PRESERVATION PREPAREDNESS

MAPPING AND DEVELOPING A TYPOLOGY OF HISTORIC UNREINFORCED MASONRY BUILDINGS IN SEATTLE
Table of Contents

Images 1
Tables 1

Introduction 1
   Background 1
   Project Goals 1
   Funding 1

Existing Data: 2007 URM Study 1
   Key Findings 1

Importance of Seattle’s URM Buildings 1
   Sustainability 1
   Economy 1
   Urban Grain 1

Importance of an Integrated Approach 1
   Preservation Preparedness 1

Methodology 1
   Overview 1
   Commercial URM Data Set 1
   Mapping 1

Citywide URM Patterns 1
   History of Seattle URM Construction 1
   Seattle’s Commercial URM Buildings: characteristics 1
   Seattle’s URM Buildings: Surveyed Unreinforced Masonry Buildings 1
Seattle’s URM Buildings: Surveyed + Commercial Masonry pre-1978
Seattle’s URM Buildings: URM + Historic

Neighborhood ‘Snapshots’
Ballard
First Hill
International District
Pioneer Square
Wallingford
West Seattle

Pike/Pine Case Study
Neighborhood Overview
Development history
Pike/Pine Commercial URM Building Stock
Pike/Pine Commercial URM Characteristics
Case Study Conclusions

URM Typology Development and Seismic Retrofit Prioritization
Alternative 1
Alternative 2
Alternative 3
Pike/Pine Prioritization Case Study

Conclusion

Appendix A

Seattle URM Tables

Appendix B
PDF Building Specs (Pike/Pine) 3

Appendix C 3

Alternative Worksheets (#1-#3) 3

References 3
# Images

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pike/Pine Small Businesses</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Pike/Pine Urban Grain</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>Day Before the Great Seattle Fire</td>
<td>11</td>
</tr>
<tr>
<td>4</td>
<td>Day After the Great Seattle Fire</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>Seattle 1890 Map</td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>Seattle 1933 Streetcar Map</td>
<td>12</td>
</tr>
<tr>
<td>7</td>
<td>Seattle URM Map</td>
<td>13</td>
</tr>
<tr>
<td>8</td>
<td>Seattle URM + Commercial Masonry prior to 1977</td>
<td>15</td>
</tr>
<tr>
<td>9</td>
<td>Seattle URM + Historic Resources</td>
<td>16</td>
</tr>
<tr>
<td>10</td>
<td>Ballard Profile</td>
<td>17</td>
</tr>
<tr>
<td>11</td>
<td>Belltown Profile</td>
<td>18</td>
</tr>
<tr>
<td>12</td>
<td>Columbia City Profile</td>
<td>19</td>
</tr>
<tr>
<td>13</td>
<td>Fremont Profile</td>
<td>20</td>
</tr>
<tr>
<td>14</td>
<td>Georgetown Profile</td>
<td>21</td>
</tr>
<tr>
<td>15</td>
<td>International District Profile</td>
<td>22</td>
</tr>
<tr>
<td>16</td>
<td>Pioneer Square Profile</td>
<td>23</td>
</tr>
<tr>
<td>17</td>
<td>Queen Anne Profile</td>
<td>24</td>
</tr>
<tr>
<td>18</td>
<td>SoDo Profile</td>
<td>25</td>
</tr>
<tr>
<td>Figure</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>19</td>
<td>University District Profile</td>
<td>26</td>
</tr>
<tr>
<td>20</td>
<td>Wallingford Profile</td>
<td>27</td>
</tr>
<tr>
<td>21</td>
<td>West Seattle Profile</td>
<td>28</td>
</tr>
<tr>
<td>22</td>
<td>Ballard URM Context Map</td>
<td>30</td>
</tr>
<tr>
<td>23</td>
<td>Ballard 2007 URM Survey + Seismic Retrofit Map</td>
<td>31</td>
</tr>
<tr>
<td>24</td>
<td>Ballard URM + Year Built + Historic Preservation</td>
<td>32</td>
</tr>
<tr>
<td>25</td>
<td>Ballard Seattle Historic Resources Survey</td>
<td>33</td>
</tr>
<tr>
<td>26</td>
<td>First Hill URM Context Map</td>
<td>35</td>
</tr>
<tr>
<td>27</td>
<td>First Hill 2007 URM Survey + 2001 Nisqually Earthquake Damage + Seismic Retrofit</td>
<td>36</td>
</tr>
<tr>
<td>28</td>
<td>First Hill URM + Year Built + Historic Preservation</td>
<td>37</td>
</tr>
<tr>
<td>29</td>
<td>First Hill Seattle Historic Resources Survey</td>
<td>38</td>
</tr>
<tr>
<td>30</td>
<td>International District URM Context Map</td>
<td>40</td>
</tr>
<tr>
<td>31</td>
<td>International District 2007 URM Survey + 2001 Nisqually Earthquake Damage + Seismic Retrofit</td>
<td>41</td>
</tr>
<tr>
<td>32</td>
<td>International District URM + Year Built + Historic Preservation</td>
<td>42</td>
</tr>
<tr>
<td>33</td>
<td>International District Seattle Historic Resources Survey</td>
<td>43</td>
</tr>
<tr>
<td>34</td>
<td>Pioneer Square URM Context Map</td>
<td>45</td>
</tr>
<tr>
<td>35</td>
<td>Pioneer Square 2007 URM Survey + 2001 Nisqually Earthquake Damage + Seismic Retrofit</td>
<td>46</td>
</tr>
<tr>
<td>36</td>
<td>Pioneer Square URM + Year Built + Historic Preservation</td>
<td>47</td>
</tr>
<tr>
<td>37</td>
<td>Pioneer Square Seattle Historic Resources Survey</td>
<td>48</td>
</tr>
<tr>
<td>38</td>
<td>Wallingford URM Context</td>
<td>50</td>
</tr>
<tr>
<td>39</td>
<td>Wallingford 2007 URM Survey + 2001 Nisqually Earthquake Damage + Seismic Retrofit</td>
<td>51</td>
</tr>
<tr>
<td>40</td>
<td>Wallingford URM + Year Built + Historic Preservation</td>
<td>52</td>
</tr>
<tr>
<td>41</td>
<td>Wallingford Seattle Historic Resources Survey</td>
<td>53</td>
</tr>
<tr>
<td>42</td>
<td>West Seattle URM Context</td>
<td>55</td>
</tr>
</tbody>
</table>
Figure 43: West Seattle 2007 URM Survey + 2001 Nisqually Earthquake Damage + Seismic Retrofit

Figure 44: West Seattle URM + Year Built + Historic Preservation

Figure 45: West Seattle Seattle Historic Resources Survey

Figure 46: Pike Street & Belmont Circa 1909

Figure 47: Typical Pike/Pine URM

Figure 48: Present Use + Residential Units

Figure 49: URM Date of Construction

Figure 50: URM + FEMA Score

Figure 51: URM Seismic Retrofits

Figure 52: URM Building Quality + Stories

Figure 53: Historic URM Buildings

Figure 54: Alternative 2
Tables

Table 1: URM Building Surveys 67
Table 2: Percentage URM Buildings 67
Introduction

Background

Seattle has a considerable stock of unreinforced masonry (URM) buildings. A typical URM has brick load-bearing walls without any steel reinforcement. Unreinforced masonry construction was a common type of construction in Seattle prior to WWII and was not prohibited until 1977. Although URM buildings are particularly at-risk during an earthquake they represent an important architectural period, construction techniques and neighborhood histories. As a result, Seattle’s URM buildings have meaning and value. Outside of earthquake vulnerabilities URM buildings are fire-resistant, durable and long lasting. There are more than 1,000 identified URM buildings in Seattle with up to an additional unidentified 1,000 more. A small percentage has been seismically retrofitted with bracing or ties, however the vast majority remains unreinforced. Many URM buildings are “Historic” being recognized as local, state, or national landmarks or are considered to be contributing buildings in historic neighborhoods. During the last Seattle earthquake event, the 2001 Nisqually earthquake, several URM buildings suffered considerable damage and loss. Today, the entire Seattle URM building stock remains vulnerable to future earthquake damages. There is an 85% chance that there will be a repeat Nisqually Benioff earthquake within the next 50 years and a 5% to 15% chance that the same period will bring a rupture to a shallow Seattle Fault event or Cascadia Subduction zone event. Both non-Benioff earthquakes would bring many times the ground shaking of the recent 2001 Nisqually earthquake meaning that Seattle’s URM buildings are at an even greater risk. An important approach to Seattle’s URM buildings is one that references the relationship between historic preservation and earthquake mitigation. An integrated approach to Seattle’s URM building management is most appropriate to identify the value, opportunities and risks presented by the stock. A future Seattle URM strategy will address both the risks and opportunities of the URM building stock and prioritize seismic retrofitting as opposed to demolition.

Seattle’s URM buildings are very important because they reflect the commercial development history of Seattle’s unique neighborhoods. In over half of Seattle’s historic districts, URM buildings make up a significant percentage of the building stock. The associated historicity of Seattle’s URM buildings underlines their value and importance. In addition to preservation importance URM buildings have sustainability, economic and urban grain value.

The concept of value is important to introduce when discussing URM buildings. Many may conclude that because of the risk, URM building should be demolished. URM buildings have value that extends beyond aesthetics. Intrinsic value resides in URM buildings ranging from sustainability value to preservation value. D.C. architect Carl Elefante is recognized as saying, “the greenest building is the one that is already built.” Preservationists and sustainability advocates alike recognize the sustainable qualities old buildings possess and therefore promote reusing and retrofitting old buildings rather than demolishing them to make room for new construction. Furthermore, planners and preservationists recognize the cultural and social intrinsic value of old vernacular buildings. As Jane Jacobs so eloquently put it:

“Cities need old building so badly it is probably impossible for vigorous streets and districts to grow without them. By old buildings I mean not museum-piece old buildings, not old buildings in an excellent and expensive state of rehabilitation – although these make fine ingredients – but also a good lot of plain, ordinary, low-value old buildings, including some rundown old buildings”
Integration between the fields of Historic Preservation and Hazard Mitigation is necessary in order to fully realize the diverse considerations of planning for natural disasters. Seattle’s unreinforced masonry building stock provides the platform for discussing historic preservation and hazard mitigation integration in this report. Commercial URM buildings have value that extends beyond the sum of their parts. Seattle’s commercial URM buildings help to tell the story of Seattle and its historic neighborhoods. Commercial URM buildings also offer sustainability value as existing buildings that were constructed during a time of great craftsmanship. Loss of life during an earthquake due to unreinforced masonry buildings presents an impressive risk. The risk becomes even greater when historic preservation considerations are integrated into the discussion. A holistic approach to Seattle’s commercial URM buildings is to plan for their survival during the next earthquake event in a way that reduces the risk of life safety and destruction of historic resources.

Project Goals

The goals of this project were to:

• Create a data set of historic URM buildings combining GIS data with other data
• Supplement data with fieldwork reconnaissance, including photo documentation
• Generate maps with information about historic URM buildings
• Develop typologies for historic URM buildings to assist with preservation interventions and treatments
• Build upon the URM Seismic Hazard Study published in 2007 that identifies URM buildings
• Provide public access to historic URM building maps
• Provide public access to additional historic URM building data and attributes

Funding

Funding for this project was provided exclusively by King County 4Culture under the 2010 Heritage Special Project fund. The funding was requested to create a data set of historic unreinforced masonry buildings in Seattle and is intended to be valuable for planning, policy and preservation decisions concerning URM buildings and their neighborhoods.
Existing Data: 2007 URM Study

Structural engineering consulting firm, Reid Middleton, was contracted by the City of Seattle to perform an unreinforced masonry building seismic hazards study in 2007. The Reid Middleton study incorporated previous Seattle commercial URM surveys including the Cindy Hoover 1994 study and the 2001 post-Nisqually earthquake Reid Middleton rapid visual survey to complete the analysis. The Reid Middleton survey was not comprehensive. The engineers selected survey areas based on perceived concentrations of unreinforced masonry buildings in neighborhood commercial districts. They attempted to cover all four corners of Seattle to get a geographically diverse sample.

The purposes of the 2007 study was as follows:

- To conduct additional neighborhood surveys in addition to the 1994 and 2001 surveys
- To identify URM buildings that have been retrofitted since 1980
- To identify URM buildings that were damaged in the 2001 Nisqually earthquake
- To assess the performance of retrofitted URM buildings and non-retrofitted URM buildings during the 2001 Nisqually earthquake
- To identify patterns of damage

The study provided technical and existing information regarding Seattle’s commercial URM buildings to the Departments of Planning and Development (DPD) and Emergency Management. After receiving the study, it was intended that DPD and Emergency Management would move forward in the process to identify policy level mitigation strategies to reduce the seismic risk posed by Seattle’s commercial URM buildings. Two committees, policy and technical, were formed and met on a regular basis for at least one year. In March 2010 Seattle suspended work on the URM project due to budget constraints related to the current economic condition. DPD intends to release preliminary design standards to be applied to commercial URM retrofits in the near future with an improved economic situation.

The 2007 study included buildings with URM characteristics and chose to consider buildings with construction dates prior to 1940. Once identified, buildings were surveyed using visual survey techniques from FEMA 154: Rapid Visual Screening of Buildings for Potential Seismic Hazards. FEMA 154 is a handbook that is used to identify potentially hazardous buildings prior to an earthquake and widely regarded as an essential tool to identify URM buildings and their associated risks. The handbook was used extensively during the 2007 study as a methodology for analyzing and identifying risk. URM characteristics and building age were the primary sources for URM building identification.

Key Findings

The Reid Middleton URM study found many concentrations of commercial URM buildings distributed throughout the City ranging from the Roosevelt neighborhood to Columbia City. Permit records indicated a less than 10% seismic retrofit rate and a less than 10% demolition rate of commercial URM buildings from 1990 to 2007. The 2001 Nisqually earthquake did not trigger widespread seismic retrofits. The Reid Middleton report references FEMA 156: Typical Costs for Seismic Rehabilitation of Existing Buildings (1995) as a tool for cost estimates. The FEMA publication was used to estimate an aggregated total cost to upgrade Seattle’s URM building stock. The estimated structural-only costs range from $358 million to $431 million.
The report’s emphasis was on mitigation and structural considerations. The report lacked information and/or emphasis placed on URM buildings as historic resources. Despite its lack of attention to historic preservation, the 2007 report laid the groundwork for this report as it provided a solid list of identified commercial URM buildings with several attributes for each building:

- Year built
- Number of stories
- FEMA score
- Gross square foot area
- Nisqually earthquake damage
- Comments
Importance of Seattle’s URM Buildings

**Sustainability**

Preservation and seismic retrofitting of unreinforced masonry buildings is a sustainable, green practice. Most unreinforced masonry buildings were constructed prior to WWII when design and construction methods were much more responsive to the immediate environment by taking advantage of natural ventilation, incorporating daylighting and consciously selecting building orientation. Interestingly enough, modern sustainable building advocates tout the same responsive construction methods of the early 20th century as green building design concepts for new construction. The environmental benefits of reuse and rehabilitation of old buildings becomes clearer when the parameters of sustainability are broadened to include landfill pressures from demolition of old buildings to the amount of new materials required to produce a new ‘green’ building. The reuse and rehabilitation of old buildings help cut down on the amount of construction waste going to landfills every year, estimated to be 140 million tons. Seismic retrofitting and general rehabilitation projects tend to source regional materials and labor thus cutting down on the amount of energy consumed in the transportation of goods.

Owners of old buildings are increasingly realizing the inherent value of rehabilitation in place of demolition. Existing buildings already have foundations and footings and some of the classic architectural features such as masonry construction and architectural shading that provide opportunities to help save energy. With increased technologies, many of the environmental and structural concerns about old buildings are easily mitigated. For example, seismic retrofitting of unreinforced masonry buildings provides the needed increase in strength and resiliency to suffer relatively little to no damage during an earthquake. A philosophical break from the mindset ‘new is better’ would greatly benefit both historic preservation and sustainable building endeavors.

**Economy**

Cities need old buildings to attract small tenants. Small local tenants appreciate and prefer the smaller spaces, varied characteristics and lower rents associated with many older buildings. It is no accident that some of the most successful, emerging neighborhoods in Seattle (Ballard, Columbia City and Pike/Pine) also are neighborhoods with a lot of historic storefronts and unreinforced masonry buildings. There is something special and unique about the old masonry commercial buildings that remain from the early 20th century that attract tenants, shoppers and residents. These neighborhoods that offer spaces for small, local tenants consist of a diverse collection of businesses that is far more likely to be economically resilient compared to neighborhoods that relies on a handful of national chains that
could choose to close hundreds of stores with little to no warning as they don’t have strong ties with the communities where they are located.

Neighborhoods such as Pike/Pine contribute to a healthy local economy and a more robust tax base. The demand for the uniqueness of Seattle’s historic commercial corridors is unlikely to shift to bland, mega-blocks of new and modern construction that is found throughout the city. The characteristics of neighborhoods, like Ballard Avenue, that charm visitors and residents alike can be conserved and their longevity ensured through the combined tools of preservation and mitigation.

**Urban Grain**

The term ‘urban grain’ refers to the pattern and arrangement of street blocks, plots and buildings. Some key elements of the urban grain are:

- Varied store fronts
- ‘Smallness’
- Continuous building lines, walls and frontage details to establish active frontages
- Diversity of building ages, types, materials and façade widths

Successful cities rely on buildings that relate to the human scale. The human interaction with buildings is a foundational piece of how we relate to and live in cities. There are many different types of interactions between humans and the built environment such as, walking, leaning, sitting or playing. Maintaining an intimate and small environment that relates to humans at the human scale positively contributes to the vibrancy of any given neighborhood.

Old, masonry buildings contribute significantly to a vibrant urban grain as they come in diverse shapes, sizes, and ages. The National Trust for Historic Preservation’s Preservation Green Lab recognizes Seattle’s Pike/Pine neighborhood as being a vibrant and diverse neighborhood in part due to its varied urban grain (see Figure 2). Interestingly enough, Pike/Pine is also one of Seattle’s neighborhoods with one of the highest percentages of unreinforced masonry buildings. Pike/Pine’s unreinforced masonry buildings have qualities that relate to the human scale such as small units, many doors, varied materials at the street level, varied colors, memorable characteristics, and quality materials. Without seismic retrofitting of unreinforced masonry buildings Seattle may suffer a great loss in the urban grain of many valued historic neighborhoods during the next earthquake.

![Figure 2: Pike/Pine Urban Grain](image)
Importance of an Integrated Approach

Historic preservation planning and hazard mitigation planning have a unique relationship and opportunity to address unreinforced masonry (URM) buildings and their associated earthquake risks. The question of how to incorporate URM buildings into planning in regions of high seismicity should be addressed by both disciplines: historic preservation and hazard mitigation. According to FEMA P-774, Unreinforced Masonry Buildings and Earthquakes: Developing Successful Risk Reduction Programs, and most earthquake hazard mitigation professionals, there are three major risks associated with unreinforced masonry during an earthquake: the risk of personal injury, property damage, and loss of use. The FEMA definition of unreinforced masonry risk omits the risk of total loss or damage to URM buildings as historic resources. Indeed, life safety, property damage and loss of use are important considerations in terms of identifying risks associated with URM buildings, however, the general conversation about unreinforced masonry often overlooks or underestimates the inherent value of old, historic buildings. Identifying the nexus between historic preservation planning and hazard mitigation planning in regards to URM buildings is important to the argument that they are in and of themselves valuable. The potential loss of or damage to URM buildings during a future earthquake would be detrimental to Seattle’s cultural, social and physical memory. Having a keen understanding of both the conventional earthquake risks and preservation earthquake risks to URM buildings is pertinent to the future development of a Seattle URM program.

Preservation Preparedness

Preservation preparedness refers to the nexus between two disciplines: historic preservation and hazard mitigation. The unique relationship between both disciplines is evident in the example of unreinforced masonry buildings in seismically active regions. Communities frequently don’t realize how important the historic built environment is until it is gone. During the Loma Prieta earthquake of 1989, Santa Cruz’s historic downtown was almost entirely leveled and their historic unreinforced masonry buildings were permanently erased. Measures to protect historic unreinforced masonry buildings help mitigate for the partial or total loss of a historic building type in the event of an earthquake. Seattle has over 1,000 identified commercial URM buildings with likely many more unidentified commercial URM buildings. A Seattle fault earthquake would compromise the identity and economic vitality of Seattle’s historic neighborhoods in a matter of minutes. Blending historic preservation and hazard mitigation to address commercial URM building stock in a way that deals with both the historic resource component and the injury/property damage/loss of use component is essential.

Historic preservation planners need to plan for natural disasters in order to ensure the longevity of historic resources. The Florida Department of Natural Resources puts it simply, “planning for the protection of historic resources prior to a disaster is smart public policy.” Historic resources serve many purposes in their communities ranging from physical representations of history to being economic drivers. The widespread loss of historic resources due to a lack of planning and earthquake event could eliminate community identity and source of economy in a few minutes. When historic preservation and hazard mitigation professionals communicate to incorporate historic resources into natural disaster planning the longevity of and integral role of historic resources are effectively addressed.

A primary reason to blend historic preservation and hazard mitigation is to avert demolition or complete destruction of historic structures. Without historic preservation considerations the hazard mitigation community would likely pursue demolition of many URM buildings because of their perceived risk. Demolition successfully removes the risk. Without hazard mitigation considerations the historic preservation community would likely be hesitant to seismically retrofit URM buildings because of the perceived interruption in historic character, significance and authenticity.
Technologies continue to evolve and hazard mitigation professionals are better able to respond to the special considerations of historic resources. Mitigation measures with the least intrusion do little to disrupt the historic integrity of URM buildings. Modern seismic retrofitting techniques will ensure the longevity of URM buildings in time to come by preparing them to withstand earthquakes.
Methodology

Overview

In order to fulfill the requirements of 4Culture grant a complete and through analysis of Seattle’s commercial URM building stock, which includes all URM buildings excluding single-family and condominiums, was completed. First, the 2007 survey results and results from past surveys were compiled into a data set. Basic information was provided about each entry: address, date of construction, number of floors, FEMA score, and general building appearance comments. Additional commercial URM buildings from a recent, 2009 DPD survey were added to the data set. Further information from the King County Assessor’s Database was added to each commercial URM building entry in the data set such as: Parcel ID number, building quality, permit history, historic name, building description, present use, and construction class. The idea was to gather as much characteristic information, especially historic characteristics, about each identified commercial URM building as possible in order to gain an accurate perception of what the building stock looks like. Intensive fieldwork in the Pike/Pine neighborhood was conducted to identify gaps in the existing commercial URM building data set. Additional potential unreinforced masonry buildings were identified based on the following: construction date prior to 1978 and masonry construction type. All potential commercial URM buildings in Pike/Pine were added to the commercial URM data set as additional commercial URM buildings. For the entire city, all commercial masonry buildings built before 1950 were added to the data set as additional potential commercial URM buildings. Also, commercial masonry buildings built between 1950 and 1977 were added as potential URM buildings because URM construction was not officially banned in Seattle until 1977. In order to fully capture Seattle’s historic buildings, each local, state and national listed property was researched to see if it fit the potential URM characteristics. If a historic property was found to be constructed prior to 1977 and masonry construction, it was added to the commercial URM data set as an additional commercial URM building.

The emphasis for identifying additional historic commercial URM buildings was placed on local, state and/or national register buildings with a keen awareness that everyday, vernacular buildings are of importance too. As a result, all commercial masonry buildings constructed prior to 1950 were initially considered as “potentially historic.” To narrow down the list of “potentially historic” buildings the Seattle Historic Resources Survey of over 6,000 buildings was referenced. The Historic Resources Survey identifies potential historic buildings based on the historic integrity of the building. The Survey also provides a recommendation for each building as to whether or not it appears to qualify for either national or local landmark nomination. The identification of additional commercial URM buildings was necessary in order to note gaps in the prior surveys and to increase the comprehensiveness and accuracy of the estimated number of commercial URM buildings in Seattle. It was also very important to identify and distinguish the “Historic” URM buildings from the non-historic URM buildings.

Once the data set was edited and completed it was imported into ArcGIS and the Pike/Pine identified buildings were mapped to reveal a number of various characteristics and to identify patterns and typologies. Comprehensive, citywide maps were also produced to identify broad patterns and relationships. Neighborhood snap-shot maps were created for six neighborhoods in addition to the Pike/Pine case study maps. The neighborhood snap-shots include four maps for each neighborhood that shows URM buildings, Historic URM buildings, seismic retrofits, 2001 Nisqually Earthquake damage, and building age. After mapping, focus was turned towards the development of URM building typologies and seismic retrofit prioritization.
Commercial URM Data Set

The Commercial URM data set contains nearly 1,100 commercial URM buildings with an extensive list of attributes for each entry. Over 600 of the 1,000 buildings came from the 2007 Reid Middleton survey. Over 350 buildings were identified as potential commercial URM buildings in a 2009 Seattle Department of Planning and Development windshield survey. The 2009 DPD survey identified potential commercial URM buildings based on exterior masonry attributes. The DPD survey focused on neighborhoods that had not been extensively covered in the 2007 survey. Over 70 likely URM buildings were identified through additional fieldwork in three neighborhoods: Pike/Pine, Pioneer Square, and International District. The fieldwork was conducted in an attempt to identify all potential commercial URM buildings in three neighborhoods. Further information about Pike/Pine’s commercial URM buildings can be found in a later section of the report. Pike/Pine is the only complete neighborhood case study although Pioneer Square and International District were included in extensive fieldwork to identify potential commercial URM buildings in addition to the 2009 and 2007 surveys. Some general assumptions can be made about how many more additional commercial URM buildings may be in each neighborhood based on the percentage of additional commercial URM buildings identified in Pike/Pine, Pioneer Square, and International District.

In addition to the 1,000+ commercial URM building data set, other data sets were created to help identify additional commercial URM buildings. One additional data set consists of all masonry commercial buildings built prior to 1950. The historic commercial data set is over 2,200 buildings and includes all masonry commercial buildings and apartment buildings. The data set does not include single family or condominium buildings. Every building in the historic commercial data set is probably not unreinforced masonry but many are likely URM construction because they were all constructed during a time when URM construction was permitted. A second additional data set that is included in the analysis is the Seattle Historic Preservation Historic Resources Survey. The Historic Resources Survey consists of an ongoing effort to identify, survey and inventory all historic buildings in Seattle. Currently, the survey consists of over 6,000 buildings with many of the 6,000 being historic single-family homes. The Survey data set does not list construction material so it is hard to know how many are masonry construction without looking up each individual building in the King County Assessor’s database or Historic Resources Survey database. The Seattle Historic Resources Survey data set could serve as a reference tool for neighborhood level analysis to identify historic unreinforced masonry buildings. A third and final additional data set is the 1950 – 1977 masonry commercial building data set. Seattle recently discovered that it wasn’t until 1977 that unreinforced masonry was formally prohibited in Seattle under the building code. Therefore, the additional years from 1950 to 1977 have been included in the commercial URM analysis and a separate data set of commercial masonry has been referenced to make the overall data set more comprehensive. The source of both commercial masonry data sets is the King County Assessor’s Office and the source of the Seattle Historic Properties Survey is the Seattle Department of Neighborhoods Historic Preservation Program.

Mapping

After the data sets were cleaned and organized they were imported into ArcGIS for mapping. The data set was joined to a layer with both building and parcel information using the parcel identification (PIN) number. The city street networks, water, and parks were added to provide context. Neighborhood outlines were included to show commercial URM densities by neighborhood. Seattle conducts much of its planning at the neighborhood level so much of the following commercial URM analysis is at the neighborhood level. Future implementation will be most successful if the individual neighborhoods play a lead role.
Citywide URM Patterns

History of Seattle URM Construction

Seattle’s large stock of historic commercial unreinforced masonry buildings exists as a response to the Great Seattle Fire of 1889. On June 6th, 1889 the entire extent of Seattle’s central business district burned to the ground, thirty blocks total, due to clapboard construction and triggered by a pot of glue at a cabinet shop on the corner of 1st & Madison (see Figures 3 & 4). The day after the fire an ordinance was passed that all future buildings and sidewalks had to be built using bricks. The full text of the first building code was carried in the July 5th, 1889 edition of the Post-Intelligencer. Ordinance No. 1147 required that inside the fire limits of the commercial district, exterior walls be constructed of masonry, that is, of brick or stone. In general, header courses were required at regular intervals. Brick or stone arches, or stone or metal lintels were to top exterior door and window openings. Within larger buildings, masonry “division” walls, spaced no farther apart than 66 feet, to prevent the spread of fire, were required. Arched openings walls were permitted within the division walls to allow movement, but the ordinance gave a size limit. Wood cornices were strictly prohibited.

Within the first year post-fire, over 150 brick buildings were built to replace the wood-frame buildings lost during the fire. Today, Pioneer Square exists as a reminder of the Great Fire. The buildings that make up historic, Pioneer Square were primarily constructed after the 1889 fire as an effort to rebuild the area using brick and stone. Today, the buildings of Pioneer Square are in danger once again; but this time it is not from fire but earthquakes. In addition to Pioneer Square, many other Seattle neighborhoods are at-risk due to large concentrations of commercial URM buildings. By 1890, one year after the Great Seattle Fire and the masonry ordinance, much of Seattle had been platted and developed (see Figure 5). In fact, all of Seattle’s neighborhoods with significant URM inventories were developed by 1900. According to the Seattle Department of Planning and Design (DPD), it wasn’t until May 1977 that Seattle’s building code explicitly
prohibited unreinforced masonry construction. For nearly 90 years unreinforced masonry construction was allowed in Seattle. For much of that time, the construction method was actually encouraged as a form of fire prevention.

Seattle’s Commercial URM Buildings: characteristics

The citywide commercial URM building maps show general commercial URM densities and neighborhood commercial URM densities. Dense commercial URM groupings appear in Seattle’s oldest neighborhoods. Neighborhoods like Pioneer Square, International District, Pike/Pine, Ballard, and Columbia City have obvious densities of commercial URM buildings due to their development timeline and increased development and construction at the turn of the century due to streetcar line development. A 1930 map of Seattle’s streetcar network nearly parallels all of the major commercial corridors with existing URM building stock (see Figure 6). The Seattle streetcar development had a significant influence on the urban morphology of Seattle and Seattle’s URM building stock. Figure 7 shows Seattle’s commercial URM stock densities by neighborhood. Figure 8 shows Seattle’s surveyed commercial URM stock in comparison with all potential commercial URM stock based on construction material and construction date. This map is to help identify gaps in the commercial URM survey data. Figure 9 shows the historical context and identifies every potentially historic building in Seattle as delineated by the Seattle Historic Resources Survey. Each neighborhood’s historic surveyed buildings should be confirmed for commercial URM status so as to integrate historic resource considerations.
Seattle's URM Buildings

Figure 7: Seattle URM Map
Seattle’s URM Buildings: Surveyed Unreinforced Masonry Buildings

URM buildings have been identified in almost every Seattle neighborhood. There are significant concentrations and increased densities in some of Seattle’s oldest neighborhood. The highest concentrations of URM buildings, identified by the 2007 and 2009 surveys, are found in Pioneer Square, Pike/Pine, West Seattle, International District, Georgetown, Columbia City, Ballard, Fremont, Wallingford, University District, and Queen Anne. Within each neighborhood, most of the URM buildings are located along either one or two main historic commercial corridor(s). Within each neighborhood corridor, there are several clusters of URM buildings at important intersections or in historically significant areas. Most of Seattle’s URM buildings were constructed between 1895 and 1930.

Seattle’s URM Buildings: Surveyed + Commercial Masonry pre-1978

Figure 8 shows that there is potentially a large stock of unidentified commercial URM buildings. The discrepancy between the surveyed commercial URM buildings and masonry commercial buildings constructed prior to 1950 and 1977 is obvious. The same neighborhoods with the highest concentrations of surveyed URM buildings also have large concentrations of potential additional URM buildings. The need to further study the SoDo and industrial area, south of SoDo, is apparent as those neighborhoods have a lot of commercial masonry buildings but the neighborhood has been overlooked in recent surveys. SoDo’s built environment historicity has generally been altered. However, some buildings have been surveyed for historical integrity and have been identified as a potential Seattle Landmark or as a “Historic” building with intact integrity.

Seattle’s URM Buildings: URM + Historic

Figure 9 provides a comprehensive analysis of hazard mitigation and historic preservation concerns. The complexities of incorporating hazard mitigation and historic preservation considerations are clear. At the neighborhood level the different layers of data are clearer and provide a better foundation for neighborhood-by-neighborhood identification and analysis. The blue dots represent all of Seattle’s historic buildings as identified by the Seattle Historic Resources Survey. The dots will serve as a metric to determine whether or not a URM building is ‘historic’ or ‘not historic’. The orange triangles represent all of Seattle’s designated landmarks, official historic buildings. The triangles will serve as a metric to determine which URM buildings are formal Seattle landmarks.

Neighborhood level case studies will provide the detail needed to assess and identify gaps in the Seattle commercial URM data set. Some maps by neighborhood are available using the URM + Historic data set and map. (See Figures 10 - 21) A neighborhood case study of Pike/Pine is detailed in the remaining sections of this chapter to further define and characterize Seattle’s commercial URM building stock.
Seattle's URM Buildings

Figure 8: Seattle URM + Commercial Masonry >1977

Surveyed URM + Commercial Masonry Pre-1977

- Surveyed URM Buildings
- Commercial Masonry Pre-1950
- Commercial Masonry 1950-1977
- Neighborhood Boundary
- Park
- Interstate 5

0 0.5 1 2 3 4 Miles
Figure 9: Seattle URM + Historic Resources

Seattle's URM Buildings

Legend:
- All URM Buildings
- Historic Resources Survey
- Seattle Historic Preservation Program
- Neighborhood Boundary
- Park
- Interstate 5

Distance Scale: 0 to 4 Miles
Figure 10: Ballard Profile
Figure 12: Columbia City Profile

URM Buildings by Neighborhood

- URM Building
- Commercial Masonry Pre1950
- Commercial Masonry 1950 - 1977

Legend:
- Seattle Landmark
- Historic Survey Property
- Includes commercial + residential
- Interstate 5
- Neighborhood Boundary

1 inch = 300 feet
Figure 14: Georgetown Profile
URM Buildings by Neighborhood

Figure 15: International District Profile
URM Buildings by Neighborhood

Figure 16: Pioneer Square Profile
Figure 17: Queen Anne Profile
URM Buildings by Neighborhood

Figure 18: SODO Profile
Figure 19: University District Profile
Neighborhood 'Snapshots'

The following section will provide a thorough analysis for six Seattle neighborhoods with significant clusters of URM buildings. Each ‘snapshot’ will consist of neighborhood characteristics, patterns, historicity, prior earthquake damages, seismic retrofits and maps. Historic URM buildings will be emphasized and identified. General assumptions about the entire Seattle URM building stock can be made based on the neighborhood level analysis and statistics. Following this section, an even further detailed analysis of one Seattle neighborhood, Pike/Pine, will be presented. The Pike/Pine case study relied on extensive fieldwork to confirm the generated URM database, to identify additional potential URM buildings.

Ballard

The Ballard neighborhood of Seattle was incorporated as a town in 1889. By 1907 Ballard was the second largest city in King County. Historically Ballard was the center for Seattle’s Scandinavian seafaring community and while this ethnic group’s presence in the area has decreased recently there remains a strong sense of pride in regards to those who still remain. Ballard reached its pinnacle population, it was annexed by the City of Seattle.

The Ballard Avenue Historic District has been on the historic places registry since 1976. Today the neighborhood is one of the most visited in the city and known across the country as a popular and expanding neighborhood, touting a healthy art, music and shopping district. The neighborhood is visibly attractive due to the beautiful neoclassical Italianate architecture, combined with old arching trees and a pedestrian friendly nature.

Characteristics & Patterns

Ballard’s confirmed URM building concentration is located almost exclusively in the Ballard Avenue Landmark District between NW Market Street and NW Dock Place. Many of the potential URM concentrations are located along NW Leary Way, NW Market Street and 24th Avenue NW.

It is no surprise that the significant URM concentrations exist along two of Ballard’s historic commercial corridors. Well over half of the confirmed URM buildings were built prior to 1920 when brick masonry construction was commonplace and even required. Historically, there was a lot of industry in the neighborhood located on the banks of the Lake Washington Ship Canal and therefore brick construction probably made more sense, as it is fire resistant.

Following the 2001 Nisqually Earthquake no Ballard URM building reported any significant earthquake damage. Although there were no reported earthquake damages in the neighborhood, several buildings have been seismically retrofitted in the past decade. Specifically, eight buildings have been seismically retrofitted. All retrofitted buildings are located on Ballard Avenue.

Historicity

The Ballard confirmed URM dataset lists two National Landmarks and four Seattle Landmarks. In addition to the formally designated Landmarks the Seattle Historic Resources Survey identified an additional three URM buildings as potential Seattle Landmarks and National Landmarks. Nearly 40 of the 76 confirmed URM buildings are located within the Landmark District. Many of Ballard’s confirmed and potential URM buildings have not been surveyed for...
historical significance. Comprehensive historic surveys should be completed of all confirmed Ballard URM buildings in order to accurately develop typologies and seismic retrofit prioritization.
First Hill

First Hill was originally settled in 1852 as it is located just east of Pioneer Square, one of Seattle’s oldest neighborhoods. Since 1852, First Hill has had an interesting history with its share of nicknames ranging from “Profanity Hill” to “Pill Hill.” One of Seattle’s original settlers, Henry Yesler, took advantage of First Hill’s elevation, cleared the hill of trees and built his sawmill at its top. By the year 1883, First Hill had transformed from an industrial neighborhood to a retreat for Seattle’s “first families” to get away from downtown and its constant barrage of outsiders. The first of many First Hill mansions was built at James Street and Minor Avenue. By the 1930s the first hospital appeared in the neighborhood and triggered nearly a century of hospital, clinic and medical building development. Today, First Hill includes many prominent institutions such as Swedish Medical Center, Harborview Medical Center, Virginia Mason Medical Center and Seattle University. Although First Hill has experienced a lot of recent development some of the original homes and buildings from the time of the early settlement still exist, such as the Stimson-Green Mansion and the Dearborn House.

Characteristics & Patterns

First Hill’s confirmed URM buildings are dispersed throughout the neighborhood without much clustering. The URM buildings are likely dispersed throughout the neighborhood due to recent redevelopment and lack of neighborhood historic preservation recognition. However, there is a small clustering of URM buildings around East Union Street and Broadway and E Madison Street and Broadway. There are 44 confirmed URM buildings in First Hill with at least the same amount of potential URM buildings. Well over half of the confirmed and potential URM buildings were built before 1930.

One First Hill URM building reported damage from the 2001 Nisqually Earthquake. Since then, six URM buildings have had some level of seismic retrofitting. Five of the six buildings were retrofitted using anchoring; a low level of retrofitting that will likely not protect the integrity of the historic building.

Historicity

The First Hill confirmed URM dataset lists one National Landmark and eight Seattle Landmarks in the neighborhood. In addition to the formally recognized landmarks, the Seattle Historic Resources Survey has identified an additional ten confirmed URM buildings as “Historic.” There are still a significant amount of First Hill confirmed URM buildings that have yet to be surveyed in order to determine historic significance. First Hill is not a recognized historic district and therefore there are no historic designations or specific incentives to maintain the historical integrity of the existing historic buildings other than the few designated Landmarks. Landmark designations for the surveyed URM buildings would be one step towards preservation of First Hill’s URM historic building stock.
International District

The International District is the cultural hub for Seattle’s Asian American community and is home to Seattle’s Chinatown and Japantown. Its origins go back to the 1910 citywide re-grading project that filled in the once tideland area with dirt and initiated immediate development. Chinatown was originally developed as a gathering place, work place and home for laborers. Japantown was developed immediately following Chinatown. Japantown is located just north of Chinatown and was immediately filled with many local businesses like laundries, markets and dry goods stores. During WWII, Japanese-American business owners were taken away from the District and sent to Internment Camps. By the early 1970s, the District was threatened again with proposals to build a new stadium and interstate on either side of the neighborhood. Also, many of the original hotels had closed down and were in disrepair. In 1973 the International District Special Review District and Board was established to promote the culture, history, businesses and other beneficial qualities of the neighborhood. Today, the International District, or ID, is a thriving and diverse neighborhood that attracts visitors year round to its cultural events, food, or Wing Luke Museum.

Characteristics & Patterns

The International District (ID) has a significant amount of confirmed URM buildings, especially located in the International Special Review District. The clustering of ID’s confirmed URM buildings is located at Maynard Avenue South and South King Street. The buildings are all rather large and are, on average, two to three stories tall. In addition to the confirmed URM buildings there is a significant amount of potential URM buildings located on the east side of I-5. ID’s URM buildings were constructed between 1900 and 1977. Most were built between 1910 and 1920 during the neighborhood’s first decade of development.

Six confirmed URM buildings reported damage from the 2001 Nisqually Earthquake. Since then, four buildings have been seismically retrofitted. Following the 2001 Nisqually Earthquake, Historic Seattle helped several ID and Pioneer Square URM buildings repair earthquake damages in order to save the building from demolition. The local historic preservation advocacy organization promptly created a grant program to give approximately $10,000 to each historic building owner whose building was damaged during the earthquake as an incentive to repair the damages rather than demolish the building.

Historicity

The International District’s confirmed URM data set lists three National Landmark and one Seattle Landmarks in the neighborhood. In addition to the formally recognized landmarks, the Seattle Historic Resources Survey has identified an additional two confirmed URM buildings as “Historic.” There are still a significant amount of International District confirmed URM buildings, especially in the International Special Review District, that have yet to be surveyed in order to determine historic significance. Much of the International District neighborhood is within the International Special Review District, a local historic district. However, many of the District buildings have yet to be formally surveyed to determine historical significance and building history. Although ID has the historic district, there are only a few formally recognized Landmarks and as a result very few buildings are protected by historic preservation regulation. A comprehensive historic survey should be completed in the historic district to determine eligibility for local landmark status to protect the URM buildings from demolition.
International District

Unreinforced Masonry Context Map

- Confirmed URN Buildings
- Pre-1950 Commercial Masonry: Potential URN
- 1950-1977 Commercial Masonry: Potential URN

Legend:
- International District Neighborhood Boundary
- Not URN
- I-5
- I-90
- Vacant Parcel
- Railroad
- Public Park
- Parking

1 inch = 450 feet
Pioneer Square

Pioneer Square is a neighborhood in the southwest corner of Downtown Seattle, Washington. The neighborhood takes its name from a small triangular plaza near the corner of First Avenue and Yesler Way, originally known as Pioneer Place. Before Seattle’s original European settlers arrived in Seattle, the area near the intersection of Yesler Way and First Avenue was the original site of the Duwamish Village and home to the leader of the Duwamish, Chief Seattle. In 1852, European settlers arrived by boat in Elliot Bay. Almost immediately businesses sprung up along First Avenue near the intersection, Yesler Way and First Avenue. By 1872, there were 575 buildings in the neighborhood as recorded in local reports. Seattle’s Great Fire of June 6, 1889, roared through the tinderbox of the business district and devoured almost everything in its path. It lasted twelve hours. By the time its fury was spent, 30 central city blocks—64 acres—were leveled. The Pioneer Square-Skid Road Historic District was created in 1970 and was also listed on the National Register of Historic Places in 1970. Since, strict historic preservation regulation has successfully maintained the historical integrity of the neighborhood and encouraged business development through preservation incentives.

Characteristics & Patterns

The Pioneer Square neighborhood has been extensively surveyed for URM buildings and as a result has the highest percentage of confirmed URM buildings in the City. There are still several potential URM buildings located in the neighborhood, for example on 2nd Avenue between Yesler Way and South Washington Street. There are significant clusters of confirmed URM buildings along First Avenue, South Jackson Street and South Main Street. As one of Seattle’s oldest neighborhoods, nearly all Pioneer Square’s URM buildings were built before 1910 during a time when masonry construction was required. Nearly 40 Pioneer Square buildings reported damages following the 2001 Nisqually Earthquake. Since then, at least fifteen buildings have had some form of seismic retrofitting.

Historicity

The Pioneer Square neighborhood is also the Pioneer Square Historical District. Therefore, all of Pioneer Square’s buildings are located within the Historic District. In addition to being in a Historic District, Pioneer Square has extensively been covered in the Seattle Historic Resources Survey. Over half of Pioneer Square’s buildings have been identified by the Survey as “Historic” or a potential Seattle or National Landmark. Formal Landmark recognition belongs to five confirmed URM buildings, with two National Landmarks and three Seattle Landmarks. Although the Survey was fairly comprehensive the additional potential URM buildings that have not been surveyed should be to determine the comprehensive historicity of the neighborhood’s URM buildings.
Pioneer Square
URM + Year Built + Historic Preservation

Year Built
- < 1910
- 1910 - 1920
- 1920 - 1930
- 1930 - 1940
- 1940 - 1950
- 1950 - 1977

Legend:
- National Landmark
- Non-URM; > 1977
- Public Park
- Vacant Parcel
- I-90
- 1 inch = 450 feet
- Seattle Landmark
- Puget Sound
- Parking
- Pioneer Square Historic District
- Alaskan Way Viaduct
- I-5

CenturyLink Field
Safeco Field
Wallingford

The area that is known today as Wallingford was first surveyed in 1856, only a few years after the arrival of the “Denny Party,” Seattle’s first European inhabitants. In 1891, Seattle annexed the area and with that brought residential and commercial development. Simultaneously, an electric trolley line was built linking Lake Union, near Fremont, to Green Lake. The new trolley line allowed significant development in the “Interlaken” area, which is much of what the Wallingford neighborhood is today. In its early history, much like its present, Wallingford was primarily a residential neighborhood filled with families and local businesses. Its significant family population was evidenced by a couple of prominent schools built around the turn of the century, Latona School and Interlake School. Both school building still exist today and help to preserve the history of the neighborhood.

Characteristics & Patterns

Wallingford’s confirmed URM buildings are almost exclusively found clustered around North 45th Street with the most significant cluster between Bagley Avenue North and Stone Avenue North on North 45th Street. North 45th Street is Wallingford’s historic and modern commercial corridor so it is no surprise that the confirmed URM buildings are found along the corridor. Most of Wallingford’s confirmed URM buildings were constructed between 1910 and 1930, a little bit later than other older Seattle neighborhoods. URM construction was likely spurred by streetcar line development in the 1920s. Following the 2001 Nisqually Earthquake only one confirmed URM building reported damages. Since then, three confirmed URM buildings have had some level of seismic retrofitting.

Historicity

The Wallingford confirmed URM data set lists one National Landmark and three Seattle Landmarks. In addition to the formally recognized Landmarks the Seattle Historic Resources Survey suggests that there are an additional twelve buildings that are “Historic” and one that is a potential Seattle Landmark. Wallingford does not contain a historic district or many Landmarks. Therefore, the identified “Historic” buildings should move forward in the process to become designated Landmarks to protect from URM demolition.
Wallingford: N 45th Street

Unreinforced Masonry Context Map

- Confirmed URM Buildings
- Pre-1950 Commercial Masonry: Potential URM
- Public Park
- Not URM
- Parking
- Vacant Parcel
- Wallingford

1 inch = 450 feet
Wallingford: N 45th Street 2007 URM Survey + 2001 Nisqually Earthquake Damage + Seismic Retrofit
West Seattle

West Seattle is a Seattle neighborhood most often recognized for its earliest European settlers who arrived in 1851 on Alki Point. The early settlers only lasted a few months once they realized the environment was too harsh. They left for what is today Pioneer Square to seek refuge against the harsh, Puget Sound climate. Original West Seattle settler, Charles Terry, remained in West Seattle and platted the town in 1853. Terry named the newly platted town Alki. As development progressed much of it moved from Alki inland near what is called Admiral Junction and California Avenue today to escape the winds of the point. In 1902, West Seattle residents voted to incorporate to better manage public service. One year later, West Seattle still had limited public services and many wanted to annex to Seattle in order to get streetcar lines. Eventually, West Seattle financed a streetcar line without annexation and the first streetcar line was opened in 1904. In 1907, West Seattle was annexed into Seattle. Since annexation, West Seattle has remained independent and headstrong, often in disagreement with city planning efforts and other attempts to change West Seattle.

Characteristics & Patterns

West Seattle’s Genesee/Fairmount neighborhood confirmed URM buildings are located primarily along California Avenue SW between SW Edmunds Street and SW Genesee Street. There is also a small cluster of confirmed and potential URM buildings at the intersection of Fauntleroy Way SW and 37th Avenue SW. In this neighborhood URM construction almost exclusively occurred along two historic and modern commercial corridors: California Avenue SW and Fauntleroy Way SW. Many of the confirmed and potential URM buildings were built either before 1910 or between 1920 and 1930. By 1933, both Fauntleroy and California were streetcar lines. Two West Seattle URM buildings reported damage from the 2001 Nisqually Earthquake. Since then, only one URM buildings has had some level of seismic retrofitting.

Historicity

The West Seattle: Genesee/Fairmount confirmed URM data set does not list any National Landmarks or Seattle Landmarks. In addition, the neighborhood lacks any form of a historic district. Although there is a lack of formally recognized historic buildings, the Seattle Historic Resources Survey has identified five confirmed URM buildings as “Historic.” There is still a significant amount of West Seattle: Genesee/Fairmount confirmed URM buildings that have yet to be surveyed in order to determine historic significance. Many of California Avenue’s confirmed URM buildings have not been surveyed to determine historic significance and integrity. There is potentially a good amount of yet to be determined stock of “Historic” URM buildings in this neighborhood. A comprehensive historic survey of the neighborhood would be the first step towards preservation of the neighborhood’s URM buildings.
Pike/Pine Case Study

Neighborhood Overview

The Pike/Pine neighborhood, a sub-neighborhood in Capitol Hill, is one of Seattle’s most rapidly changing. Historically, Pike/Pine is known as “Seattle’s auto row,” beginning in 1905 with the sale of the first automobile in Seattle. After WWII the neighborhood witnessed an exodus of dealerships that moved out into the suburbs for larger display rooms and lots. Today, Pike/Pine is known as a vibrant and interesting neighborhood with a rich urban grain. The Pike/Pine case study and intensive fieldwork is relevant due to Pike/Pine’s extensive commercial URM building stock, lack of historic district status and lack of designated local or national landmarks. Historic district status or landmark status is useful in securing seismic retrofitting because the building(s) have formally been designated as historically significant. In Pike/Pine, the historical significance is well known, however the neighborhood has yet to be formally designated. The City of Seattle has recently recognized the unique qualities of the neighborhood and in 2009 the Pike/Pine Conservation Overlay District (PPCOD) was formalized. The PPCOD is currently in its third phase with the creation of a transfer of development potential (TDP) program to facilitate and incentivize the preservation of Pike/Pine’s character structures. Character structures have been defined as those being 75 years and older. It is anticipated that the Seattle City Council will adopt the TDP program in October 2011 and future TDP will be directed to Seattle’s South Lake Union neighborhood while maintaining Pike/Pine’s historic character and built environment.

Development history

Pike/Pine developed as an urban commercial district in 1880. Pike and Pine streets serve as the two main commercial corridors and run east-west. Both Pike Street and Pine Street originate downtown, near the sound, at the historic Pike Street Market. Pike/Pine is located south of the greater Capitol Hill neighborhood and north of First Hill. Pike/Pine developed almost exclusively to cater to the newly emerging auto industry at the turn of the century. Auto dealers as well as other related uses such as repair shops, service centers, and parts shops defined the neighborhood prior to WWII (see Figure 46).

Due to the specific use nature of the businesses, the masonry constructed buildings served the purpose of being durable and fire resistant. Some of the businesses hired architects to assist with the exterior design work such as decorative ornamentation and expansive windows. The Great Depression hurt many of the dealers and some resorted to selling used cars as a result. By the end of WWII, most of the auto dealers had moved out of Pike/Pine as they wanted large, outdoor display lots instead of the small, interior display rooms in Pike/Pine. Today, the neighborhood boasts much of its original, ‘auto-row’ architecture and businesses but with many of the original buildings being converted into new uses as well.

Pike/Pine Commercial URM Building Stock

The Pike/Pine Conservation Overlay District has 181 buildings. There is an estimated 145 buildings with either unreinforced masonry bearing walls or unreinforced masonry exterior embellishments, like brick parapets or brick facades. The 145 potential commercial URM buildings were identified by two fieldwork surveys and construction characteristics: masonry construction and date of construction. Typical Pike/Pine unreinforced masonry uses. See Figure 47 for an example of a Pike/Pine commercial URM building.

Figure 46: Pike Street & Belmont Circa 1909
Pike/Pine Commercial URM Characteristics

Pike/Pine’s building stock has a considerable amount of unreinforced masonry. Almost 50% of Pike/Pine’s buildings can be categorized as commercial unreinforced masonry constructed prior to 1977. Some of Pike/Pine’s URM buildings have been retrofitting in the last five to ten years. 26 of Pike/Pine’s URM buildings have had some level of seismic retrofitting.

Figure 48: Present Use + Residential Units

Pike/Pine: URM + Current Use + Residential Units

Pike/Pine’s URM building uses are varied but with a significant amount of retail store and multi-family uses. There are nearly 600 residential units located in Pike/Pine. This is an important consideration because of where there is a multifamily use there will always be people. Future prioritization of commercial URM buildings will take occupancy and residential units into consideration for life safety purposes. On the other hand, there are several commercial URM buildings classified as warehouse uses. Warehouse use exclusively does not usually have many occupants and could be considered lower priority as long as the use is exclusively warehouse with little to no consistent occupants. (See Figure 48)

Figure 47: Typical Pike/Pine URM
Almost all of Pike/Pine’s commercial URM buildings were constructed between 1900 and 1930 during the era that was most significant to Pike/Pine’s auto row history. This is important because of the sustainability qualities associated with these buildings. Buildings constructed prior to 1930 were commonly constructed in a way that responded to the natural environment and took advantage of design elements to facilitate natural heating and cooling processes. The majority of Pike/Pine’s commercial URM building stock represents an era when craftsman builders constructed buildings with intricacies and details. Those are the qualities that contribute to Pike/Pine’s thriving urban grain. (See Figure 49)
The 2007 survey calculated a FEMA score for each commercial URM building. The FEMA score is a function of occupancy, use and building type. A FEMA score less than 2.0 triggers an additional, through seismic study. Scores operate on a logarithmic scale. For example, a score of 1.0 means the chance of building collapse during the next major earthquake event is 1 in 10. All of Pike/Pine’s 2007 surveyed buildings scored less than 2.0 ranging from .7 to 2.1. (See Figure 50)
The majority of Pike/Pine’s commercial URM buildings have not been seismically retrofitted. 26 Pike/Pine buildings have some level of seismic retrofitting. King County Assessor’s data permit history identifies seismic retrofit projects on commercial URM buildings. If seismic retrofit work has been completed, but is not listed under permit history on the assessor’s page, it is unknown whether or not any work has been completed. Only one Pike/Pine building had a permit history that indicated Nisqually earthquake damage. Although only one Pike/Pine building indicated
damages from the Nisqually earthquake it does not mean that retrofitting is not important. The Nisqually earthquake was relatively small and does not compare to the expected damages and strength of a Seattle fault earthquake. (See Figure 51)

**Pike/Pine: URM Case Study**

Most of Pike/Pine’s commercial URM buildings are categorized as average building quality. Buildings categorized as either average/low or low cost with more than one story stand out as high priority buildings. Buildings categorized as good or average/good are not resistant to earthquake damages but are likely to suffer the least amount of damage. Building height is important because it indicates how the building might affect other surrounding buildings if it collapses. (See Figure 52)
Pike/Pine: Historic Unreinforced Masonry Building Stock

This map is similar to Figure 30, but what this map does that Map 1 does not do is effectively include the historic preservation part of the equation. Figure 36 includes the Seattle Historic Resources Survey layer by indicating which URM building has been identified as ‘historic’ and which buildings are ‘not historic’. Designated Seattle landmarks are also identified using a yellow star. Pike/Pine has only three Seattle landmarks that are also URM buildings.
There are 59 historic URM buildings in Pike/Pine. Those should be higher prioritization in a future seismic retrofit schedule because of their historic resource attributes. (See Figure 53)

Pike/Pine: URM Case Study

Case Study Conclusions

Seattle has a relatively large stock of commercial URM buildings. Some of the buildings have been formally identified by one of several surveys and some have been informally identified based on year of construction and construction material (masonry). Seattle also has a large stock of historic buildings; many of which are unreinforced masonry. Consideration of all potential commercial URM buildings (formal, informal, and historic) will lead to an
integrative approach to Seattle’s commercial URM building stock and ultimately will result in a comprehensive commercial URM program.

The Pike/Pine neighborhood case study reveals several things that can help us better understand the entire stock of Seattle’s URM buildings. Pike/Pine has a total of 224 buildings. Of the 224 buildings, 145 buildings have been identified as potential URM buildings. Of the 145 potential URM buildings, 128 buildings are masonry; <1950, 14 buildings are masonry; 1950-1977, and 3 buildings are wood frame; <1977. Approximately 65% of Pike/Pine’s buildings are potential URM buildings. The 2007 Reid Middleton survey identified 60 potential URM buildings. Consideration of all commercial masonry buildings built prior to 1978 increases the number of potential URM buildings from 60 buildings to 145 buildings. In addition to the 2007 survey URM buildings there are 73 pre1950 commercial masonry buildings and 12 1950-1977 commercial masonry buildings in Pike/Pine. The three categories of potential URM buildings equals the total of 145 potential URM buildings in Pike/Pine (see Table 1 & Table 2).

It can be concluded that approximately 73% of all of Seattle’s commercial masonry pre-1950 is likely to be unreinforced masonry. Similarly, Pike/Pine has a total of 23 buildings that fall into the category: commercial masonry 1950 – 1977. Of the 23 buildings, 2 have been identified as unreinforced masonry or likely unreinforced masonry. It can be concluded that approximately 1% of Seattle’s commercial masonry 1950 – 1977 is likely to be unreinforced masonry.

Seattle has 2,211 commercial masonry pre-1950 buildings. According to the Pike/Pine analysis there is a likely 1,614 URM buildings in the data set. Seattle has 4,244 commercial masonry 1950 – 1977 buildings. According to the Pike/Pine analysis there is a likely 424 URM buildings in the data set. 1,075 URM buildings have been identified to this point. It is suggested that the approximate total of Seattle’s URM stock is 2,038.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>60 buildings</td>
<td>73 buildings</td>
<td>12 buildings</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Potential URM Buildings</th>
<th>145 buildings</th>
<th>Pike/Pine Buildings Percentage URM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Buildings</td>
<td>224 buildings</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: URM Building Surveys

Table 2: Percentage URM Buildings
Alternative 1

Alternative 1 suggests that each commercial URM building be tagged for one of two typology groups: historic or non-historic. The historic building group (A) will contain commercial URM buildings that belong to one of the following categories: national landmark, state landmark, local landmark, Seattle Historic Resources Survey, Seattle historic district, or Pike/Pine Conservation Overlay District (PPCOD). The non-historic building group (B) will contain all other commercial URM buildings. Group A buildings should be required to retrofit up to a level that protects human life and the building itself. Group B buildings should be required to retrofit up to a level that protects human life.

Group A

- Historic/High Use
- Historic/Low Use

Group B

- Non-Historic/High Use
- Non-Historic/Low Use

Alternative 1 relies on historic and building use characteristics to determine highest retrofit priority. Prioritization is a function of historic attributes (group A or B) and use occupancy. Group A commercial URM buildings with a higher than average use occupancy will be high priority. Group B commercial URM buildings with a higher than average use occupancy will be medium-high priority. Group A commercial URM buildings with a lower than average use occupancy will be medium priority. Group B commercial URM buildings with a lower than average use occupancy will be low priority. The prioritization balances both life safety and historic preservation concerns and supports an integrative management approach to Seattle’s commercial URM building stock.

Alternative 2

Alternative 2’s URM typology is a combination of age, historicity, use and number of stories. This alternative places high importance upon older, historic URM buildings. Each URM is assigned to four different categories based on the above characteristics. There are twelve different typologies possible using this alternative:

- Historic; 1900-1920; Apartment
- Historic; 1900-1920 [not apartment]
- 1900-1920; Apartment [not historic]
- 1900-1920 [not historic, not apartment]
- Historic; 1920-1930; Apartment
- Historic; 1920-1930 [not apartment]
- 1920-1930; Apartment [not historic]
• 1920-1930 [not historic, not apartment]
• Historic; 1930-1977; Apartment
• Historic; 1930-1977 [not apartment]
• 1930-1977; Apartment [not historic]
• 1930-1977 [not historic, not apartment]

All twelve typologies are sorted to determine seismic retrofit priority. The sorting places a greater importance upon historicity, age of building, and apartment use. The seismic retrofit prioritization sorting for the twelve typologies, from highest priority (Group 1) to lowest priority (Group 12), is as follows:

1. Historic; 1900-1920; Apartment
2. Historic; 1900-1920
3. Historic; 1920-1930; Apartment
4. Historic; 1920-1930
5. Historic; 1930-1977; Apartment
6. Historic; 1930-1977
7. 1900-1920; Apartment
8. 1900-1920
9. 1920-1930; Apartment
10. 1920-1930
11. 1930-1977; Apartment
12. 1930-1977

Once the buildings have been assigned to one of the twelve groups they should then be sorted by number of stories, placing greater importance upon taller buildings.

Alternative 3

Alternative 3’s URM typology takes the form of a rating system and is a combination of use, square footage, building quality, number of stories and historicity. The methodology is borrowed from the City of Berkeley’s report on URM seismic analysis, “Standards for the Seismic Analysis of Unreinforced Masonry Buildings.” URM buildings are assigned to one of four categories: Level 1, Level 2, Level 3, or Level 4. Level 1 includes unreinforced masonry public buildings, such as hospitals, schools, and public spaces. Level 2 includes commercial and mixed-use URM buildings larger than 10,000 square feet. Level 3 includes commercial and mixed-use URM buildings ranging from 5,000 to 10,000 square feet. Level 4 includes commercial and mixed-use URM buildings less than 5,000 square feet. After every URM building has been assigned a level, each level is then sorted according to building quality, number of stories and historicity. High building quality represents higher retrofit priority, taller buildings represent higher retrofit priority, and Historic buildings represent higher retrofit priority.
Pike/Pine Prioritization Case Study

The Pike/Pine URM buildings can be used to do sample retrofit prioritization following the criteria of each alternative. Pike/Pine has 145 URM buildings. The results of each retrofit alternative for Pike/Pine’s URM buildings are as follows:

Alternative 1
Alternative 1’s criteria prioritizes historicity and use and places each building in one of four categories.

- Group A - Historic/High Use: 59 buildings
- Group B - Non-Historic/High Use: 62 buildings
- Group C - Historic/Low Use: 6 buildings
- Group D - Non-Historic/Low Use: 18 buildings

Alternative 2
Alternative 2’s criteria prioritizes historicity, present use, and number of stories and places each building in one of twelve categories.

- Group 1 - Historic; 1900-1920; Apartment: 7 buildings
- Group 2 - Historic; 1900-1920 [not apartment]: 42 buildings
- Group 3 - Historic; 1920-1930; Apartment: 1 building
- Group 4 - Historic; 1920-1930 [not apartment]: 13 buildings
- Group 5 - Historic; 1930-1977; Apartment: 0 buildings
- Group 6 - Historic; 1930-1977 [not apartment]: 2 buildings
- Group 7 - 1900-1920; Apartment [not historic]: 8 buildings
- Group 8 - 1900-1920 [not historic, not apartment]: 37 buildings
- Group 9 - 1920-1930; Apartment [not historic]: 3 buildings
- Group 10 - 1920-1930 [not historic; not apartment]: 17 buildings
- Group 11 - 1930-1977; Apartment [not historic]: 3 buildings
- Group 12 - 1930-1977 [not historic; not apartment]: 12 buildings

Alternative 3
Alternative 3’s criteria prioritizes present use, square footage, historicity, number of stories, and historicity and places each building in one of four levels.

- Level 1 - Public Buildings: 6 buildings
- Level 2 - Commercial; >10,000 square feet: 89 buildings
- Level 3 - Commercial; 10,000 - 5,000 square feet: 26 buildings
- Level 4 - Commercial; <5,000 square feet: 22 buildings

*See appendix for complete tables*
Conclusion

The inventory of Seattle’s unreinforced masonry buildings has been fully explored, compiled and mapped. First, the value of old buildings was discussed as a function of sustainability, urban grain and preservation. Second, the characteristics of Seattle’s commercial URM buildings were described, analyzed and presented with support from several citywide maps and six neighborhood snapshots. The commercial URM study was scaled down to the case study level to look every building in the Pike/Pine neighborhood to identify gaps in existing commercial URM surveys and to draw conclusions about the larger, Seattle URM building stock. Third, three alternatives for how to determine URM building typologies and seismic retrofit prioritization were presented along with their associated logic flow charts.

The main key finding of this research was the identification of nearly twice as many commercial URM buildings in Pike/Pine than had previously been identified by the 2007 Reid Middleton survey. The addition of three data sets, commercial masonry pre-1950, commercial masonry 1950-1977, and the Seattle Historic Resources Survey provided a needed comprehensiveness. The additional potential commercial URM buildings will need to be confirmed however, it is assumed that many of them will be identified as unreinforced masonry. Accurate and thorough identification of Seattle’s commercial URM buildings is the first step towards reducing the earthquake risk. The identification of additional potential commercial URM buildings in Pike/Pine can be used to estimate additional commercial URM buildings in the entire city.

It is intended that this compilation of work about Seattle’s commercial URM buildings will be useful to the City of Seattle as they move forward with the development of the Seattle commercial URM ordinance. This report has identified nearly 1,000 additional potential commercial URM buildings in addition to the previously identified 1,000. The estimated total of Seattle URM buildings is now 2,038. The report has also presented a neighborhood level methodology, demonstrated with the Pike/Pine case study and neighborhood snapshots that will hopefully continue neighborhood case studies to identify all URM buildings. The importance of the integration of historic preservation and hazard mitigation has been identified as a way to verify that the planning for Seattle’s commercial URM buildings is comprehensive. A Seattle commercial URM ordinance will ensure the safety of people and buildings during the next earthquake and ensure the longevity of treasured historic buildings through the integration of historic preservation and hazard mitigation.
Appendix A

Seattle URM Tables
Appendix B

PDF Building Specs (Pike/Pine)
Appendix C

Alternative Worksheets (#1-#3)
References

Department of Archaeology and Historic Preservation. “Washington Heritage Register.”


HistoryLink.org. “Now and Then: Seattle’s Great Fire of 1889.”

HistoryLink.org. “Seattle burns down in the Great Fire on June 6, 1889.”


Merlino, Kathryn R. “Measuring Urban Grain in Older Neighborhoods: Metrics and Measures.” Presentation at the National Trust for Historic Preservation Annual Conference, Austin, TX, October 2010.


Reid Middleton. City of Seattle Unreinforced Masonry Building Seismic Hazards Study prepared for City of Seattle Department of Planning and Development. December 2007.


