improvement Project<sup>22</sup>. This project was part of the broader collaborative effort between the Foundation and city hall – the Pawtucket Downtown Design Plan – that was completed in 2011<sup>23</sup>.

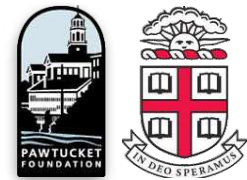
The Streetscape Plan focuses on smaller details such as banners and trashcan placement, but there is the shared idea of promoting visually appealing physical features. The Foundation notes: “establishing a physically appealing urban fabric through the installation of streetscape elements is an important aspect of revitalization and development efforts.” The Foundation's Strategic Plan FY '15-'17 highlights utilizing the Landscape Improvement Fund, which can also incorporate current vacant land into a temporary use model.

“Historically, scholars and planners have viewed vacant land as a problem that must be “fixed,” but the upsurge in vacant land as a result of ongoing deindustrialization, as well as the

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<sup>22</sup> Streetscape Improvements. (2015). Retrieved March 21, 2015, from <http://www.pawtucketfoundation.org/WhatWeDo/ProjectsReportsStudies/StreetscapeImprovements/tabid/248/Default.aspx>

<sup>23</sup> PDDP Volume 2: Final Report. (2011, April 24). Retrieved February 25, 2015, from [http://issuu.com/thurlowsmall/docs/pddp\\_final\\_report](http://issuu.com/thurlowsmall/docs/pddp_final_report)



challenges associated with planning in the context of “shrinking cities” has given rise to approaches that consider vacant land as a resource, one that can even provide opportunities for transformative social and ecological processes.”<sup>24</sup>

Nemeth and Langhorst take a number of strong stances that question the efficiency of traditional solutions for urban vacant land. Indeed, they challenge the very thought of “permanent” solutions: “...since vacancy is mediated by ownership and ‘developability’ at any one moment, vacancy is always a temporary condition.” It is argued that because even finely detailed and prepared developments can falter, and companies can leave cities behind, that what we often consider strong, long-term projects are anything but. This strikes against the notion that temporary green spaces and other uses are shortsighted, or mere disruptions in the way or “real” development. Temporary use spaces would allow the community to utilize or beautify neglected land to extract non-monetary value from it. At the same time, these spaces would not allow any permanent structures or alterations to be made that would prevent a future traditional project from entering.

Lastly, like “Maintain, Demolish, Re-purpose,” this article includes an examination of stakeholder impact in its conclusion. With the temporary use model allowing and even promoting community investment in designated vacant land plots, there is considerable social engagement. The authors note that this development can be viewed as both a benefit and cost to the local government and potentially other stakeholders. As temporary spaces become vibrant and “woven into the fabric” of a city, there will then be a vested interest and commitment that did not previously exist. Introduction of permanent solutions could then be met with resistance.

For this reason, Nemeth and Langhorst provide a similar consideration that was included by Johnson and Hollander – the development of a “decision model” that balances the city, business and community interests equally as projects or open spaces are proposed. The temporary land use

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<sup>24</sup> Németh, J., & Langhorst, J. (2014). Rethinking urban transformation: Temporary uses for vacant land. *Cities*, 40, 143-150.



model allows a city to extract value (even if not necessarily monetary) from existing open land, and does not disrupt any future permanent projects, as it is design to not leave behind a footprint. The authors use a quote from former City of Curitiba (Brazil) Mayor Jaime Lerner that summarizes this alternative approach in a startling way: “The idea that action should only be taken after all the answers and the resources have been found is a sure recipe for paralysis. The planning of a city is a process that allows for corrections; it is supremely arrogant to believe that planning can be done only after every possible variable has been controlled.”

### **(3) Chicago**

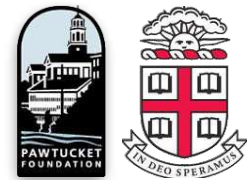
Since Chicago shares quite different characters with Pawtucket, here our discussion about Chicago's case focus mainly on the TIF projects.

Chicago has emerged as one of the country's leading areas for TIF districts, and has credited the strategy for successful projects. A recent post on the city's webpage claims: “Chicago's TIFs have provided \$1.5 billion in TIF assistance to reimburse private developers for eligible costs...in return, the private sector has invested more than \$8.4 billion in their neighborhood TIF projects. That's \$6 of private investment for every \$1 of TIF funds invested”<sup>25</sup>. Though there are certainly key differences between Chicago, Pawtucket and the Iowa that Swenson and Eathington studied in the previous decade – there are success stories to be found that support TIFs as a option for cities facing population decline and economic stagnation.

In Swenson and Eathington's article, they note the large TIF trend changes in the same way from 1989-1999 and there have been additional significant developments in the following decade. Furthermore, the goal of their research was to study the impact of TIFs specifically in the state of Iowa – comparing early TIF projects to more recent initiatives that enjoyed fewer restrictions and

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<sup>25</sup> Frequently Asked Questions. (2015). Retrieved April 8, 2015, from [http://www.cityofchicago.org/city/en/depts/dcd/supp\\_info/frequently\\_askedquestions.html](http://www.cityofchicago.org/city/en/depts/dcd/supp_info/frequently_askedquestions.html)



less oversight (early TIF laws required that project areas be blighted – that changed in the early 1990s to allow for far more speculative economic deals).

#### **(4) Louisville, Kentucky**

Louisville is a valuable case showing how to transfer heavy industries into entertainment venues, and to make riverside asset useful. Over the years, the waterfront area of Louisville became a blighted area filled with abandoned or underutilized land and buildings. Because it was considered one of the most unattractive parts of the city, Louisville city and Jefferson County leaders created the Waterfront Development Corporation in 1986 to oversee redevelopment of the area into a vibrant, active park meant to achieve two objectives:

- a. Improve the quality of life for residents
- b. Be a catalyst for business and residential development.

Beginning in 1987, the community held public forums to determine needs and provide planning and vision for redevelopment. The once heavy industrial area that was somewhat cut off from the city now boasts more than 6,000 employees, major residential developments and the ripple effect of restaurants, entertainment venues, support retail, and new residential and office spaces.

- **Waterfront Area**

the waterfront area has been a major development center with projects such as Louisville Slugger Field and Waterfront Park Place, including a newly developed wharf area, children's interactive play parks (Adventure Playground, Extreme Park), Louisville Downtown Arena, the great lawn, and the Lincoln Amphitheater. Public infrastructure projects have included widening roads and connecting downtown Louisville to the heart of historic Jeffersonville by renovating the Big Four Bridge which also has pedestrian-bicycle centered components. Private investment in office buildings, restaurants, retail, apartments and lofts have followed. These long-term focused efforts have lured new projects to this growing list of amenities that helped spur residential and commercial



development in downtown Louisville. The latest additions to Louisville's downtown revitalization include a \$252 million arena and the \$465 million Museum Plaza (mixed use development that will include a contemporary art museum, hotel, shops, condominiums, offices and a hotel). Like Chattanooga, Louisville experienced investment and employment increases along with downtown population growth.

Waterfront Park now attracts more than 1.5 million visitors every year for special events, festivals, concerts and every day use – walkers, joggers, families and those who come to enjoy the river. The Urban Land Institute named the park one of the Top Ten Urban Parks in the country.

As another riverside city, Pawtucket should learn from Louisville and make the riverside to full use. As mentioned earlier, the population density of Pawtucket can be an advantage. However, we need to consider the existence of Providence waterfront area.

### **(5) Galesburg, Illinois**

Galesburg is a small town located in north west Illinois, having a population of about 31K. The median household income is around \$33,000 per year, which is relatively low comparing to the national level of \$53046 and Pawtucket's \$40383. Galesburg is a regional employment center due to several institutions (Knox College, Carl Sandburg Community College), rail, and manufacturing. Galesburg's major employers include the Burlington Northern Santa Fe Railway (1,115 employees), the OSF St. Mary Medical Center (973 employees) and Galesburg Cottage Hospital (500 employees).<sup>2</sup> Galesburg is able to offer a range of specialized medical services not located in other communities of smaller size, including a Level II Trauma center, cancer treatment and mental health facilities.<sup>26</sup>

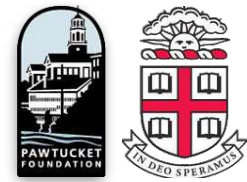
In the Community Profile, Galesburg defines its most valuable assets as below:

- a. Rail Hub: Galesburg has Amtrak station.

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<sup>26</sup> Community Profile, GREDA Region, Western Illinois, 2010.

<<http://www.greda.org/media/2010/03/GREDA-CommunityProfile2010.pdf>>



b. Institutional Presence: Galesburg is the home of both Knox College and the Henry C. Hill Correctional Center, which combined provide jobs for 700 residents.

c. Quality of Life: Galesburg has a multitude of entertainment venues, specialized services and major franchise retail such as Walmart. It has the competitive advantage of being a regional superstar, drawing its residents from a two county area.

Similar to Galesburg, Pawtucket also benefit from the transportation convenience — Pawtucket is a gateway city. Besides, Pawtucket has a even bigger population density than Galesburg, which means the entertainment facilities will benefit more for Pawtucket. Here are some strategies Galesburg used to revitalize the downtown area, only those might be useful for Pawtucket are listed.

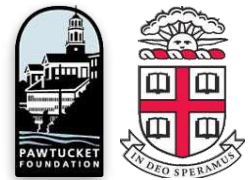
- **Special Services Area (SSA)<sup>27</sup>**

One of the most important strategies of Galesburg is SSA. In addition to multiple TIF districts, Galesburg SSA covers a small six-block area of the downtown. SSA operates similarly to a Business Improvement District (BID) in that it is voted in by participating business owners within the designated area and the funds generated can be used to provide a ‘special service’ to only that district. The Galesburg SSA currently has \$400,000 in reserves and produces annual revenues of approximately \$80,000.

To attract businesses for SSA, Galesburg offers subsidies to non-building owners. Galesburg offers a matching program for businesses interested in locating inside their Special Service Area. The

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<sup>27</sup> Special Service Areas (SSAs) are becoming more prevalent in the suburbs of Chicago, and similar areas are popping up in the St. Louis Metro-East area. SSAs are special taxing districts in municipalities that are established by ordinance, often at the request of developers of new housing subdivisions, in order to pass on the costs of the streets, landscaping, water lines, and sewer systems to homeowners who reside within the SSA. The SSA assessments pay off the municipal bonds that are issued to pay for the infrastructure. A Special Service Area can include a neighborhood, an entire subdivision, or an entire village. There are three purposes for SSAs in residential areas: to pay for the repairs and maintenance of existing infrastructure, to pay for new infrastructure, or to be in place in the event a homeowners association dissolves and no longer maintains the infrastructure (these SSAs are also known as “shadow” or “fall back” SSAs). New homes in SSAs are typically marketed at lower prices because the infrastructure costs aren’t rolled into the cost of the home. Instead, the infrastructure costs are paid annually through SSA assessments.



Downtown Council offers \$3,000 in rent funds whenever a property owner agrees to offer free rent to a tenant.<sup>28</sup>

- **Upper Floor Commercial**

Downtown Galesburg is unique in that many of its upper floors are occupied by businesses instead of residences.<sup>29</sup> Most of these businesses are legal and professional services that complement the services provided by a county seat. These high-end lofts cater to a niche market looking for luxury housing in a historic district; these lofts have architectural features found in much larger cities, but at an affordable cost of living below the average for the state and the nation.

This strategy is useful for Pawtucket especially with a knowing of many vacant rooms in some downtown lofts. This is also a way to spur commercial development of downtown area.



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<sup>28</sup> Galesburg Downtown Council Financial Program.

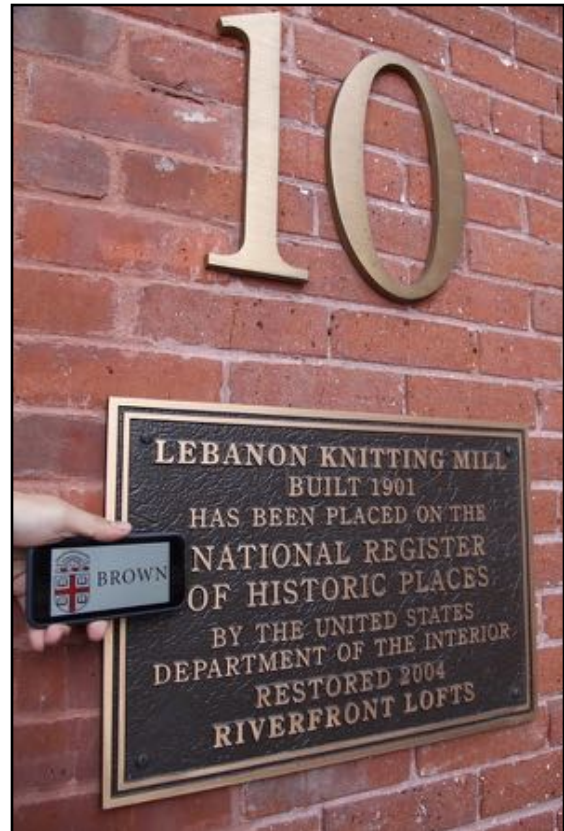
<sup>29</sup> Ferrer, K. (2011) Downtown Revitalization: Case Studies from Illinois, Iowa and Wisconsin



## Geographic Visualization of Trends in Property Values

One of the most important goals of this Capstone project is to generate a series of visualization of property values over an extended period of time using advanced data analysis softwares such as the ArcGIS package. The Capstone team believes that a trend analysis can be useful. This includes both a vertical trend and a horizontal trend<sup>30</sup>. The Capstone team collected current tax assessor's data on property values in the city of Pawtucket with the assistance from Mr. Michael Wilcox from the City's Planning Department, as well as historical assessor's data offered by the Foundation. Those datasets combined covers a time period from 1999 to 2015, or a total of 16 years. This opens doors of possibilities for a trend analysis with depth.

First, the team used a parcel shape file of the City of Pawtucket, passed along by Professor Jack Combs at Taubman Center to the team, and clipped it into 5 smaller shape files, with each representing a single census tracts<sup>31</sup>. Then, we combined those 5 smaller shape files together into an entire new shape file, which is the boundaries of our analysis. This part is both unique in the sense that this shape file is custom-made for our project,

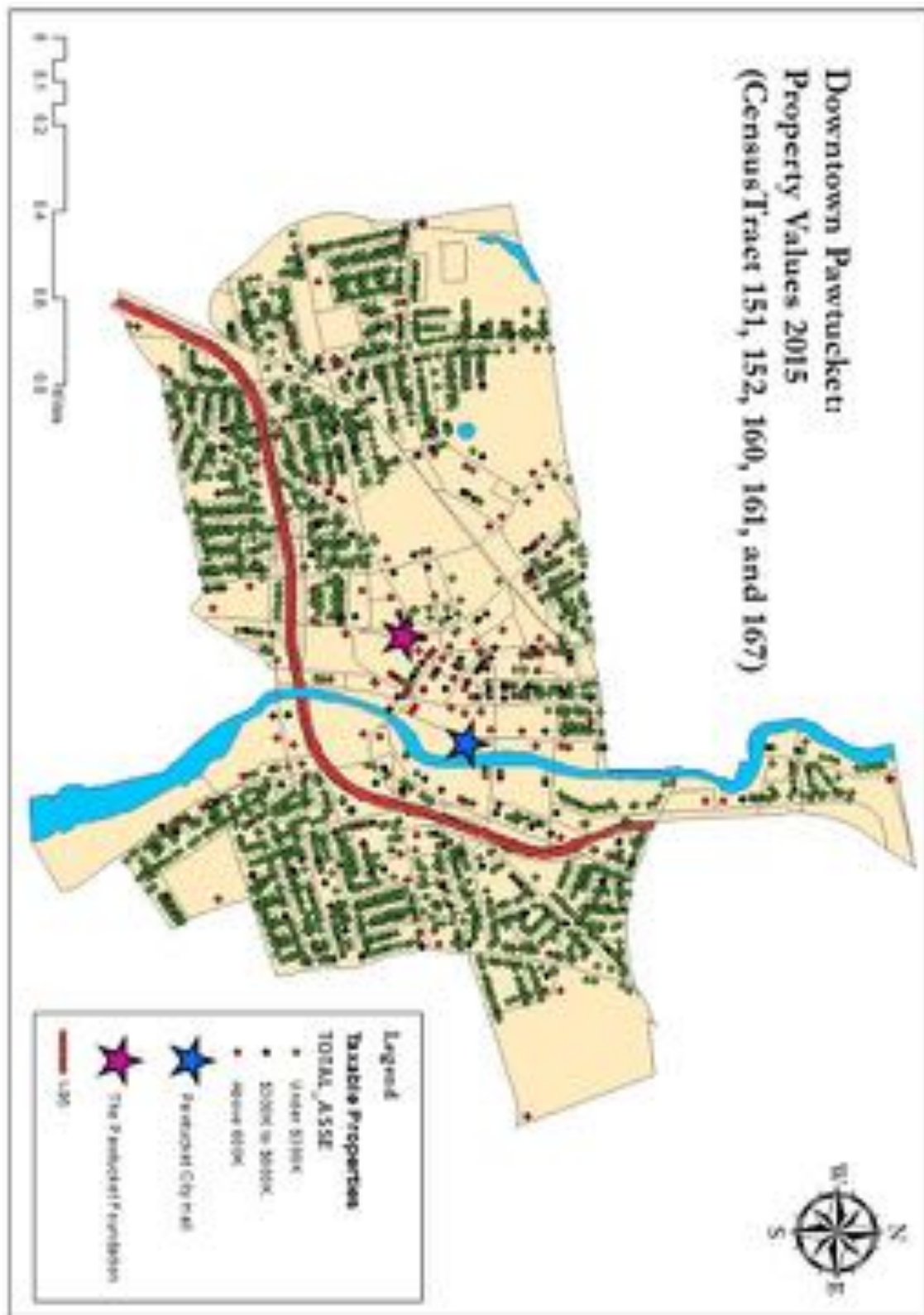


<sup>30</sup> A vertical trend refers to Downtown Pawtucket through a period of time (15 years). Here, location is fixed and time is varied. A horizontal trend compares Pawtucket with other similar cities. Here, time is fixed and location is varied.

<sup>31</sup> We created 5 individual shape files initially because the boundaries of our analysis is a combined area of 5 census tracts, namely census tracts 151, 152, 160, 161, and 167. Those 5 census tracts combined covers a majority of the commercial/business districts of the Pawtucket area.

## Rebuilding Pawtucket's Foundation

*Transforming the vacancy and underutilization of properties in Downtown Pawtucket*





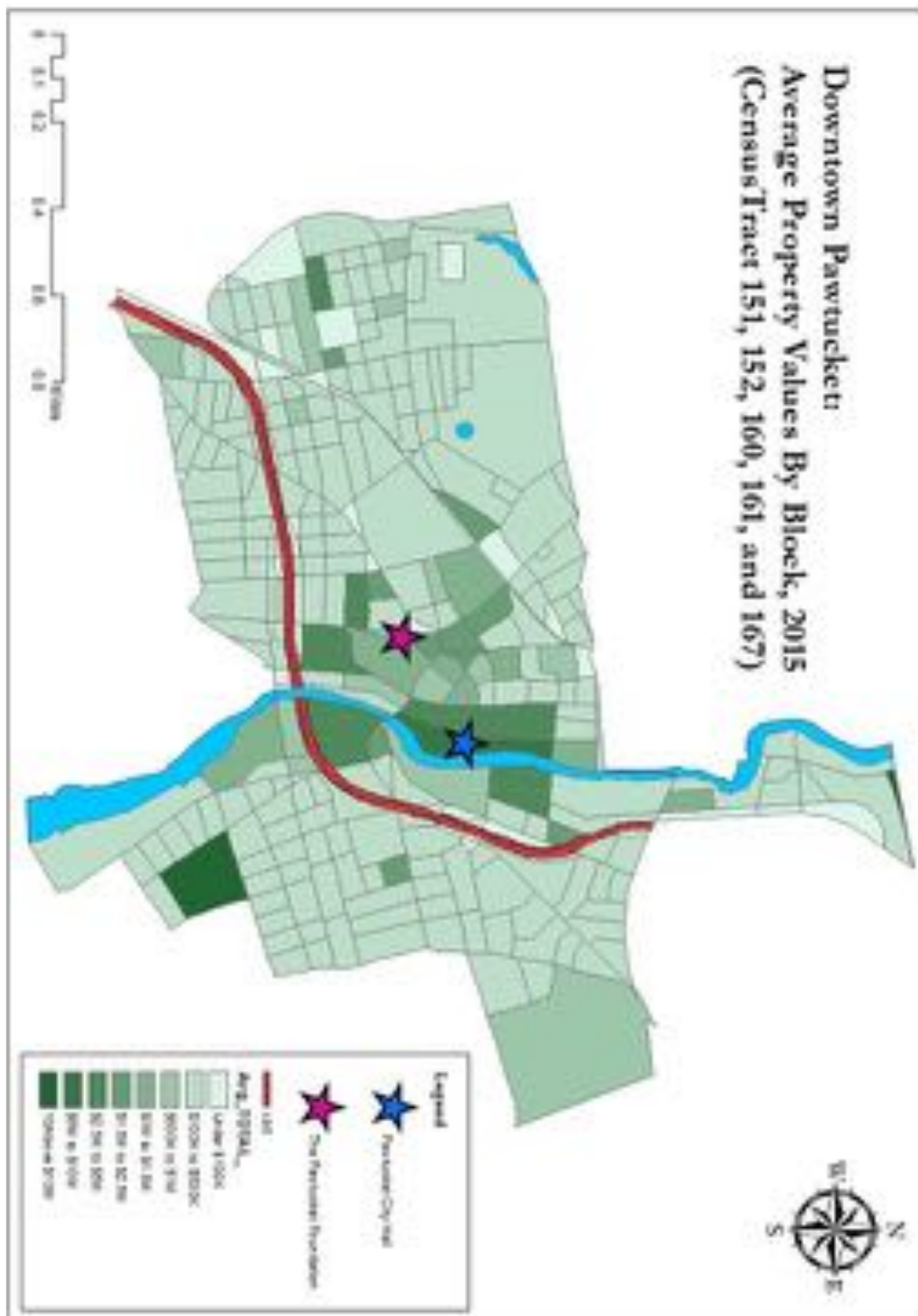
and crucial because all of our analysis will happen within this geographic boundary. After this step, we joined the current data into this shape file. This step allowed us to visualize how properties with different values are located within the downtown Pawtucket area, shown in Figure 1 from the previous page.

As we could see in this map, the majority of the properties with values above \$600,000 are concentrated in tract 152, where the Pawtucket City Hall and the Foundation are also located in. Areas surrounding tract 152 on both sides of the Blackstone river are packed with properties with value under \$300,000, shown in Figure 1 as green dots. A large portion of those properties with lower values are residential properties, which include single-family homes, condominiums, apartments, and townhouses. One thing we found intriguing was that there are not many properties with values between \$300,000 and \$600,000, shown in Figure 1 as black dots. This fact suggests that in the downtown Pawtucket area, properties are rather polarized in values, meaning they are either low value residential properties or high value commercial properties.

However, because many dots in Figure 1 can be overlapped with one another, we decide to generate another type of map which could allow us to make better assessments, both visually and statistically. In Figure 2, properties in those 5 tracts are divided into census blocks<sup>32</sup>. We then take the average property value by each block, and allow a color spectrum to represent the block average value, with darker green representing higher value:

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<sup>32</sup> We decided that census blocks is the best available analytic unit because it is the smallest geographic unit, which makes the analysis more accurate.





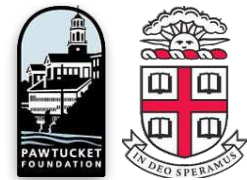
This average-value map gives us a more clearly visualization of which block has high value property concentration and which block has low high value property concentration. As mentioned earlier, this map also makes more statistical sense because by taking the average we are treating each and every neighborhood equally. Using this technique, we created 6 additional maps for year 1999, 2002, 2005, 2009, 2010, and 2012<sup>33</sup>. Those maps are not shown here but will be displayed in Appendix I and put into animation in the presentation. Through the animation, we are able to see that property values have changed dramatically through this time horizon of 15 years. The average property values for almost each and every blocks in these 5 tracts peaked in year 2005, right before the start of the Great Recession. Then, surprisingly, the property value remained fairly stable during and after the Recession. The worst years are 2010 and 2012, where we witnessed significant depreciation in property values. And finally, in recent years, as suggested by the 2015 maps, the property values are slowly rebounding back to the pre-Recession level.

After the maps were created and put into animation, the team couldn't help but wonder what had happened behind those maps. Are there any correlations or even causations between the property values and vacancy rate - the single most important economic indicator both the Foundation and the team agreed? The only way to test the hypothesis is to run a statistical regression and see if we could reject the null hypothesis<sup>34</sup>. Like any statistical analysis, we then need data on the vacancy information. However, unlike the tax assessor's data which we call the

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<sup>33</sup> These years are chosen because they are the years of which we have Assessor's data on. We feel they make a qualifying representation because: 1. Our analysis can trace back 15 years in time - higher than 5 years as we originally agreed in the joint Memorandum of Understandings. 2. There are datas before and after the Great Recession, happened in 2007 to 2009, which impacted property values nation-wide greatly.

<sup>34</sup> Here, the H<sub>0</sub>, or the null hypothesis, states that there is no correlation between the two factors, property values and vacancy rate.



hard data, vacancy information is soft data, meaning it is often not conveniently handy. As a result, the team decided to collect the vacancy data using the most simple yet labor intensive method by going out on downtown streets and check the vacancy status of actual properties. With the vacancy data, the study can move to another important phase of the analysis, which is creating and testing the hypotheses on the potential relationship between property values and vacancy information.

### **Hypotheses, Methodology, and Data**

This Capstone study evaluates an important question in the City of Pawtucket: Are values lower for vacant properties when compared to values of occupied properties? Because vacancy is often associated with a lack of maintenance of the property, this study expect the assessed values between vacant and occupied properties to be significantly distinct from each other.

**H1:** The assessed value of a vacant property will likely to be lower than the value of a similar but occupied property.

To test this hypothesis, this study uses a non-equivalent group design. The study gathers assessed property value data for the entire city of Pawtucket as well as the vacancy data for census tract 152, which encompasses the majority of Downtown Pawtucket. The study analyzes the value gap in property values. The study utilizes several logistic multivariate regression models of property values based on vacancy and zoning regulation characteristics which the study assumes could potentially affect how much value an assessor will put on a specific property within the boundaries of this analysis.

The study uses the 2015 Tax Assessor's dataset to evaluate trends in property values in Pawtucket. The dataset was provided to the Capstone team by Mike Wilcox from the City's planning department. It is a cross-sectional dataset with 20,323 total entries. The study also uses a dataset on



the vacancy information of Census Tract 152<sup>35</sup>. For simplicity purposes, this study will be named as Vacancy 152 dataset in following sections. The dataset contains 71 complete records. Both datasets provide large enough sample sizes such that overfitting the multivariate regression shall be prevented.

The study chooses the two datasets for two reasons. First, the Tax Assessor's dataset is widely considered the "gold standard" of property values. It is updated annually which captures the fluctuation in the property market. It also includes a variety of properties with different zoning regulations, such as residential, commercial, industry, and even tax-exempted properties. Many of those properties would be excluded in a majority of dataset generated by other for-profits entities. Second, because the property values are current, it is necessary for the study to obtain the current vacancy data in order to have the analysis making statistical sense. The Vacancy 152 data satisfies this need because it is current.

### Statistical Results

As a first cut at the data, the study plots assessed values among vacant and occupied properties in Graph 1, by using the Vacancy 152 dataset<sup>36</sup>. This scatter plot is meant to show the existence of a gap in assessed values between vacant and occupied properties. The y-axis records the

---

<sup>35</sup> This dataset, Vacancy 152, contains current vacancy information, zoning regulation, and current assessed values for a random-selected sample of properties in Census Tract 152, which is essentially the business district of Downtown Pawtucket where the density of commercial property is high. This dataset is manually collected by the Capstone team using the most traditional yet effective "boots-on-the-ground" mechanism. Team members each took a section of the census tract and by walking down each street and eyeballing the properties, the team was successful in generating a substantial dataset with matching property addresses and vacancy information. This task was initially done in February, and was then repeated twice in March and April. After the final data entries done in April, the team ended up with 255 records. Then, these 225 records were paired with the information in the Assessor's dataset for property values, square-footage, and zoning regulations. Surprisingly enough, only 74 entries were successfully matched. In this process of pairing, the team did notice discrepancies and data missing in the Assessor's dataset.

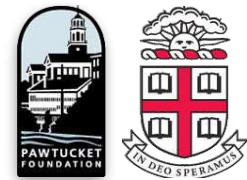
<sup>36</sup> A "jitter = 5" command is used in STATA to avoid overlaps of each responses. In the absence of this command, all points will concentrate in two vertical lines parallel to the y-axis, providing no informative presentations of the analysis.



assessed value of properties in census tract 152. The x-axis separates all properties into two distinct racial categories, with 1 being the property is vacant and 0 being the property is occupied.

On the left-hand side of the spectrum, occupied properties are distributed rather evenly between 0 and 1 million dollars based on property values. Put another way, there is almost the same number of occupied properties with relatively lower values than those occupied properties with relatively higher values, despite the fact that the number in the latter group may be slightly higher.

On the right-hand side of the spectrum, however, vacant properties are not distributed evenly. The absolute majority of vacant properties concentrate in the relatively lower value portion of the y-axis. None of the vacant properties has value greater than 1 million dollars. As a result, the study expects a gap exists in assessed property values, that vacant properties are more likely to have lower assessed values when compared to occupied properties.

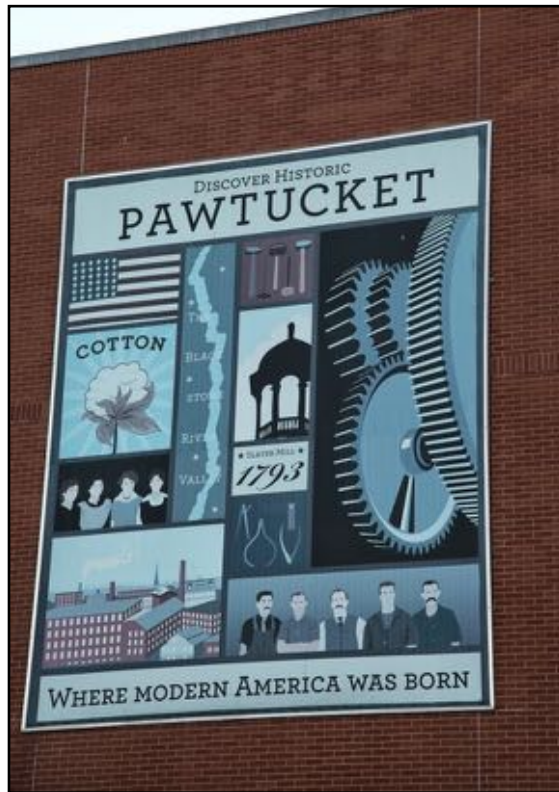


As seen in Graph 1, there is a substantially larger number of occupied properties than vacant properties. This comparison is detailed in Table 1 below:

**Table 1**  
**Current Vacancy Rate of Census Tract 152 (Downtown Pawtucket)**

	Frequency	Percentage
Occupied	64	86.5%
<b>Vacant</b>	<b>10</b>	<b>13.5%</b>
Total	74	100%

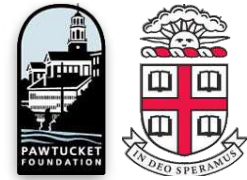
As Table 1 shows, among the total 74 properties in the sample for census tract 152, 10 properties are



vacant, making up 13.5% of the total properties. This vacancy rate of 13.5% shows 1.6% increase from 2008 when the vacancy rate is 12.1%<sup>37</sup>.

With the existence of a value gap, to what extent precisely does being vacant affects the likelihood of having a relatively lower assessed value? And while Graph 1 is suggestive, can other factor, such as zoning regulation, contribute to this likelihood? To answer both questions, the study runs two logistic regressions with different levels of complexity on assessed property values using

<sup>37</sup> This figure is obtained from the 5-Year Comprehensive Report generated by the City Planning Department. However, it is important to note that the City's report uses the American Community Survey 2008 dataset, which is an all-residential dataset. As a result, the vacancy rate, 12.1%, is the residential vacancy rate. On the contrary, the vacancy rate generated using the team's Vacancy 152 dataset is an overall vacancy rate for all types of properties within the geographic boundaries. Although this distinctions exists, the historical data still carries some value because residential vacancy rate and overall vacancy rate tends to fluctuate together. Yet it is necessary to also take into consideration that residential vacancy rate is more "sticky" than the overall vacancy rate because commercial businesses usually relocate more frequently than households, which often take schooling, works, and family-ties into consideration when relocating.



Vacancy 152 dataset. In Table 2, The dependent variable is Assessed property values, measures in U.S. dollars. The independent variables are a dichotomous measure of current property status (Vacancy) and a dichotomous measure of zoning regulation (Non-Commercial<sup>38</sup>).

The simplest form, regression (1), demonstrates a straightforward relationship between the main independent variable, Vacancy, and assessed property values. Specifically, being vacant drops the property values by \$289,668.9, or 58.9%, compared to being occupied, significant at the 95% level<sup>39</sup>. Without any additional independent variables and controls, the property value gap between vacant and occupied properties is tremendous.

**Table 2**  
**Logistic Multivariate Regression Result of Property Values in Downtown Pawtucket**

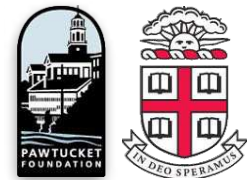
	(1)	(2)
Vacancy	-289668.9 (184790.6)	-334584.8* (166350.9)
Non-Commercial		-364150.7* (129595.3)
Per-Sqft Price		4665.127* (2154.512)
Constant	491868.9* (69350.67)	394421.8* (123365.2)
R <sup>2</sup>	.03	.22
N		74

Standard errors in parentheses.

\* $p < 0.05$

<sup>38</sup> The Non-Commercial variable is a dichotomous variable, as mentioned above, with non-commercial properties carry the value 1 and commercial properties carry the value 0. The Non-Commercial variable affects property values for obvious reasons. However, it is associated with the main independent variable, Vacancy, in a relatively more subtle fashion. The study believes that commercial properties are more elastic in both demand and supply, thus making them relatively more likely to be vacant than other types of properties.

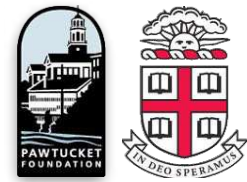
<sup>39</sup> Claiming that a statement is at 95% confidence level entails that the study is 95% confident that the relationship between the inspected independent variable and the dependent variable is non-trivial. Or put in another way, that the researcher can be 95% confident in rejecting the null-hypothesis and accept the original hypothesis which in this case, is H1.



In order to lessen the potentially unseen omitted variable biases, regression (2) includes two additional independent variables, non-commercial and price per-sqft. The coefficients on this non-commercial variable is statistically significant at the 95% level. The main story here is that regression (2) has controlled for zoning regulation and per-unit price. As previously noted, there exists a strong linkage between zoning regulation and the assessed property value. As regression model (2) in Table 2 suggests, being a non-commercial property decreases the assessed value by \$364150.6.7, which should be considered a substantial drop. Now, even with the effective independent variables, non-commercial, being included, the value gap between vacant and occupied properties is still substantial at \$-341,419.8, and statistically significant at 95% confidence level.

### **Summary of Data Analysis Findings**

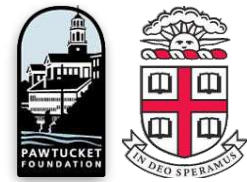
As requested by the Pawtucket Foundation, the team has successfully mapped property values in Downtown Pawtucket using ArcGIS softwares. The maps suggest that property values have fluctuated up and down from 1999 to 2015. The general trend here suggests that property value in Downtown Pawtucket peaked around year 2005 and dropped significantly in 2009 and 2010, following the nation-wide real estate recession. The trend then suggests that property value has been rising steadily in recent years. The majority of relatively high value properties is in Census Tract 152, where the vacancy rate is also the highest. By utilizing a “boots-on-the-ground” data collection method, the team has identified that the current vacancy rate in Downtown Pawtucket sits above 13.5%. Further analysis then suggests that vacancy is an important factor in determining a property's value. Statistical test proves that there exists a strong correlation between vacancy and property value: when the property is vacant, the value is likely to decrease by a substantial amount and can be as high as 45% of its total value.



## GIS User's Manual

The above data analysis work is not the only technical product the team delivers to the client. As one of the final deliverables to the Pawtucket Foundation, the team has also created a GIS User's Manual. The purpose of this manual is to detail every exact step required to generate appropriate GIS maps for the Capstone projects. With this manual and associated datasets, the Pawtucket Foundation should have the capability to re-generate the data mapping and analysis, with the possibilities to extend this analytical approach to other similar projects. The capstone team hopes to leave a legacy for the Pawtucket Foundation, and this tool does exactly that. It builds a solid data-processing and analysis foundation for the client, while allowing the client to go above and beyond with this handy tool to tackle other similar projects in the future. Unlike the final report, this tool-kit is not a one-time product. Rather, it should be considered as a live document. The Pawtucket Foundation could incorporate slight modifications into this manual and tailor it to suit the specific needs of other projects. Overall, this user's manual adds to the value of this final report. This GIS User's Manual will be attached with this report and shall be found at the end of the report.





## Recommendations

Noted throughout earlier sections of this report, we have touched upon key case studies and examples from around the country. We feel that these items provide a pathway for the city of Pawtucket to take a number of near-term steps towards a stronger development climate downtown. Additionally, we have learned from our case studies that emerging cities around the country utilize a comprehensive set of data analysis tools similar to the products that we have created for the Foundation. Continued use of our “toolkit,” and future creation of similar data products requires that the city moves to adopt the more encompassing data collection process that we highlight below as part of our series of final recommendations.

**First Recommendation - Expand current data collection efforts within Census Tract 152.** Though Pawtucket has utilized common economic and development data in the past for various reports and studies, we recommend that the city consider collecting consistent data on additional indicators. This includes, but is not limited to:

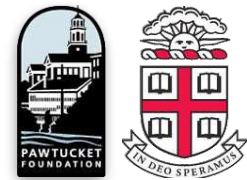
### **Non-Economic**

- Population change and decline (Census)
- Out-migration (Census)
- Commercial and residential vacancy

### **Economic**

- Unemployment (BLS)
- Job growth
- Property taxes (Gov't)
- Purchasing power

These indicators listed above were selected because they are the core data that Wolff used in 2010 to create his “complex shrinking city” metric. The authors of “Maintain, Demolish, Re-



Purpose” went on to apply Wolff’s metric and these underlying indicators to accurately analyze the economic development conditions of Fall River, MA. This is simply a start, but expanding Pawtucket’s data collection practices to include not only new and meaningful indicators - but also more frequent baselines (annually) - will be important to making accurate projections.

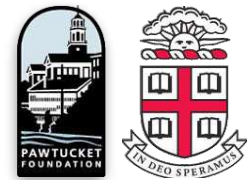
**Second Recommendation - Enact a model for the temporary use of vacant land.**

The Foundation has placed an emphasis in recent years on developing a more pedestrian-friendly downtown and taking advantage of green spaces where possible. These improvements come at a comparatively minor cost, yet can have a strong positive impact on resident and visitor perception of city quality. Authors Nemeth and Langhorst consider the challenges and benefits of implementing such a model in “Rethinking Urban Transformation.”

We understand from past projects in Pawtucket, Providence, Fall River and other cities around the country that even many of the successful permanent developments take a substantial amount of preparation and time to develop. Because of this, we recommend that the city develop a program similar to the examples set forth in “Rethinking Urban Transformation” that allow for the open and free use of current vacant land. So long as long-term, permanent development is not obstructed by activities on these plots, the benefits envisioned in other previous Foundation initiatives calling for additional community engagement on green spaces.

**Third Recommendation - Create a Tax Increment Financing Board & Program.**

Tax Increment Finance districts have become a popular way for cities to take advantage of underutilized areas to spur development and tax revenue where there would otherwise be continued stagnation. We recommend that Pawtucket create a TIF Board or Council that would consist of local elected officials, business leaders and public members of the city. This would mirror the body established in Fall River that recently worked for a number of years analyzing, and ultimately approving the Amazon TIF project that will break ground shortly in Pawtucket’s “sister city.”



Governor Gina Raimondo has acknowledged that TIF is a viable tool for Rhode Island, and some proposed projects on the former Interstate 95 land in Providence have already highlighted this financing approach as an option. Aligning with the Governor's administration on economic development issues and TIF districts will be beneficial to Pawtucket. The city has already taken strides to become one of the pilot cities using the new online permitting system. A focus on becoming a state leader on TIF projects would be another success. We recommend that the city design a Tan Increment Financing Board to review potential districts within census tract 152 and court potential developers.

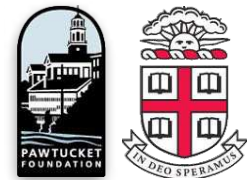
#### **Fourth Recommendation - Create a Special Service Area.**

As mentioned in former case studies, a Special Service Area (SSA) is a taxing mechanism. This type of district allows local governments to establish such areas without incurring debt or levying a tax on the entire municipality. In short, an SSA allows local governments to tax for and deliver services to limited geographic areas within their jurisdictions. SSA is to some extent very similar to Business Improvement District (BID). Creating a SSA in Pawtucket downtown area will help government fund a wide range of special or additional services and/or physical improvements in a defined geographic area within a municipality or jurisdiction.

TIF and SSA can be implemented together, just like in Galesburg. Usually TIF areas are smaller than SSA. SSA will be more useful to help building base facilities like pedestrian and bicycle ways, providing public advertisements and improve public space vision. We can consider to offer a reasonable allowance for those new business coming to SSA.

#### **Fifth Recommendation - Mixed use of building**

To learn from Galesburg, we can try to build or open more mixed use buildings to attract businesses. Putting some vacant high-end lofts into use might provide good options for those who are trying to find a place for their offices. With an affordable cost and a location of historic district,



those mixed use buildings will be attractive. There have already been some attempts in Pawtucket, such as several riverfront sites. In addition, we can try to open upper floors to commercial use.

**Sixth Recommendation - Generate Additional Data for the “Toolkit” by Connecting the Report to Upcoming AmeriCorps Programming in Pawtucket**

This is a recommendation resulting from a unique project that emerged outside of our team's scope of study in early spring 2015. Discussions with Aaron informed us that the city and Foundation expects a substantial investment by AmeriCorps within the city for the summer of 2016. This will include the residency of approximately fifty volunteers who specialize in working with high school aged youth to inform and prepare them for college and other post-graduation career opportunities. As part of this initiative, there will be a focus on learning more about the students' local community and the impact that they can have on it.

After considering potential ways for these young folks to participate in civic engagement, we agreed that developing a plan to have the students collect first-hand data within the boundaries of census tract 152 would be a meaningful recommendation for this report. Though time constraints do not allow for us to create a comprehensive process for the students to follow, we believe that utilizing the AmeriCorps program of 2016 to continue the data collection that our team began would be helpful. This data could then be plugged into our toolkit to produce up-to-date, accurate analysis of downtown Pawtucket. Possible data collection topics include, but are not limited to:

- Vacancy (Structural and Land)
- Parking Accessibility
- Building Facade Compliance
- “Clustering” of Vacant Spaces
- Survey of Businesses (Concerns, etc)



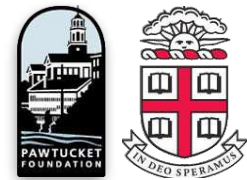
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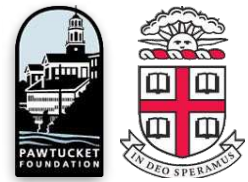
**Rebuilding Pawtucket's Foundation**

*Transforming the vacancy and underutilization of properties in Downtown Pawtucket*

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## Acknowledgment

### *The Pawtucket Foundation*

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### *Office of the Mayor*

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Dylan M. Zelazo

### *Department of Planning and Redevelopment*

Barney Heath  
Michael Wilcox  
Susan Mara

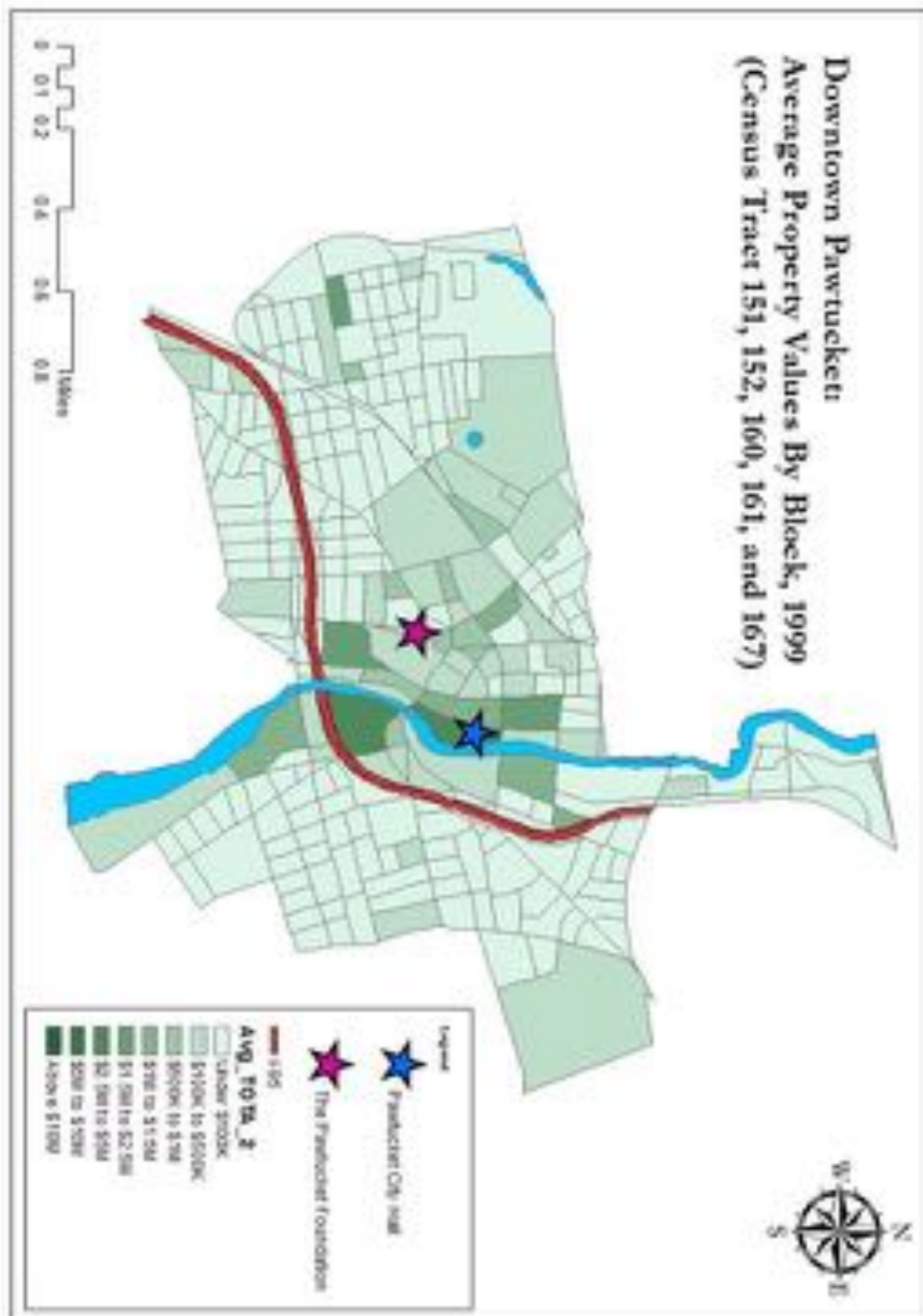
### *Tax Assessor's Office*

Robert Burns  
Tina Esposito



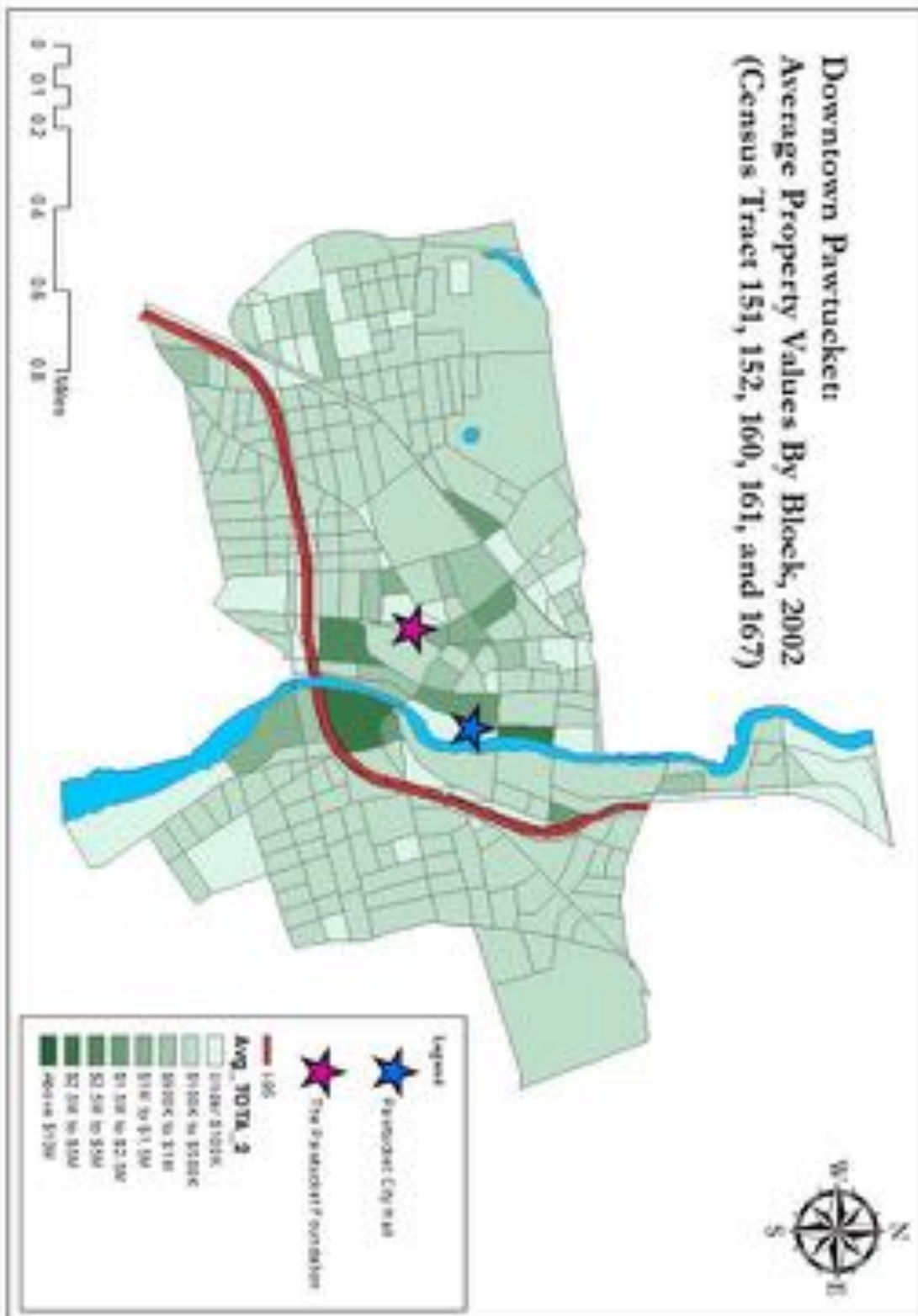


Appendix I



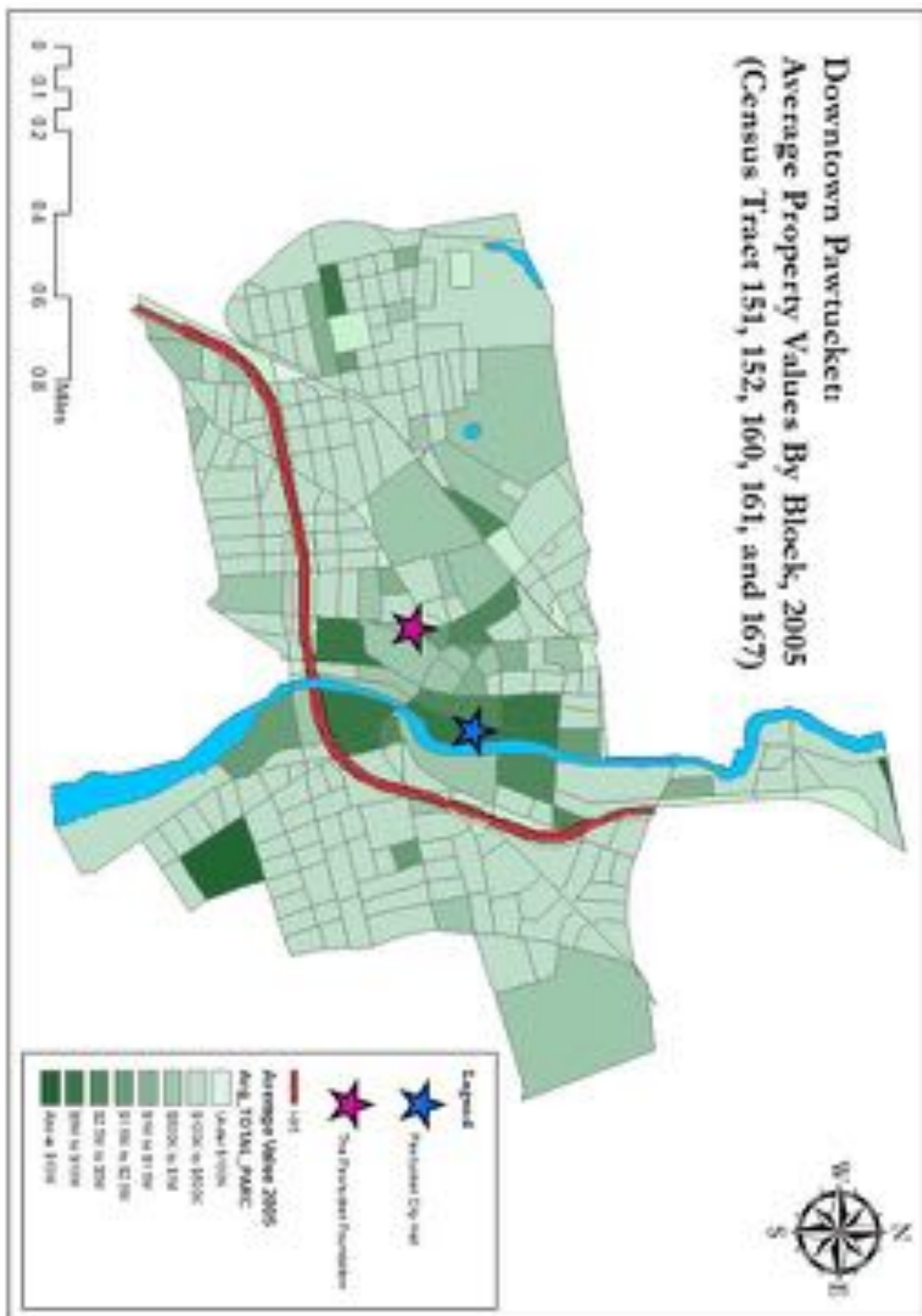


## Appendix I (continued)



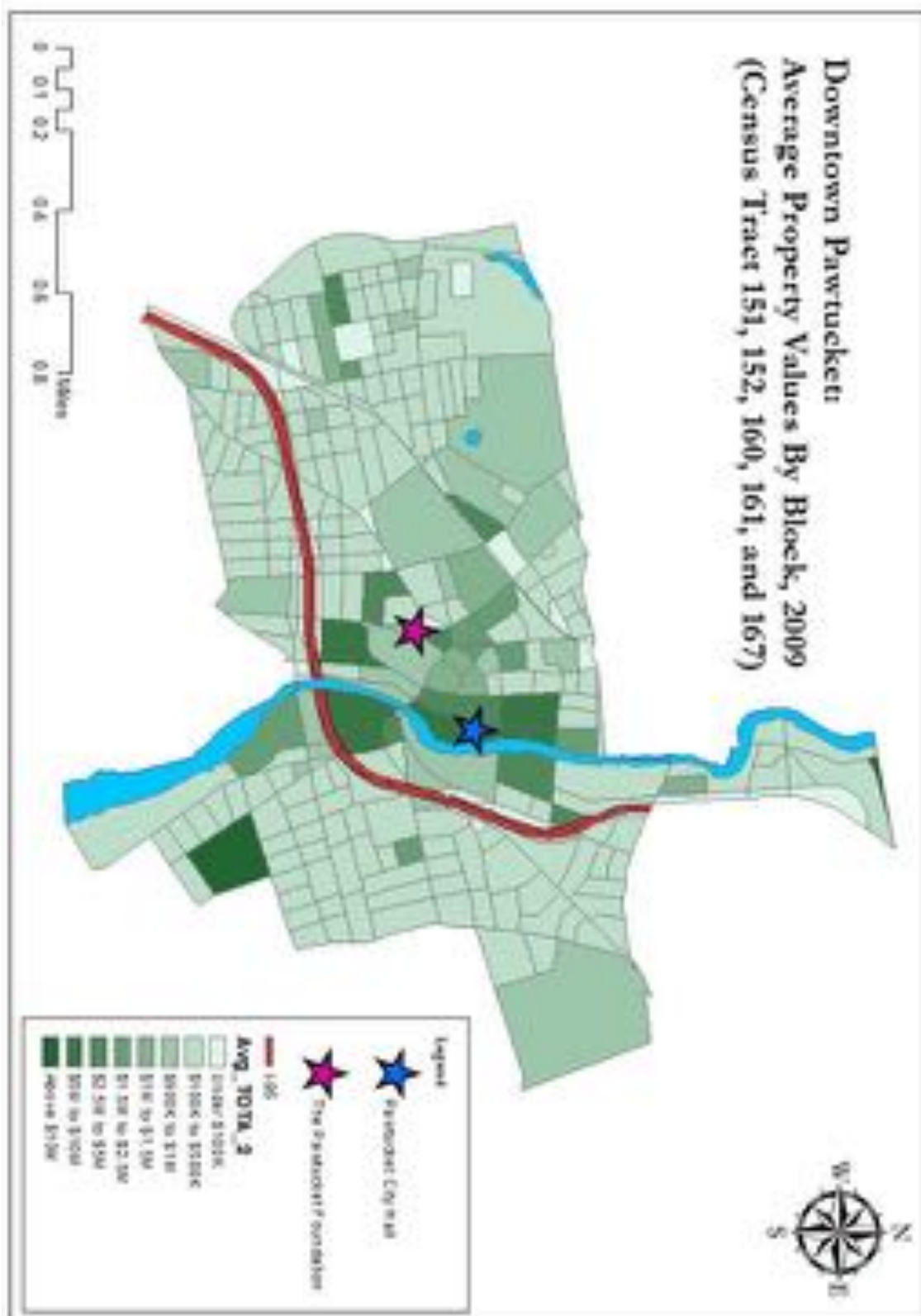


## Appendix I (continued)



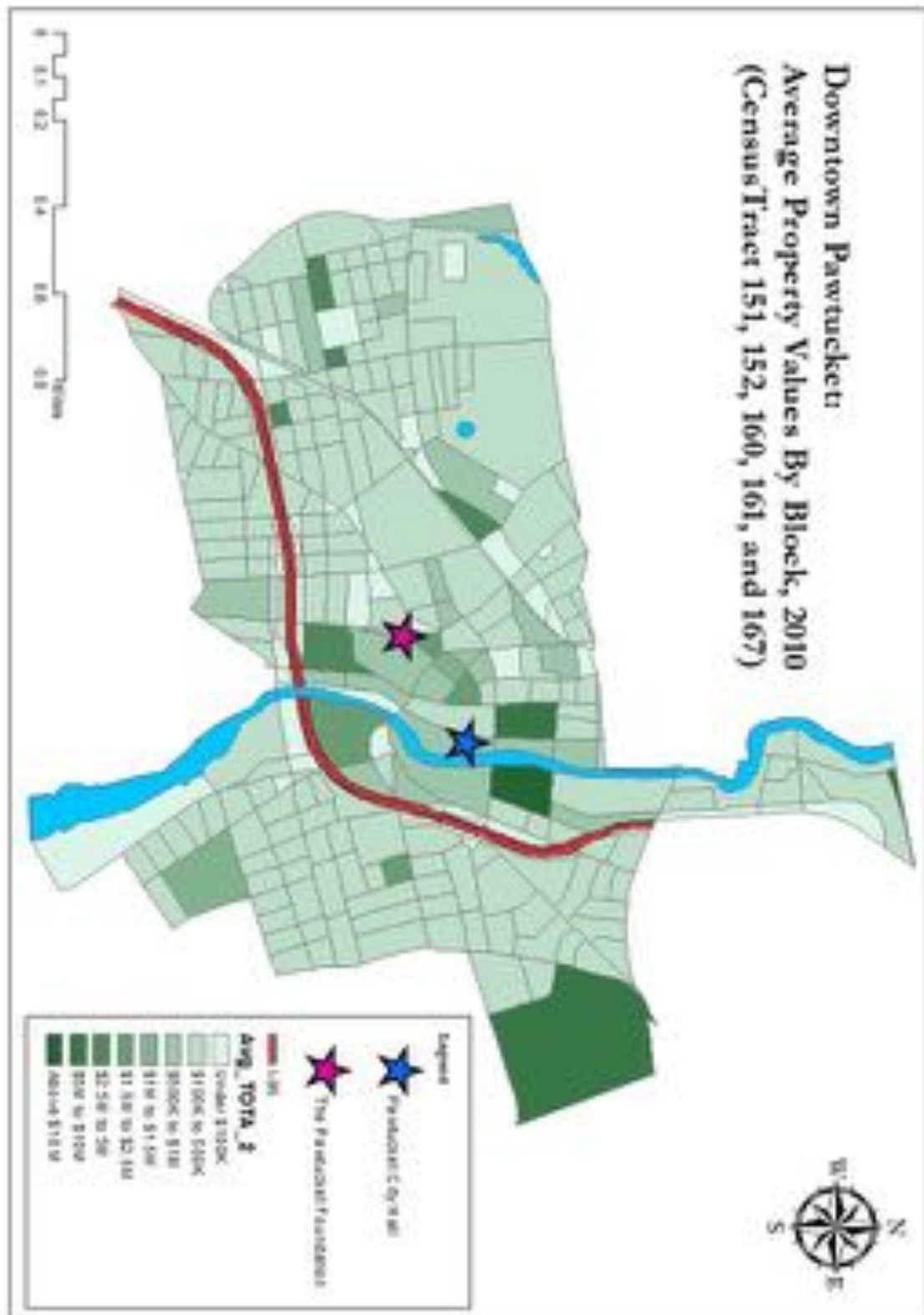


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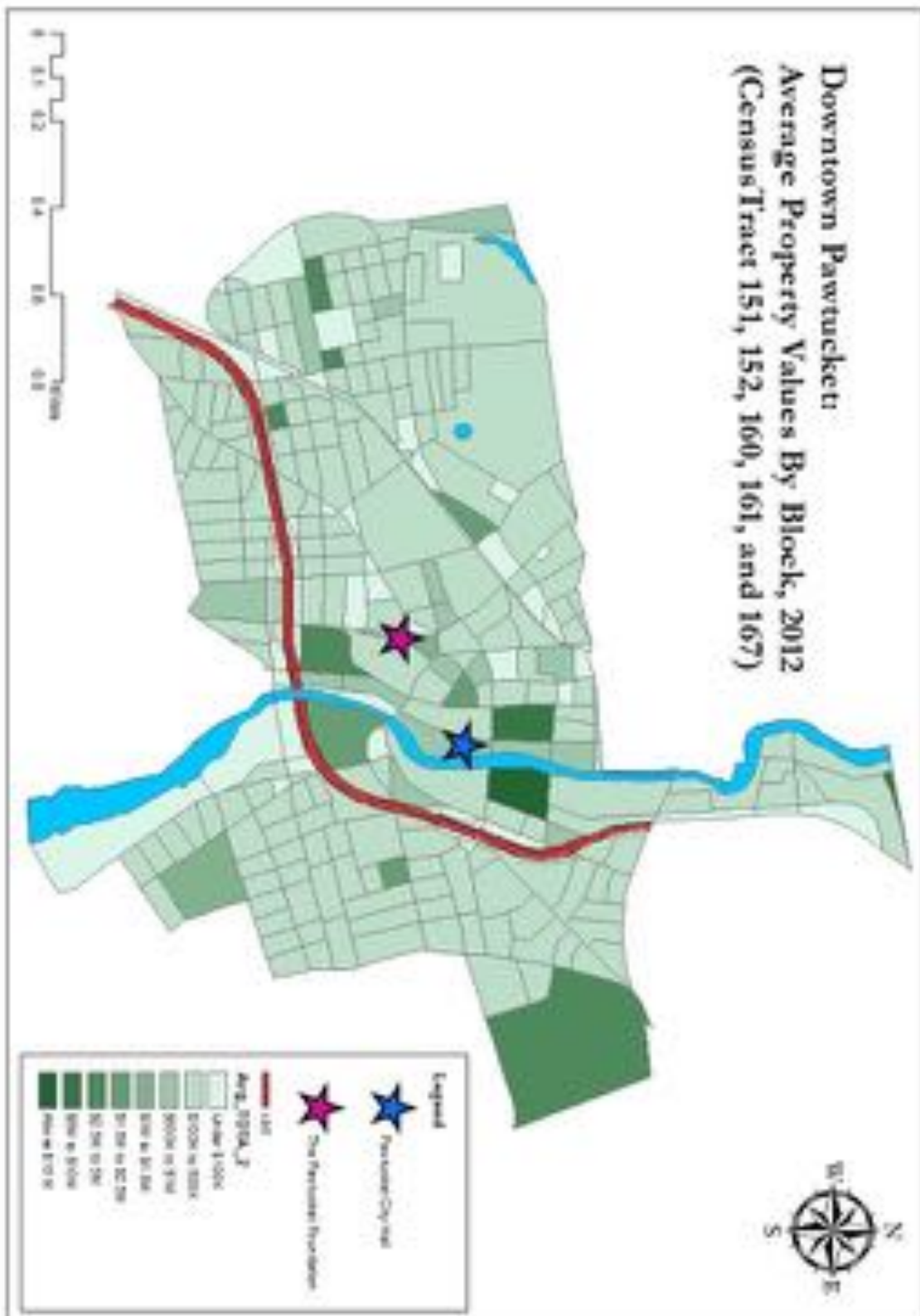


**Appendix I**  
**(continued)**





**Appendix I**  
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# GIS User's Manual: The Pawtucket Foundation

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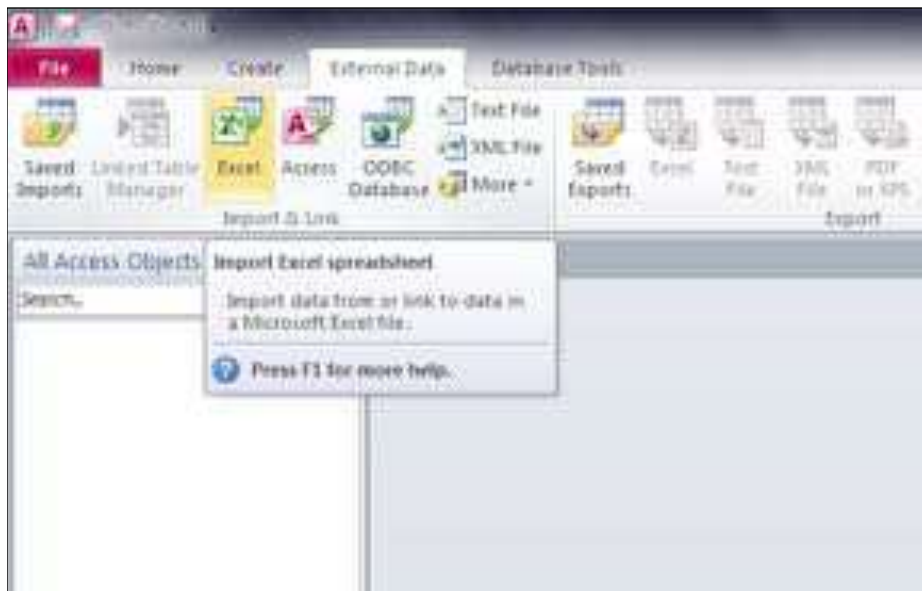
## Introduction

This GIS User's Manual is prepared for the Pawtucket Foundation by the Capstone group from Taubman Center for Public Policy, Brown University. The purpose of this manual is to detail every exact step required to generate appropriate GIS maps for the Capstone projects. With this manual and associated datasets, the Pawtucket Foundation should have the capability to re-generate the data mapping and analysis, with the possibilities to extend this analytical approach to other similar projects. This manual is considered to be a final product given to the Pawtucket Foundation by the Capstone team, however, this manual is also considered to be a live document. If any person, when using this manual, finds discrepancies or ambiguities, please contact the Capstone team. We hope the Capstone program leaves its legacy in this document, and we hope it can be helpful to any person using this manual.

## Raw Data Processing

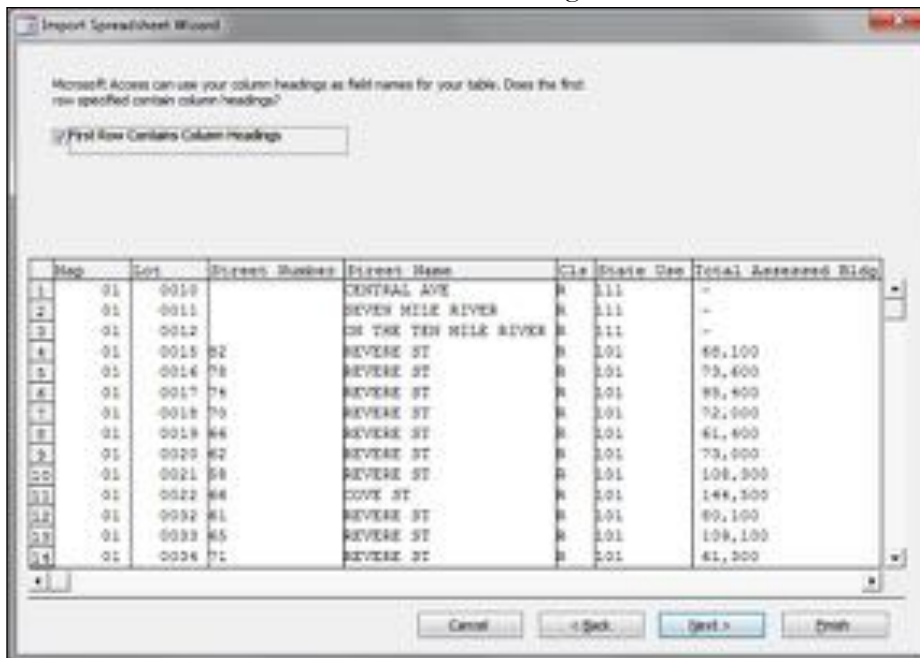
This manual uses the 2015 Tax Assessor's Dataset provided to the Capstone team in February, 2015 by Mr. Michael Wilcox from the Planning & Redevelopment Department of City of Pawtucket. This dataset will be provided along with this manual to the Pawtucket Foundation.

- Open Microsoft Access Software
- Double-click "Blank Database"
- In the Import&Link section of "External Data", choose Excel

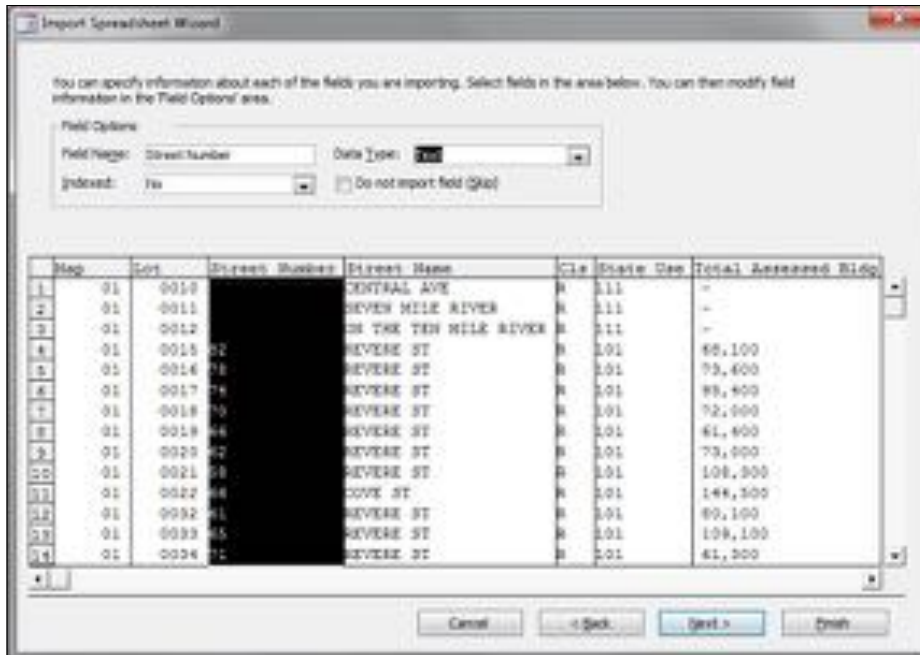


- Use the Browse button in the pop-up window to import Planning Report 2-24-15
- Use the default "Import the source data into a new table in the current database"

- Click OK
- Click Next
- Click “First Row Contains Column Headings”

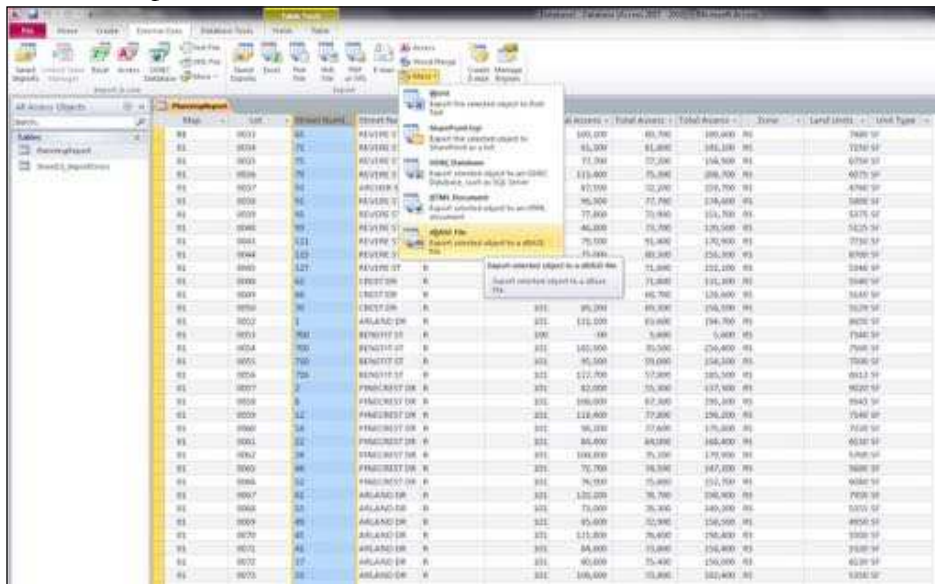


- Then click Next
- Choose Field Name “Street Number” and Change the Data Type to “Text”



- Click Next
- Import to Table: Rename the output as “PlanningReport”
- Click Finish

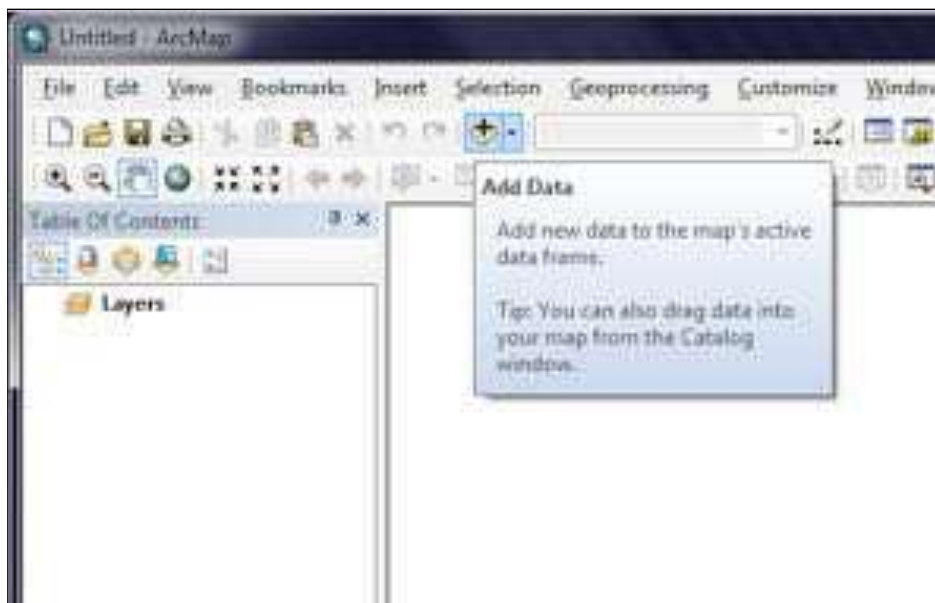
- In the Export section of “External Data”, choose more, then “dBase File”



- Save it to a folder of your preference, for simplicity purposes, let us call it “Folder GIS”<sup>1</sup>.
- Close Microsoft Access

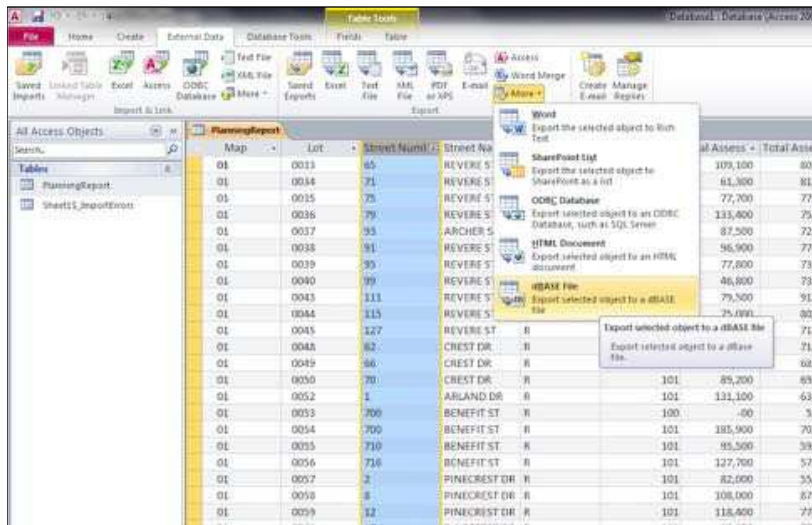
## ArcGIS: Add Data Layers

- Open ArcMap
- Choose Blank Map
- Click the Add Data Button

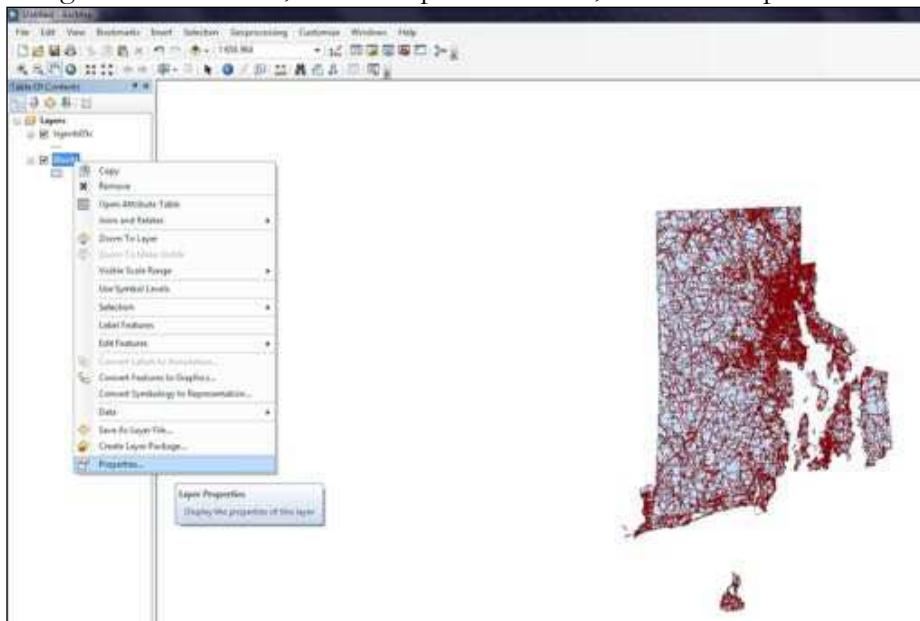


<sup>1</sup> If an error message pops up at this stage, which has occurred to me several times, it was because two column head names share the exact same first 10 characters. In this case, because three columns begin with the words “Total Assessed”, this error is likely to happen. To fix this problem, just change the column names, for example, use the name “building value”, “land value”, and “total value”.

- Click Connect to Folder



- Choose folder RI\_Tiger\_St and double click “tigerds05c.shp”<sup>2</sup>
- Use the same method as above to import “Water\_RI.shp”<sup>3</sup>
- Use the same method as above to import “blocks.shp”<sup>4</sup>
- Right click “Blocks”, in the drop-down menu, choose “Properties”

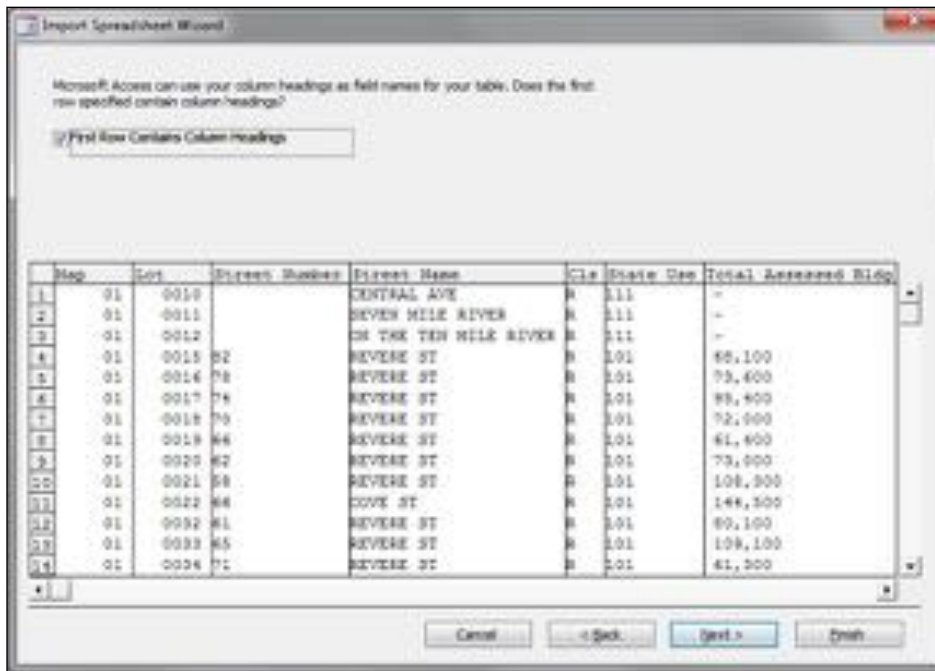


<sup>2</sup> This is a ArcMap shape file which captures the shape and geographic information of each and every street in the State of Rhode Island. It is important to have this shape file to 1. Geocode the addresses 2. Identify major roads. This file will be provided to the Pawtucket Foundation manual.

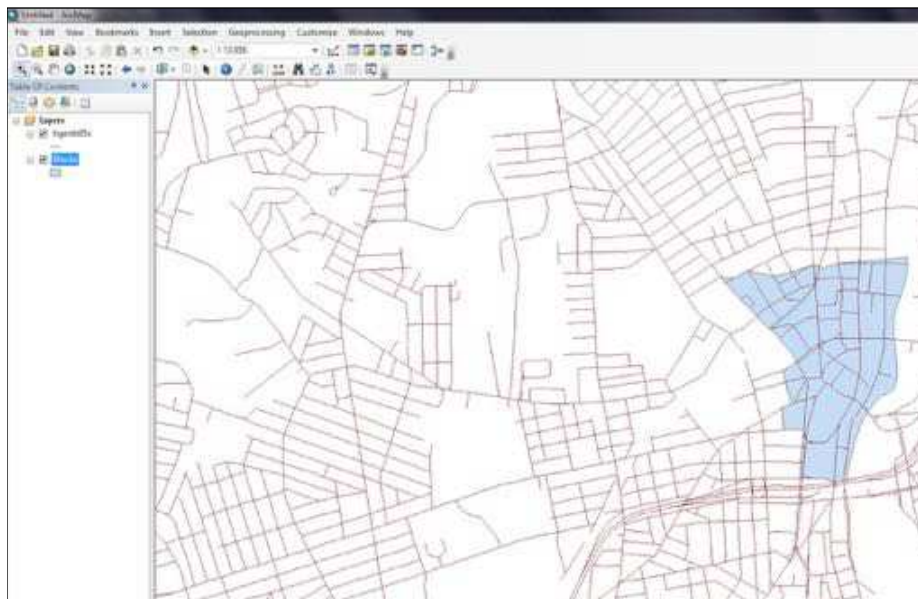
<sup>3</sup> This is a ArcMap shape file which captures the shape and geographic information of each and every water areas in the State of Rhode Island. It is important to have this shape file to identify major water areas such as the Blackstone River. This file will be provided to the Pawtucket Foundation manual.

<sup>4</sup> This is a ArcMap shape file which captures the shape and geographic information of each and every block in the State of Rhode Island. It is important to have this shape file to 1. Identify the boundaries of analysis 2. Present values at the block level. This file will be provided to the Pawtucket Foundation manual.

- In the layer properties, choose “Definition Query”
- Choose Query Builder
- Double click “TRACT2000” so it appears in the box below
- Double click “=”
- Click “Get Unique Value”
- Double Click “152”
- Click OK

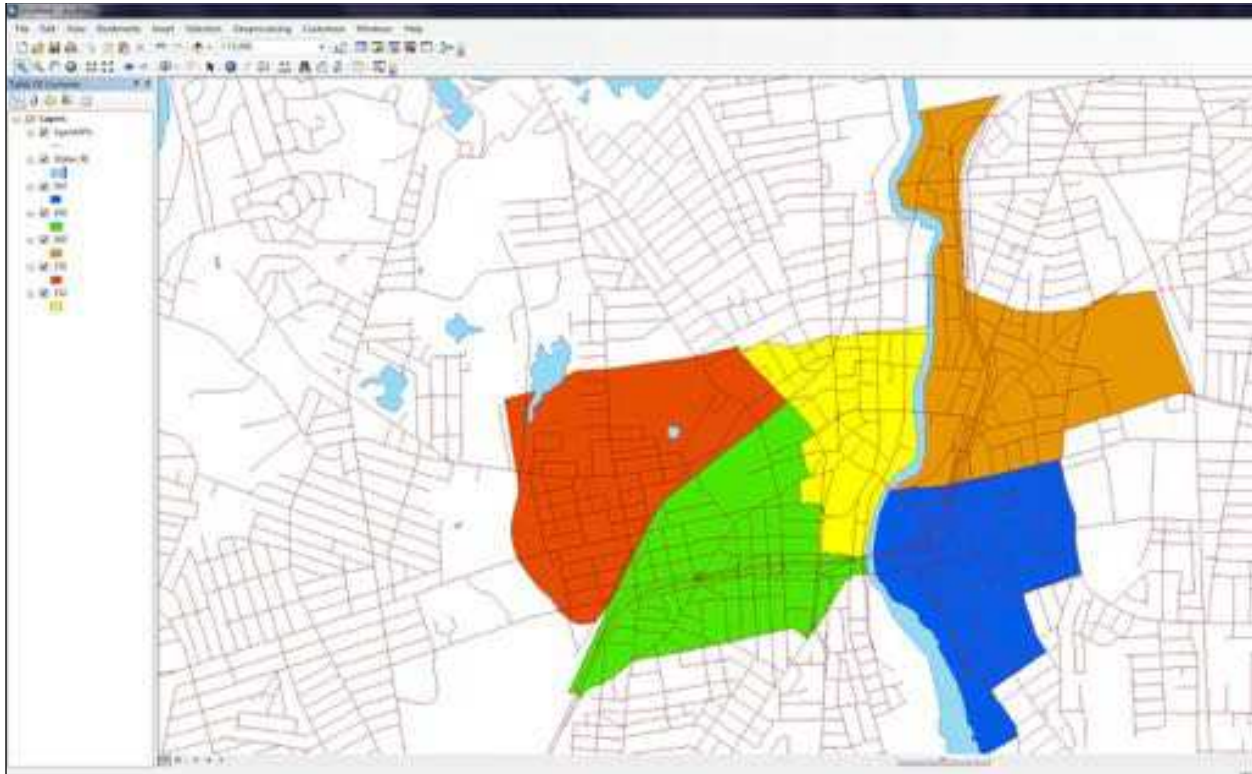


- Click OK in the main dialogue box
- Use the zoom in button and finds the color-shaded area. This is Census Tract 152<sup>5</sup>.



<sup>5</sup> Census Tract 152 is the center of analysis of this Capstone project. It includes the majority of Downtown Pawtucket. The Pawtucket Foundation, as well as the City Hall, are within the boundary of Census Tract 152

- Rename “Blocks” to Tract152 under the Layers box to the left
- Import “blocks.shp” again
- Use the same method above to identify the Census Tract 151
- Repeat the process 3 more times in order to add in Census Tract 160, 161, and 167. The result should look as follows:



## Geo-processing: Merge

Geo-processing is a tool in the ArcMap. It allows the user to process and manipulate the geographic image and information. This merge technique allows the user to combine information from different layers into a single layer. This step is crucial because it identifies and determines the geographic boundary of this analysis. This step is also unique because it is specifically created for this Capstone project. For future projects which concern different geographic boundaries, the user should apply slight modifications yet shall follow the similar steps as detailed below.

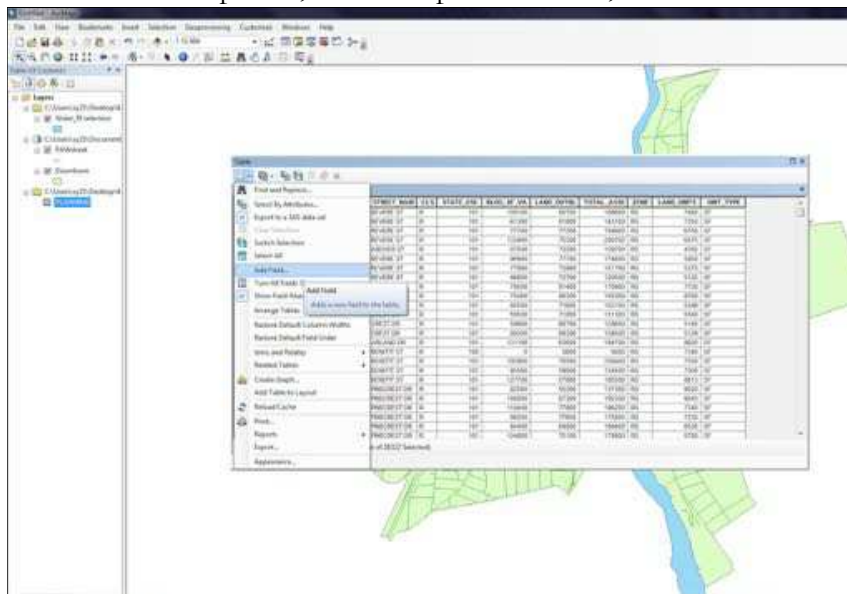
- Click “Geoprocessing” in the tool bar
- In the drop-down menu, choose the tool “Merge”
- Add all five layers, Tract151, Tract152, Tract160, Tract161, and Tract167
- Click Ok

- ArcMap will generate a new layer named “Blocks\_Merge”. This new layer is a combination of 5 census tract, which is the boundaries of our analysis as agreed in the Memorandum of Understandings<sup>6</sup>.
- Rename the new layer “Blocks\_Merge” as “Downtown” in “layer properties”
- You may then delete the 5 Census Tract layers and only keep the new combined layer in ArcMap

## Geo-processing: Clip

Like Merge, Clip is also a tool that has been used frequently in ArcMap. It allows the user to trim a specific layer using the boundaries from another layer, while keeping the original information within that layer intact.

- Click “Geoprocessing” in the tool bar
  - In the drop-down menu, choose the tool “Clip”
  - In “Input Features”, choose “tigerds05c”
  - In “Clip Features”, choose the layer “Downtown”
  - Click Ok
  - ArcMap will generate a new layer named “tigerds05c\_Clip”
  - Rename the new layer as “PAWstreet” in “layer properties”
  - You may then delete the old tiger\_street layer if you wish
- 
- Add “PlanningReport.dbf” into ArcMap
  - Right click “PlanningReport”, and in the drop down menu, choose “Open”
  - Click “Table Option”, in the drop down menu, choose “Add Field”



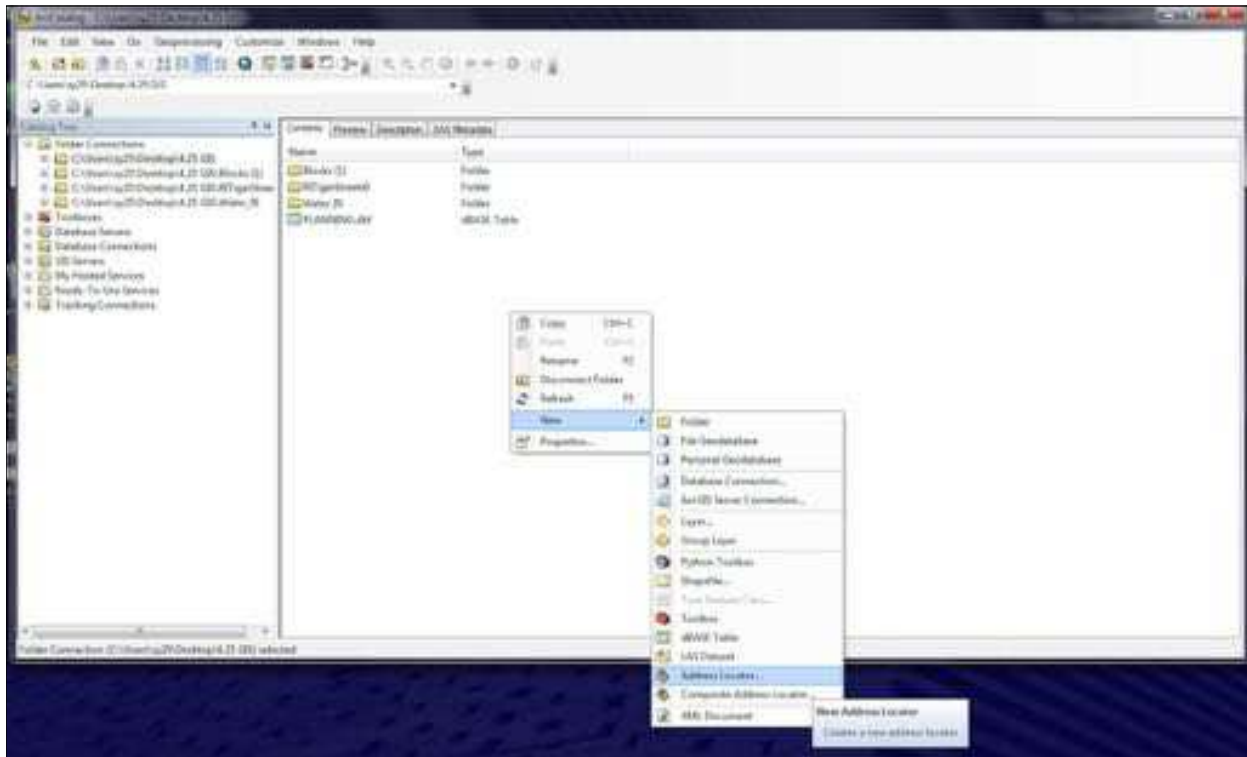
<sup>6</sup> This layer is also important in our ArcMap logistics because it should be used as the boundaries to each and every layers. Note that most layers, or shape files we have is for the entire State of Rhode Island. In order to re-generate them to only the 5 Census Tracts we are interested, we should use this layer as the foundation to every other layers.

- In the name field, type in “Address”
- Choose type as “Text”
- Click OK
- You will see a new column being generated with the column name “Address”
- Right click the column head, and choose “Field Calculator”
- Double Click “STREET\_NUM”
- Click “+”
- Type in “ space ”
- Click “+”
- Double Click “STREET\_NAM”
- Choose “String” in the type options
- Click Ok (Note here the function should look like STREET\_NUM+ “ ” +STREET\_NAM)
- The you’ve generated the complete street address for every properties in the original dataset.
- Add another field using the same method as detailed above and rename it as “ZIP”
- You will see a new column being generated with the column name “ZIP”
- Right click the column head, and choose “Field Calculator”
- Choose “String” in the type options
- In the calculation field, type in “02860”



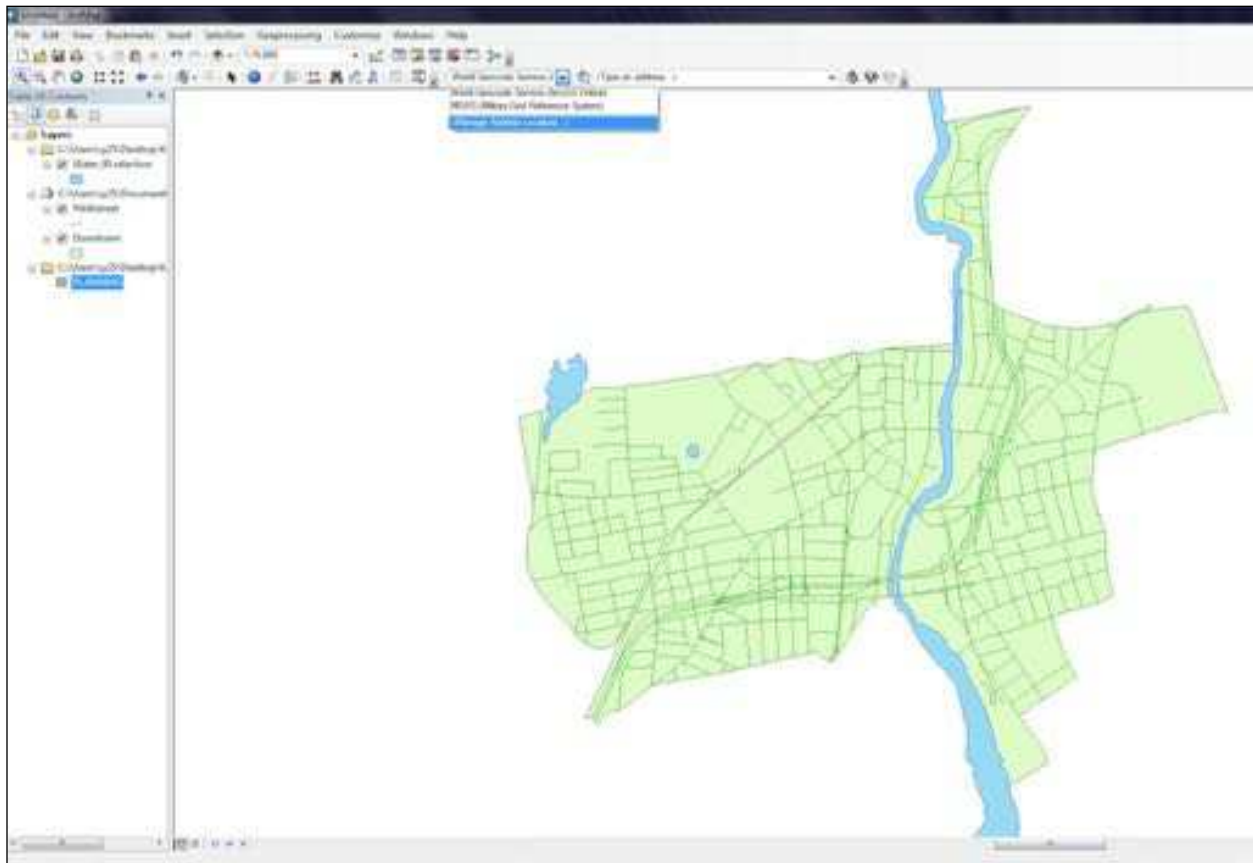
- Close window

- Launch ArcCatalog<sup>7</sup>
- Locate the folder where the file “PlanningReport.dbf” is placed. In this case, it is “Folder GIS”.
- Right click in the blank space
- In the drop down menu, choose “New”
- The choose “Address Locator”



- In the dialogue box, choose “US Address - Dual Ranges” as Address Locator Style
  - Use PAWstreet as Reference Data
  - Click Ok
  - Wait until the icon appears (a house with a red roof)
- 
- Switch back to ArcMap
  - In the top tool bar, choose “Customize”
  - In the drop down menu of toolbars, choose “Geocoding”
  - In “Manage Address Locators”, click Add and then choose the address locator created in the last step

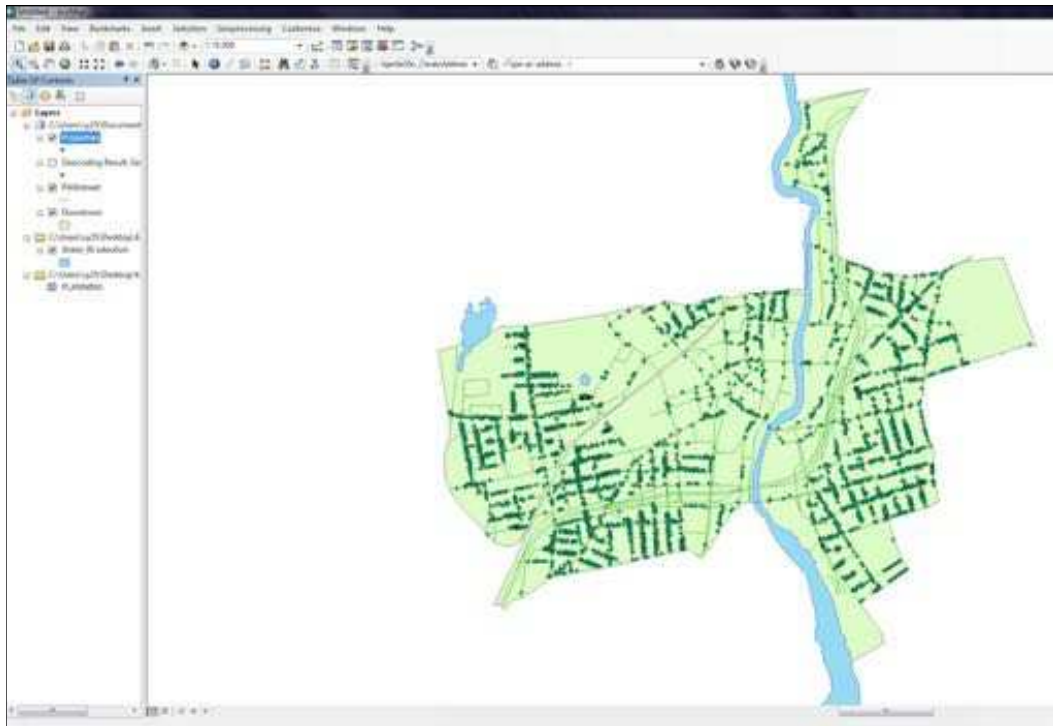
<sup>7</sup> ArcCatalog, like ArcMap, is also a geographic data processing software. It allows the user to translate plain text information to specific point on the map, using appropriate matching identities such as street address, city, and zip code. It is particularly useful in this project because tax assessor’s dataset is an Excel file and we need to map each entries onto our map.



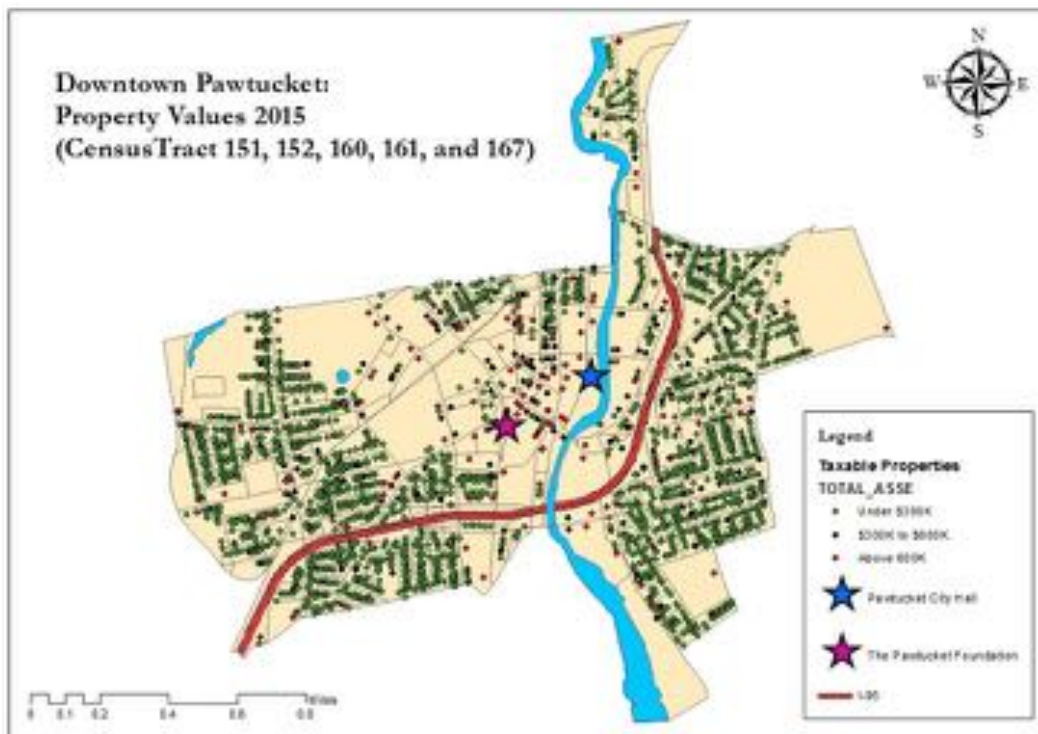
- Right click the layer “PlanningReport”
- In the drop down menu, choose “Geocode Addresses”
- Click Ok
- The dialogue box will automatically matches address and zip code with appropriate columns within the dataset.
- Click “Geocoding options”
- Set spelling sensitivity to 95 instead of the default setting of 80
- Click Ok
- You will see many dots all over on the map. Each dot represent a single property.
- The layer being generated is called the “Geocoding\_Result”

## Geo-processing: Clip

- Click “Geoprocessing” in the tool bar
- In the drop-down menu, choose the tool “Clip”
- In “Input Features”, choose “Geocoding\_Result”
- In “Clip Features”, choose the layer “Downtown”
- Click Ok
- ArcMap will generate a new layer. Rename this layer as “Properties”
- You may then delete the old tiger\_street layer such that only the dots on the new layer becomes visible in the map



- Right click “Properties”
- In the drop down menu, choose properties
- In the “Symbology Section”, choose the item you wish to see on the map. In this case, we choose the total assessed value and separate it into 3 categories. After clicking Ok and put in legends, titles, and descriptions, we have successfully generated a detailed map.

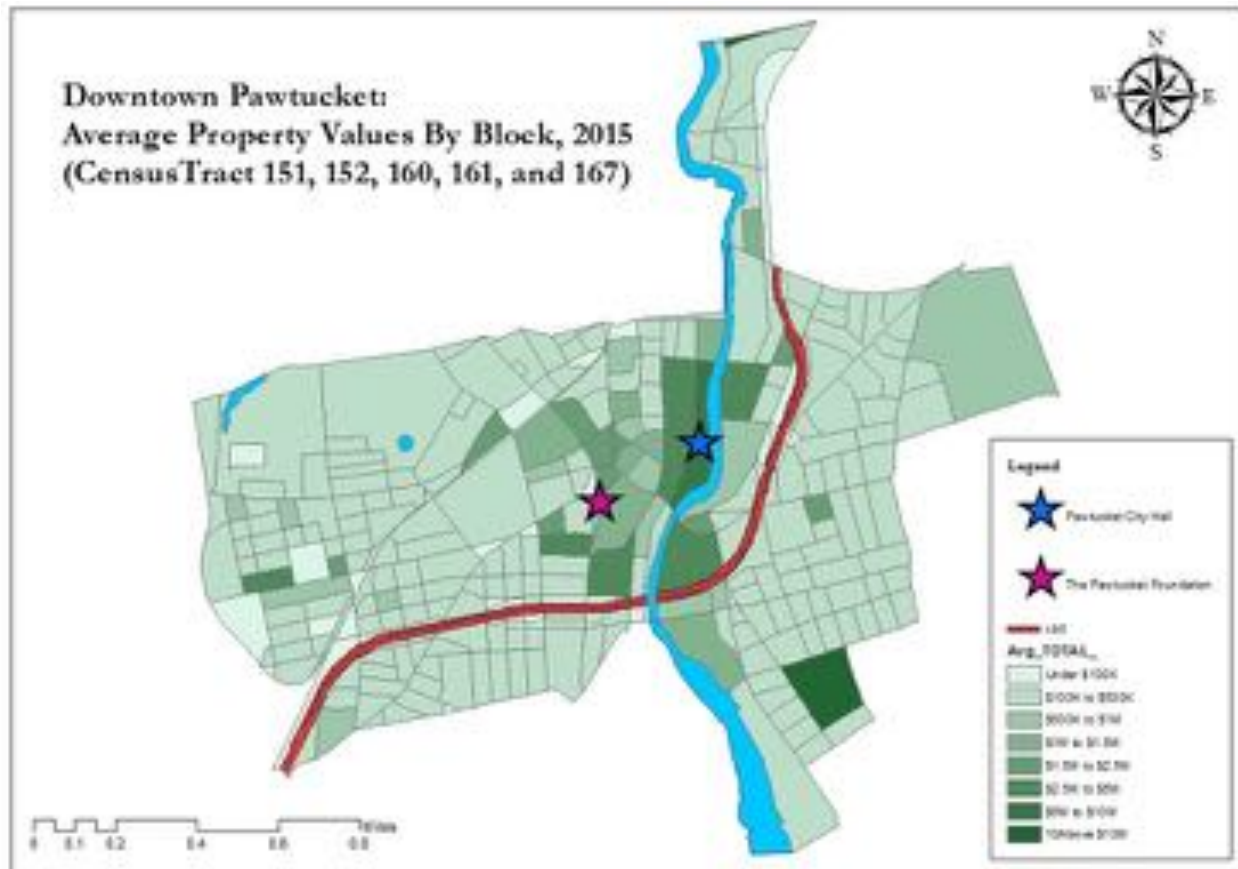


- Right click “Downtown” layer
- In the drop down menu, choose “Joins and Relates”
- Then choose “Join”
- Click “Join data from another layer based on spatial location”
- Choose “Properties” as the layer to join
- Summarize the attributes by “Average”
- Click Ok



- ArcMap will generate an output named “Join\_Output” as a new layer
- Right click this layer and choose “properties” from the drop down menu
- In column “Symbology”, click the option “Quantities”

- In the “Value” box, choose the item you wish to investigate. In this case, we choose the total assessed value and separate it into 8 categories. After clicking Ok and put in legends, titles, and descriptions, we have successfully generated a detailed map.



The steps above can be repeated in order to generate similar maps for different years, which would also require the user to import different datasets if they are available.