SUSTAINABLE DISASTER RECOVERY OF HISTORIC BUILDINGS, THE CASE OF SAN FRANCISCO AFTER LOMA PRIETA EARTHQUAKE

A Dissertation

by

FATIMA M. AL-NAMMARI

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

May 2006

Major Subject: Architecture

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ABSTRACT

Sustainable Disaster Recovery of Historic Buildings, the Case of San Francisco after Loma Prieta Earthquake. (May 2006)

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Co-Chairs of Advisory Committee: Dr. Michael K. Lindell
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Recovery from disaster is a challenging period for any community. Long-term recovery is important, especially in relation to the built heritage, but it is among the least explored phases of disaster. Identifying past problems is needed to reduce future recovery complications.

This study investigates the long-term recovery of public and Non-Government Organizations (NGO) owned historic buildings after an earthquake in the light of chosen sustainability variables. It examines San Francisco after the 1989 Loma Prieta earthquake as a case study and analyzes time needs, community participation, and maintenance of historic character, to identify whether historic buildings faced special issues and the variables involved. The study uses different methods. It statistically compares data for a sample of public and NGO owned buildings in San Francisco and then analyzes the dynamics of recovery for three buildings that faced delays.

The study has found that historic buildings faced delays in recovery but such delays were sometimes the results of major rehabilitation projects, thus having long-term benefits. There are many variables in the recovery process that delay historic buildings and can be addressed to reduce future delays, which are mostly results of the context, process, and players. Time needs for the recovery of buildings are affected by their function, damage level, and status. Also, the sustainability of the process needs to be addressed, mainly in terms of the way historic buildings are valued, and the degree to which such valuation allows them to be part of the heritage of the community at large.

To My Parents and Sister

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ACHP	Advisory Council for Historic Preservation
CEQA	California Environmental Quality Act
EIR	Environmental Impact Report
FEMA	Federal Emergency Management Agency
LPAB	Landmarks Preservation Advisory Board
MOA	Memorandum of Agreement
NGO	Non-Governmental Organization
PA	Programmatic Agreement
URM	Unreinforced Masonry
UBC	Uniform Building Code
SFRA	San Francisco Redevelopment Agency
SFUSD	San Francisco Unified School District
SHPO	State Historic Preservation Officer
SHBC	State Historic Building Code
SOTA	School of the Arts

CHAPTER I

INTRODUCTION

The notion of sustainability has become an important part of any study that tackles resource management, whether it is business, economic, tourism, cultural, or disaster recovery. Sustainability identifies three notions as vital - environment, economy and community - and they are to be considered in any management process so that none of them is forfeited. This includes heritage and historic buildings' management efforts (Daher, 2000; Giddings, 2000; Lefevre, 2000; Rothrok, 2000; Hardy and Beeton, 2001; Al-Nammari, 2003) and recovery efforts (Berke and Beatley, 1997; Mileti, 1999; NHRAIC, 2001).

Sustainability has many sides. Its social facet calls for social equity, justice, and equilibrium in distribution of resources. Its environmental facet calls for sound strategies that avoid environment and resource depletion. Its cultural facet calls for maintaining cultural resources for future generations and reducing losses due to carelessness, damage, or disasters (Giddings, Hopwood, & O'Brien, 2002). Therefore, the concept of sustainability provides a backbone for evaluating both disaster recovery and historic preservation. It links the goals of recovery, hazard reduction, preservation, heritage management, development, and other social and environmental goals.

Literature divides the post-disaster period into four main stages: 1) Emergency (response) period; 2) Restoration (short term recovery) period; 3) Reconstruction I (long-term recovery) period; and 4) Reconstruction II (commemorative period) (Haas, Kates, and Bowden, 1978; Berke and Beatley, 1997). The recovery phase itself has been referred to using many terms (Quarantelli, 1999) but, for the purpose of this research recovery is defined as the time needed to repair a building after an earthquake[1].

This dissertation follows the style of *Disasters.*

Recovery is the least investigated phase of the four phases of disaster: mitigation, preparedness, response, and recovery (Berke and Beatley, 1997; Quarantelli, 1999; Lindell and Prater; 2003). Moreover, within the body of research, long-term recovery has been neglected as the focus is usually on the response and short-term recovery phases (Haas et al., 1978; Geipel, 1982; 1991). Improving the management of disaster recovery requires taking into account the long term effects on community resources and adopting sustainable approaches (Berke and Beatley, 1997; NHRAIC, 2001). Such goals need to be informed through systematic research.

Disasters have physical, social, psychological, sociodemographic, socioeconomic, and political impacts, in addition to many indirect impacts (cf. Lindell and Prater 2003). Economically, the cost of disasters is constantly escalating; Hurricane Andrew, Northridge Earthquake, Kobe Earthquake, and other disasters afterwards have cost billions of dollars. (Mileti, 1999; Tierney, Lindell, and Perry, 2001). Hurricane Katrina is estimated to cost $200 billion (Murray and VandeHei, September 21, 2005).

Studies about the effects of the Loma Prieta earthquake say that about 1 % of the historic buildings in the Bay area were damaged, about 11.25 % of the total damage is in historic buildings, amounting to 350 million dollars, and that the cost of public historic buildings was large (ARG, 1990). This indicates that an investigation into the recovery of historic buildings is important, not only due to the effects of earthquakes on the built heritage, but also because of the high costs that seem to be associated with it.

Time is an issue that is critical after disasters. People need to go back to their original pre-disaster life as soon as possible, which creates stress for city managers and staff (Wilson, 1991). Research to improve time needs have usually focused on mitigation and better preparedness. Yet, it is also important to understand the dynamics of the recovery process and how that can be improved in the light of recommendations of sustainability.

The Loma Prieta earthquake was the major impetus to the increased interest in the disaster management of historic buildings, probably due to the rich architecture of the Bay Area cities (Merritt, 1990; CPF, 1999). The effects of the earthquake have been

investigated and the importance of preparedness for the next earthquake has been emphasized, especially for historic buildings. However, no studies have tackled the long-term recovery of the historic buildings in a systematic investigation. Thus, this study focuses on San Francisco as a case to investigate chosen sustainability aspects of the long-term recovery of historic buildings. The study aims at identifying whether historic buildings perform differently than non-historic buildings in term of the time needed for recovery, and then investigates the dynamics of the recovery for chosen historic buildings in the light of sustainability principles.

Consequently, this research is significant as an investigation into an otherwise neglected area of study. It helps bridge two fields of study that overlap during the recovery phase. Such an investigation is also a means for improving our understanding of the disaster recovery of the built heritage in particular, so that the results of the study would help in improving the sustainability of recovery. Its findings are relevant to owners, stewards of the built heritage, cities, and other public agencies involved in the recovery process. It also has policy consequences for the different levels of governments involved.

CHAPTER II

BACKGROUND AND LITERATURE REVIEW

Sustainable development was initiated as a concept in the 1970s, and was identified as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Bank, 1999). The concept was adopted in to several UN conferences, especially in relation to the developing world. Agenda 21 identified several principles for sustainability that call for social equity, maintaining resources, community development, and participation (WTTC, 2002). The concept of sustainability has three notions as vital: environment, economy, and community. These three notions interact with each other throughout the process of human development. Thus, sustainable development has been identified to revolve around four standpoints (Giddings et al., 2002):

1. Futurity (inter-generational equity),
2. Social justice (intra-generational equity),
3. Procedural equity (social equality, community participation), and
4. Geographical equity and biodiversity.

Within that framework, heritage management and disaster recovery are essential practices that fall under the umbrella of sustainability. The following literature reviews what sustainability means in each field, with regard to the post-disaster recovery of the built heritage.

Sustainable Heritage Management

Among the early concepts of sustainable heritage management was that promoted by the Council of Europe in the Congress of European Architectural Heritage (1975) which is called” integrated heritage conservation”. It emphasized that all areas in historic centers are part of the architectural heritage and should not be allowed to fall under the threat of neglect, demolition, excessive traffic and incompatible new

construction. It maintained that the social structure of such centers is important and that its rehabilitation would not encourage gentrification. It also fostered the responsibility of local authorities emphasizing citizen participation and legislative and financial management that would support saving such heritage (Council of Europe, 1975). A significant aspect of this concept was citizen participation in making decisions about their heritage.

Many international charters foster concepts of sustainable heritage management, sometimes without mentioning that specific term (cf. ICOMOS, 1982, 1987; 1999; 2000; Australian-ICOMOS, 1998; WTTC, 2002). Notions of maintaining local values associated with that heritage by encouraging community participation are stressed in these declarations.

Consequently, sustainable approaches in cultural management aim at maintaining the cultural value of a place for future generations. But identifying value and the proper methods for the management of a cultural resource requires community participation to maintain local values and prevent the alienation of the community from its heritage. Sustainable heritage management requires a comprehensive view that incorporates, among other things, the economic validity of preservation, the maintenance of community values and the preservation of the environment (Daher, 1999; 2000; Serageldin, Ephim and Martin-Brown, 2001; Al-Nammari, 2003). Sustainability in the management of heritage is important in terms of utilizing and safeguarding heritage assets for future generations, maintaining a social balance, providing employment, encouraging community participation, tourism management, and environmental conservation (Pickard, 2001:6). These principles are significant, but of interest for this investigation is public participation as a tool for maintaining community values, and safeguarding the built heritage as an asset for future generations.

Preservation[2] is defined by the Australian International Committee of Monuments and Sites (Australian- ICOMOS 1999: article 1.4) as a process of looking after a place to retain its cultural significance. Preservation is thus an act of management and international charters have stressed that cultural resources should be preserved so

that their tangible and intangible values are maintained and passed to future generations (cf. ICOMOS 1982; 1987; 1999, 2000). The essence of preservation, thus, lies in the maintenance of such values.

Pickard and de Thyse (2001) note that sustainability indicators have not yet been developed for heritage management, nevertheless it is possible to generate general principles that can guide the management of heritage sites towards sustainability. They suggest the following: 1) Respecting community life and improving its quality through the preservation of the cultural heritage. 2) Maintaining identity, diversity, and vitality. 3) Minimizing the diminution of heritage assets that are non-renewable. 4) Changing the attitude and perception of all actors and players in the community through facilitating stakeholder dialogue. 5) Encouraging community involvement and empowerment through participatory processes. 4) Providing policies that integrate sustainable development with heritage conservation; and 5) defining the capacity by which the historic center can permit change. Such principles help in providing guidance for heritage preservation projects, including post-disaster heritage preservation.

On the other hand, the disaster recovery period poses special challenges for historic buildings. Spennemann and Look (1998), and others (Jones, 1986; Fielden, 1987; 1994; Merritt, 1990; Nelson, 1991; Look, Wong and Augustus, 1997) have identified the main issues in post-disaster management of a historic building. Some of the points that are problematic include maintaining historic character and integrity of fabric[3] both of which are critical for the preservation of the built heritage for future generations. Time pressures in disaster response and recovery lead to decisions that damage both these aspects thus causing losses in the built heritage (Fielden, 1987; Nelson, 1991; Craigo, 1998; Donaldson, 1998). Thus, research is needed to investigate whether historic buildings face special challenges after disaster and how such challenges develop, especially in regard to participation and maintaining of historic character.

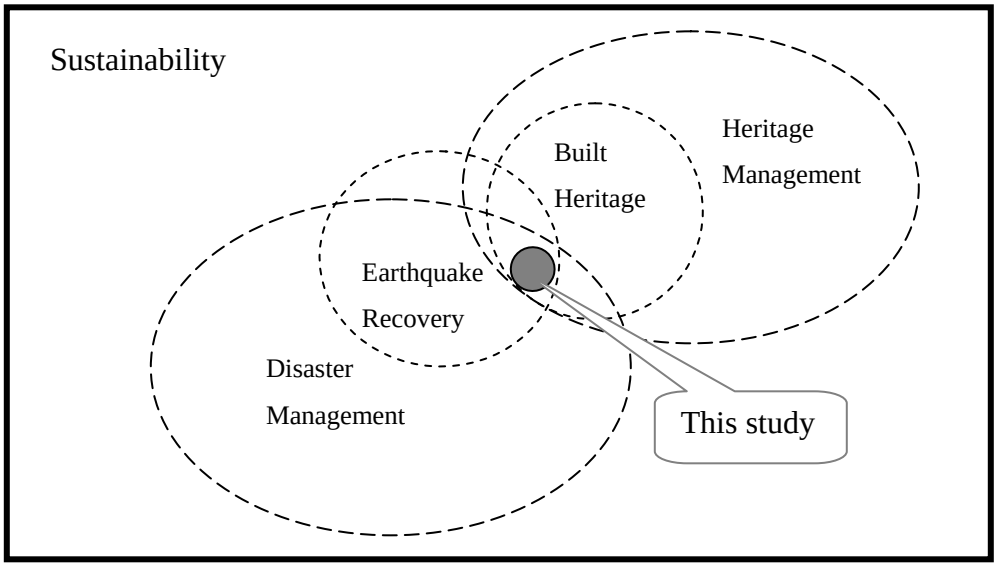
Sustainable Disaster Recovery

Sustainable disaster recovery requires taking in to account the long-term effects on community resources and adopting sustainable approaches (Berke and Beatley, 1997; NHRAIC, 2001). Berke and Beatley (1997) provide several recommendations for achieving sustainable recovery. Although they focused on the Caribbean after a hurricane, their recommendations apply to natural disasters in general. Their suggestions include: promoting bottom-up recovery, avoiding political hindrances, making disaster plans relevant, achieving fair and equitable recovery, establishing inter-organizational coordination, using resources wisely, and including sustainable mitigation.

Available literature contends that achieving sustainable recovery requires attention to issues such as mitigation, local resources (including cultural), funding, time needed, bureaucracy, and community participation (Haas et al., 1978; Alexander, 1989; Merritt, 1990; Mader, 1994; NHRAIC, 2001). To achieve sustainable recovery for historic buildings, planning is critical since it helps in preparation and avoidance of problems. Such planning needs to be informed through systematic research, which is lacking.

The stance taken by this study in regard to sustainability falls under the notion of holistic sustainability (figure 1). This study recognizes sustainability as an umbrella that should cover all decisions in the built environment. Within this view, sustainability of the built environment is concerned with managing all aspects in the built environment. But what differentiate the management of the built heritage from the management of other buildings is the special meanings and values for historic buildings, which sets them aside. This requires special care in decisions affecting them, consequently decisions about them takes into account not only the functional, economic, developmental, and aesthetic values they have, but also their social and cultural value as well. This relates to what Sokrin (2001) points out, in that Preservation is “always an investigation into a system of beliefs and desires” (Sokrin, 2001, 59). This requires decision makers to know what such heritage means for the people, thus citizen participation is emphasized.

Figure 1 The theoretical framework of the study.



Although it took place in an underdeveloped part of China, the reconstruction of Lijian is interesting as the main principles of sustainability were planned to be implemented. The project is a good example of merging disaster recovery and heritage management. The World Bank developed the plans, and the publication does not go into the details of the implementation or the challenges faced. However, the study lists several lessons learned about heritage conservation in post-earthquake reconstruction that provide good general principles (Ebbe and Hankey, 2000; Read and Ebbe, 2001): 1- Administrative management and coordination between government departments, especially in regard to historic proprieties. 2- Community involvement in the process by setting goals, strategies, and policies for the identification and management of cultural heritage. This should be associated with outreach programs that educate the public about the value and significance of their heritage. 3- Upgrading historic neighborhoods to provide a better quality of life and safety. It is important to use historic buildings so that they have a vital role in the lives of their communities. This would support their maintenance and provide for benefits for the community through rehabilitation. 4-

Proper tourism planning and heritage management that balances the effects of tourism. And 5- planning for the future of the site should be done in light of the community needs and the preservation of cultural values while providing for economic and regional development.

Recommendations of sustainable recovery in literature are varied depending on the perspective taken by the researchers (Haas et al., 1978; Berke, Kartez, and Wenger, 1993; USDE, 1994; Ebbe and Hankey, 2000; NHRAIC, 2001). Nonetheless, they have been grouped into six main categories (NHRAIC, 2001):

1. Enhancing the quality of life. This is achieved by providing all community members equal opportunities for education, health, employment, affordable housing, sound environmental management, and encouragement of civic evolvement. This objective also achieves environmental maintenance through historic preservation.
2. Upholding environmental quality. This includes all acts of conservation and preservation of natural resources, the built heritage, management of open spaces, and pollution prevention.
3. Encouraging public participation in decision-making through active involvement.
4. Supporting economic sustainability. This is achieved by decisions that generate economic development by attracting and retaining the workforce and preserving the environment (both natural and cultural) through sound management policies that do not consume such resources. An important part is accountability for effects on environment and society due to economic investments.
5. Confirming social equity by taking special attention to social groups that are usually marginalized. These include new immigrants, underprivileged households, the elderly, and individuals with special needs.
6. Building disaster resilience by supporting sound land use management, mitigation, and preparedness.

Based on the above literature, there are common goals between sustainable disaster recovery and sustainable heritage management. This should help in post disaster

situations as it builds common objectives. This study will not investigate all these points, but it will focus on community participation and cultural continuity (through maintaining historic character and fabric), as they have been identified in the literature (Jones, 1986; Fielden, 1987; Merritt, 1990; Nelson, 1991; Fratessa, 1994; Mader, 1994; Look, et al., 1997; Spennemann and Look, 1998).

Recovery of Historic Buildings

Available literature on recovery of historic buildings can be identified in two groups. The first group, done under the umbrella of general disaster recovery (Haas et al., 1978; Geipel, 1982; 1991; Berke, Kartez and Wenger, 1993; Bolin and Stanford, 1994; Fratessa, 1994; Mader, 1994; Berke, 1995; Berke and Beatley, 1997; Comerio, 1998a; Rubin, Saperstein and Barbee, 1985; Schwab, Topping, Eadie, Deyle, and Smith, 1998), sometimes mentions historic buildings as one aspect of a planner's perspective of the recovery process (Alexander, 1989; NHRAIC, 2001; Schwab et al., 1998). The second group consists of studies done by preservationists (Jones, 1986; Fielden, 1987; Merritt, 1990; Eadie, 1991; Nelson, 1991; Kariotis, 1998; Katchka, 1998; Spennemann and Look, 1998; Blair-Tyler and Kristiansson,1999; CPF, 1999; Estes, 2000). This work is usually focused on issues of cultural continuity, preservation of integrity, historic character and other issues pertaining to preservationists and groups interested in heritage. Both groups of studies contend that there is a lack of research on recovery, and particularly on long-term recovery. Moreover, both agree that the recovery of historic buildings is the least investigated.

The earliest work to address disaster recovery of historic buildings was that of Fielden (1987), which focused on earthquake hazard management. Nelson (1991) provided a good study of the different stages of disaster by using the short-term recovery after the Loma Prieta earthquake in California to point out to the main difficulties of the process. Spennemann and Look (1998) provide an overview into the effects of disasters on historic buildings and sites. The California Preservation Foundation published more studies that tackle the immediate response to earthquakes and the challenges that faced

historic buildings in the aftermath of Loma Prieta and Northridge earthquakes (Merritt, 1990; Eichenfield, 1996; Kariotis, Krakower and Roselund, 1991; CPF, 1999).

Several studies have indicated that historic buildings face complications in recovery (cf. Jones, 1986; Fielden, 1987; 1994; Merritt, 1990; Eadie, 1991; Nelson, 1991; Look, 1997; Craigo, 1998; Kariotis, 1998; Spennemann and Look, 1998; Blair-Tyler and Kristiansson, 1999; Look and Spennemann, 2000; 2001). Therefore, investigating the recovery of historic buildings as it compares to non-historic buildings is important to identify whether historic buildings are different and why. This is essential for achieving successful disaster recovery: fewer complications mean a shorter recovery time (Haas et al., 1978; Wu and Lindell, 2004).

Main Variables of the Study

Based on the review above, certain variables have been identified. Community participation, maintenance of cultural values, and the timely repair of historic buildings are important aspects of the sustainable recovery and management of the built heritage.

Participation

Participatory approaches to decision making are essential for sustainable recovery, sustainable development, sustainable heritage management, and sustainable governance. Public participation provides for a better-informed general public, legitimate plans, and a reduction of conflict among stakeholders (Berke, et al., 1993; Bass, Dalal-Clayton, and Pretty, 1995; NHRAIC, 2001; Hague and Jenkins, 2005; Haus, Heinelt, and Murray, 2005).

Community participation in heritage management provides input by the community that is relevant to their viewpoints and needs. They participate with information that would help make the project better in addressing a wide variety of issues, allow for discussion of their values and beliefs, thus making the project of benefit to a larger sector of the community. Participation provides the community with a sense of ownership. Through participation, benefits of the project can be maximized (Grimwade and Carter, 2000; Hardy and Beeton, 2001).

Through participation the project would not be based on the needs or values of a particular group, which may be any group in power or the cultural elite of the community. Decisions about the site, its use, and its meaning as heritage would be representative of all community groups. This not only would prevent power monopoly and the use of heritage for the benefit of specific groups, but also present a wider spectrum of the community opinions. When all community groups participate effectively in the development of the preservation plans, alienation of any particular group from their heritage or depriving them the benefits would be reduced.

Research has shown that participatory projects in cultural resources management can lead to better results for preservation projects and communities, since it makes stakeholders into partners. That benefit, however, depends on the level of empowerment provided for the participants and their role in the process. Some participatory processes provide the public with a chance to obtain information, or comment on it, while other processes would make them partners and decision makers (Dalal-Clayton and Pretty, 1995; Grimwade and Carter, 2000; Al-Nammari, 2003)

Moreover, international charters stress the importance of community participation, especially for minorities and minority groups. For heritage management, participation aims at the presentation of all meanings and values preventing the marginalization of groups as much as possible. However, it is important to view participation as a process and not a end. It is the process of participation that differentiates the outcome (Al-Nammari, 2003). A heritage resource will have different values for different groups and participation is one conduit that elicits the building's meaning to all groups. Participation is a process that gives decisions about heritage legitimacy (Pickard and de Thyse, 2001; de La Torre, 2005).

Participation is integral to the heritage conservation process. Sorkin points out that "the self-identities of societies that preserve are bound up not simply with the appearances of the structures they produce but with the process by which they agree on what is to be saved, what modified, and what destroyed" (Sorkin, 2001, 59). Different communities have several ways to managing their heritage. In the US, there are several

laws that organize management of cultural heritage. The National Environmental Policy Act (NEPA) is considered the umbrella for management of natural and cultural resources. An important law is the National Historic Preservation Act and its Section 106, which draws a specific a process for federal undertakings (see Appendix A). Other cultural resources laws are the Native American Graves Protection and Repatriation Act, the Public Buildings Cooperative Use Act, among many other acts and executive orders (cf. King, 1998; 2000; 2002). States have their own laws for protection and regulation of cultural resources. In California, the California Environmental Quality Act (CEQA) is the main umbrella for cultural resource preservation. Locally, each jurisdiction will develop laws pertaining to their community.

In a series of studies on the preservation of historic centers in Europe, participation was a central theme in the management of such heritage (Pickard, 2001). Participatory approaches to cultural heritage management are encouraged in the USA as well (King, 1998; ACHP, 2002). Literature clearly pushes for community participation, yet, more studies are needed to investigate the laws and processes that exist and how they can be improved, especially in post disaster situations.

Historic Character and Integrity of Fabric

Among the main challenges facing historic preservation after disaster is the maintenance of the historic character in spite of the repair work and code upgrades, especially if such repairs are extensive in nature. This becomes critical when the damage is severe and requires extensive interventions (Spennemann and Look, 1998).

International charters have stressed the importance of maintaining the historic character of buildings and places of heritage value for future generations. The Burra Charter points out the importance of the character and fabric of place . It states that “cultural significance means "aesthetic, historic, scientific or social value for past, present or future generations"” and states that significance helps in the identification of the value of place. “The places that are likely to be of significance are those which help an understanding of the past or enrich the present, and which will be of value to future generations” (Australian-ICOMOS, 1998, article 2.1).

Historic fabric is important in conservation. The significance of the place is related to its integrity of fabric (National Parks Service, n.d.; Australian-ICOMOS, 1998; La Torre, 2005). Most conservation guidelines have a form of requirement for fabric and character conservation. In the USA, the Secretary of the Interior's Standards stress the integrity of fabric and historic character for the purpose of listing a property on the National Register (National Parks Service, n.d.). In Canada, the federal heritage building review code of practice points out the importance of preserving the character-defining elements, patterns, and relationships in primary areas of heritage value (Parks Canada, 2005). In Europe, Both the Granada and Malta conventions (Council of Europe, 1985; 1995) recommended that additions to historic contexts would not be permitted unless it shows compatibility to the existing in terms of volume, scale, form, materials, and quality of design. Those safeguards would be taken to protect views, vistas, settings, and historic street layouts. They required that control measures, sanctions, and coercive measures would be made to protect the historic character and fabric.

Time

Time is an important aspect in the post-disaster period. Time is particularly important in housing recovery, as recovery passes through several stages and is usually challenged in terms of financing and management (Wu and Lindell, 2004). In general, city managers and staff try to return life to its normal pace as quickly as possible (Wilson, 1991; Eichenfield, 1996). After Hurricane Hugo, the Charleston Board of Architectural Review speeded up its review process in order to hasten the recovery, and according to Nelson (1991), this was done without compromising its standards. The action of speeding review process is often taken by cities after disasters to help in speeding the recovery of the community as time is a critical factor and a quick return to normal life functions is desirable (ARG, 1990). Conversely, time needed for recovery provides insights as to whether recovery faced complications, especially if done on a comparative basis.

The seminal study of long term recovery by Haas et al. (1978) divided the process into four stages. Although that has been critiqued as providing a linear

representation of a process that is more complicated (Rubin et al., 1985), the timeline of recovery is one way for evaluating the success of recovery (Wu and Lindell, 2004). According to Nelson (1991), historic buildings are expected to have been restored in the first five years. No research has so far attempted to investigate the differences between historic and non-historic buildings in terms of time needed for recovery, or to see which functions require more time. Such research would identify each community's priorities and help identify where to expect delays in future disasters.

Literature following points out several complications that create delays after disasters. Delays in recovery start during the response stage, during which decisions would impact long-tem recovery. Delays for some public buildings happened due to disagreements over damage estimates, the cost of repairs, and the level of expected performance (Mader, 1994). Oaks (1990) points out that tagging of buildings was one source of delays for several reasons. There were complications during tagging due to hazardous materials (i.e. asbestos), aftershocks, liability, language barriers, and landowner-tenant disputes. Repairs were delayed in some cases due to complications in damage assessments. San Francisco had an emergency permitting process in place, which helped their Bureau of Building Inspection face the thousands of requests for inspections after the earthquake of 1989 (Oaks, 1990; ARG, 1990).

(Oaks, 1990) identifies the stages of recovery for a privately owned building after an earthquake: 1) evaluation (ATC I^4, ATC II), both done by the city and county; 2) further evaluation (ATC III) is done and paid for by the owner; 3) based on ATC III, a decision is made on the cost-benefit of repair and retrofit, or demolition; 4) preparing architectural and engineering drawings; 5) getting proper permits (emergency permit process) and finally; 6) getting construction firms.

For publicly owned buildings, the process is a little different, as the city would evaluate its own buildings, thus the three stages of ATC are simpler. Also, obtaining the proper permits depends on who the owner is; the city may or may not require its own buildings to go through the same permitting process as private buildings.

For public buildings, there are standard time limits for recovery, which depends on the function of the building. According to the California Seismic Safety Commission (1991), which identifies the policy on acceptable levels of safety in state buildings based on their function and construction, the maximum time needed to resume functionality of buildings after an earthquake is :

1. Immediately fully functional without disruption. This is for nuclear facilities and buildings with hazardous materials if there is a risk of release.
2. Within hours after the earthquake: for hospitals and essential services, with minimal acceptable earthquake performance. These buildings should need minimal repairs and such repairs should be mainly non-structural.
3. Within days to months. Buildings with hazardous materials can take this long if there is no risk for release of hazardous materials. Also recommended for this category are nursing homes, prisons, public schools, but this time limit is not the maximum allowable for them.
4. Years of repair are considered a maximum recommended time for nursing homes, prisons, and public schools.
5. For unreinforced masonry (URM) buildings that are not historic, it is acceptable to delay functionality for unlimited time. Offices, universities, research, courts and other non-historic buildings are included. For historic buildings, however, the Seismic Safety Commission allowed unlimited maximum time provided that it is not due to excessive damage and that the buildings are following code. This last point is of interest as it indicates that historic buildings, and certain buildings that have specific construction (i.e. URM), are expected to take longer time by default.

The table is clear on what is not acceptable: it is not acceptable for 1) hospitals and essential services to take days or months, and 2) for public schools, nursing homes, prisons, to take unlimited time (California Seismic Safety Commission. 1991)

The table is interesting for two points: 1) All historic buildings are compiled as one category, regardless of their function (i.e. if they are hospitals, emergency centers,

prisons, or else), and 2) historic buildings are placed as buildings that take the longest time. Interestingly, the table states that for historic buildings, the long time should not be due to extensive damage. This requirements means that delays in historic buildings should be for reasons other the damage level. The table requires that historic buildings be in compliance with the State Historical Building Code and that damage be repairable. This requirement is in need of investigation to see if historic buildings do take longer time, and if that is related to damage level or other reasons.

The investigation of time to recovery requires taking into account several variables. These variables are the function of building, damage level, construction type, age of building, and the cost of the recovery.

Function of Building

The functional use of a building will lead to specific requirements for its architectural and structural design, thus its future seismic behavior. The pattern of occupancy and the specific use of the spaces translate to space proportions, construction methods, and materials. This in turn affects how the structure behaves during an earthquake. As such, different building uses will require different strengthening schemes in relation to the structural type and construction materials. Also, code requirements vary with the criticality of the occupancy level of the building. Buildings that are occupied by large numbers of people at the same time are not similar to buildings that are used by a limited number of people. Likewise, buildings that house critical functions, such as fire stations, are expected to remain functional during emergencies and after earthquakes.

Functions after a disaster can be categorized as follow:

1. Important for the community's return to normal everyday life: residential, commercial, business, and schools.
2. Important for the city's emergency response and recovery management: public offices, emergency respondents, and health care.
3. Important for both: utility and infrastructure.

Literature indicating the influence of function on repair and recovery is scattered. In most instances, functions are referenced through discussions of mitigation or

strengthening requirements. The needs of buildings are acknowledged to be different. Literature discussing mitigation has identified schools, homes, hospitals, emergency and health care, as a discrete group of structures that require special attention. This was done while providing guidelines for such buildings for mitigation purposes. Research has for a long time identified their distinction in seismic performance and strength needs, yet it has not yet investigated whether their recovery is different as well.

1-Residential

The recovery of housing is essential as the effect of the disaster on the lives of people is heavily related to its effect on their homes (FEMA 152). The timely recovery of housing is an important indicator of recovery (Wu and Lindell, 2004). Comerio (1998a) discusses how the housing sector is essential for the recovery process, and she points out frustrations with multi-family dwellings in particular. Disasters impact low-income individuals more severely than higher income individuals so the rapid recovery of public housing and downtown hotels and apartments is important (Bolin and Bolton, 1986; Comerio, 1998a; Phillips, 1998).

Elderly housing is critical as well, since that sector of the community usually lacks affordable housing and often would use single-room-occupancy hotels (Phillips, 1998). Housing tenants of downtown apartments and hotels are mostly low income individuals and do not afford the costs of repairs. And as tenants, they are affected by any increase in the rent that the owner might consider to facilitate such repairs. Research identifies such groups as socially marginal with limited participation in society. Residents of such housing have several characteristics that make them more vulnerable (Bolin and Bolton, 1986; Phillips, 1998).

Phillips (1998) contends that earthquakes such as Loma Prieta affect the homeless population because it causes serious damage to housing. It makes affordable housing more remote as the damaged units would decrease the number of affordable housing. This is in addition to the “marginally homeless” who live in doubled-up or tripled-up housing and who may also lose their affordable homes, creating more homelessness.

A lot of literature talks about the significance of hastening the recovery of housing, especially for low income and elderly groups that reside in downtown apartment buildings and hotels. No literature has attempted to see how long such buildings take to recover in comparison to other functions.

2- Schools

Literature points out that school buildings deserve special seismic standards for safety because they house children, a vulnerable and important group of the society, and because of their importance for post-disaster housing as shelters (FEMA 149).

Not only are schools special because of their inhabitants, but also because the spaces they incorporate are complex and diverse. There contain small and large halls with different structural systems. In addition to that, their closure for long periods after earthquakes would have serous long-term effects on the community as the education of a generation would be seriously affected. Taking into account that repairs after earthquakes are challenging, closure for long periods might be unavoidable should there be serious damage. Thus, any delay in school functionality should be avoided (FEMA149).

Within schools, there are certain spaces with special functions that may increase cost and recovery time. The library, information resources centers (or places with stacked materials), kitchen areas, science laboratories, industrial and vocational areas have higher risk and require extra attention to mitigation and compensation for damage during recovery. Moreover, school buildings are expensive as they are designed for specific functions with special spaces so replacing them is economically unfeasible. From an economic viability perspective, the objective is to maintain their functionality for the community for a long time.

For the purpose of facilitating the analysis, all educational facilities were collapsed in one group. Therefore, schools, colleges, universities, and day care centers were all one category.

3- Cultural facilities

Libraries, archives, and museums contain significant objects and materials that could sustain damage and repairing them adds to the cost and time of recovery. Some disasters might inflict long-term damages on the contents of the museum or library, such as hurricanes and floods (Jones, 1986; Nelson, 1991). Cultural facilities are also reported in terms of recovery cost. The elaborate detailing and the special requirements to maintain their historic character make such buildings of high cost (Couret, 1998; Wyland Sept. 2, 2001).

4- Infrastructure

The loss of infrastructure is among the most important effects of disasters that cities try to limit. Power, gas, water, sewer, and communication lines are essential to restoring normal life functions and their absence creates hardships not only for the community but also for city personnel trying to respond to the emergency (Wilson, 1991; Schwab et al., 1998).

For facilities that are drastically damaged, usually temporary replacements are provided until a permanent facility is constructed, as transportation and infrastructure are essential for restoring normal community functions. Restoration of infrastructure services is among the basic functions that a post-disaster plan should have (Schwab et al., 1998).

Restoring infrastructure services is essential not only for helping people feel that normal life functions are back, but also for pragmatic reasons too. Most importantly, economic recovery has been linked to the recovery of utilities and infrastructure (Schwab et al., 1998). The importance of infrastructure has been cited through their economic impact. According to Brady and Perkins (1998), the economic losses from the damages of the Loma Prieta earthquake are minimal when compared to the losses in retail and selected manufacturing activities, totaling about $5.9 billion. The gross GRP lost in Loma Prieta was between $181 to 725 million, but San Francisco experienced the greatest loss in retail activity for the fourth quarter after the earthquake, which was due to the disproportionately high damages in transportation and power facilities. They

conclude that this indicates the importance of transportation and infrastructure facilities in maintaining economic activity. This also provides a glimpse of what could happen, should there be a major failure in these systems in a future earthquake.

5- Hospitals

The high cost of evacuating patients and finding alternative buildings, the importance of safety of such vulnerable occupancy, and the criticality of the services provided by health care facilities require that they be among the earliest to recover after and earthquake.

Hospitals and health care facilities are among the important functions in the response period and as such they should not suffer high damage nor should they be out of service for extended period of time (California Seismic Commission, 1991). Hospitals, similar to schools, have special legislation requiring their strengthening (the California Field Act for schools and the California Hospital Act) (Mader, 1994).

6- Emergency

Emergency functions are police and fire stations and related service buildings that are imperative during emergencies. These buildings house the first responders and their functionality should not be impaired (California Seismic Commission, 1991; Schwab, et al., 1998).

7- Public office buildings

Literature discuss office buildings in terms of their importance after disasters. Public offices that are non-emergency management departments need to remain functional after the earthquake as city staff and officials will need to use such spaces. Their lack of functionality hinders recovery efforts and creates complications. City or state staff will have to find alternative places to work and serve the public, thus maintaining the functionality of public buildings after a disaster is important. This was one of the main lessons learned during the response for Loma Prieta Earthquake as many state buildings lost their functionality, even though they were retrofitted for life safety (Fratessa, 1994). No literature is available to investigate if public office buildings do recover early.

One of the functions that are important after disaster is the Building Department, as they decide on the safety of buildings and their repair needs. They also monitor the code enforcement. Similarly, the Planning Department and the Department of Public Works start working as early as possible to facilitate the city's reconstruction and return to normality. Of significance are also the Health Department, media relations, and all other public service positions (Schwab et al., 1998).

Damage Level

Damage levels are significant for assessing the time needed to recovery as it affects the extent of the needed repairs. The damage level depends on:

1. The earthquake: intensity, duration, and epicenter location;
2. The site: type of soils and geology.
3. The building: quality of construction, materials, inspection, maintenance, and design (FEMA 149; Kariotis et al.,1991).

High damage leads to decisions to demolish; examples are Santa Cruz Pacific Garden Mall and Odd Fellows Hall, as feasibility of repairs becomes an issue (Kariotis et al., 1991).

Construction Type

The design and construction of a building affects the earthquake damage among other factors. The structural system of a building determines how it responds to earthquake forces and stresses. Shear walls, moment resisting frames and frames with diagonal braces usually resist earthquakes well with diaphragms connecting roof and floors (FEMA 149). Construction materials work hand in hand with the structural systems. Load bearing masonry and steel frames are systems of both materials and structural systems.

In most cases, well-constructed and designed buildings will suffer less damage (Fratessa, 1994). This in turn relates to the time and cost needed for repairs.

Some earthquake damages are related to certain types of construction:

1. In wood frame buildings, the damages in the building itself will not be significant but the cripple walls (the walls that raise it off the grade and create a void under it), often failed. Also, old wood frame buildings are not well anchored to the ground and they bounce off their foundations. Wood frame residential structures suffered the most losses in the Loma Prieta earthquake in the Bay area (Fratessa, 1994).
2. Unreinforced masonry buildings identified as a major vulnerability among historic buildings. Called URM buildings, they may have a steel-frame structure or have a bearing walls construction. In steel-frame structures walls might collapse, including interior walls. In addition, unreinforced masonry infill walls may crumble, leaving the structure standing while the wall falls due to lack of proper anchor to the structural framework (Fratessa, 1994).
3. Large concrete frame building may have their slabs collapse in what Nelson called a “pancake” failure (Nelson, 1991). Older concrete structures did not have sufficient reinforcement and connections so they did not resist strong shaking (Kariotis et al., 1991; Nelson, 1991; NRC, 1994). Precast concrete elements, reinforced conventionally or prestressed had serious failures in some earthquakes due to lack of strong connections, preventing them from functioning monolithically. In addition, in-situ reinforced concrete behaved in different ways depending on the type of the structural systems and the quality of the details. Important factors are the shear walls and the size of openings. Similarly, in moment resisting frames the detailing was critical (FEMA 149).

Construction materials are reported to have been a challenge for repairs after the Loma Prieta earthquake, as certain materials faced delays due to lack of immediate availability. Most residential buildings use wood, with predominantly interior finish of gypsum board (ARG, 1990). But commercial buildings and institutional buildings were mostly URM or stone building. Wood did not face any shortages in 1990, when ARG was reporting. But they did report hardship in

obtaining certain materials, such as terracotta and original sandstone. Such materials are used for large buildings of commercial or public use. They had a long lead time for manufacturing of the pieces, in addition to the extra cost in making and handling them. In some cases, there are delays of up to a year and many projects were considering replacement materials (ARG, 1990).

In general, the performance of buildings is categorized according to their construction:

1. URM buildings have functioned poorly in earthquakes.
2. Steel and wood frame can perform relatively well as they allow for deformation before failing, but they perform badly if their connections are inadequate.
3. Reinforced concrete performs better than other construction.
4. A combination of materials (i.e. concrete and masonry with reinforcement) would only function well if the reinforcement was properly designed, fabricated and constructed (FEMA 149).

San Francisco City has identified 2,100 URM buildings in a survey in 1991. There are about 2,000 URM residential and commercial buildings in San Francisco. Usually brick, but they also contain terra cotta, stone, and concrete blocks. The majority are multi-use with at least one business in the building. Two-thirds of the URM buildings were built before 1912, half of them have architectural or historic significance (Nothenburg, 1994).

Building materials are important, but what really matters is the quality of construction, detailing, design, and execution-unless the construction material has inherent problem such as URM buildings. Details such as the type of mortar, connections, and execution quality also has major effects (FEMA 153).

Age of Building

The time at which a building was constructed influences its strength and ability to resist earthquake stresses. This is because codes developed through time gradually

requiring better reinforcement and higher performance. The Long Beach earthquake of 1933 led to several changes in codes. It required reinforcement on new construction in order to resist earthquakes, it also prohibited constructing URM buildings. But nothing was done to reinforce existing buildings until 1981, when ordinances requiring non-historic buildings' reinforcement started to be implemented. In 1983, The Coalinga earthquake showed the importance of strengthening all URM buildings leading to many demolitions in the central business district, which had a severe economic impact on the city (Kariotis at al., 1991).

The level of maintenance of a building is also relevant. This is especially important for historic buildings, as the fabric may suffer deterioration through time. The effects of weathering can only be limited through continuous maintenance, which may not be available for all buildings (Spennemann and Look, 1998; Fratessa, 1994).

Cost

High cost is an issue that can complicate the recovery process. Finding funding sources to cover high repair or strengthening cost can take time and effort (Wyland, Sept. 2, 2001). Local city decision makers are faced with funding issues in disasters especially since such sudden unexpected high costs are hard to cover. On the individual level, cost makes a difference between keeping and repairing the building or demolishing it (Blair-Tyler and Kristiansson, 1999).

Cost is important for both the public sector and the private sector (Blair-Tyler and Kristiansson, 1999). An important source of high cost is Unreinforced Masonry (URM) buildings as they need retrofitting, which is especially costly if the building is historic (cf. Look, 1991).

The cost of code upgrading for historic buildings has been identified as problematic since it is expensive (Merritt, 1990; Mader, 1994; Spennemann and Look, 1998). A major objective of long-term recovery is to make historic buildings less vulnerable, so structural mitigation has been incorporated into building codes. In California, adherence to such codes is required and the problems of mitigation with minimal cost has been cited (Fratessa, 1994; Mader, 1994). Also, some literature

indicates that historic buildings have high cost not only due to structural mitigation, but also due to the ornamentation and historic elements that give character to the building but require special expertise.

The above literature points out three main points:

1. Sustainability should be the main guide for both disaster recovery and historic preservation; however, no systematic investigation has been done to investigate that aspect (figure 1).
2. Time for recovery is an indicator of successful recovery; however, historic buildings seem to take longer time to recover. Also, no systematic investigation has been done to investigate that.
3. Community participation, and the maintaining of historic character and integrity of fabric, are pointed out to be important issues of the sustainable disaster recovery and sustainable heritage management, however, there are no systematic investigations of these aspects within the framework of recovery and historic preservation at the same time.

CHAPTER III

RESEARCH OBJECTIVES AND METHODS

Objective, Hypothesis and Operational Questions

The objective of this study is to investigate the sustainability of long-term recovery of public and NGO owned historic buildings after an earthquake. The study explores the difference between historic and non-historic buildings in their time needs, and then investigates the dynamics of the recovery for delayed historic buildings in the light of recommendation for sustainability, focusing on community participation and maintaining of historic character. The study identifies the variables that affected the recovery in order to guide future pre- and post-incident recovery planning for historic buildings.

In consequence, the study investigates the following questions and hypotheses:

1) **Did the recovery of historic buildings require more time than non-historic buildings? If so, what were the historic buildings that required more time?**
    a) **Time required for recovery of historic buildings is longer than time required for recovery of non-historic buildings.**

    This hypothesis is based on the above literature (Merritt, 1990; Kariotis et al., 1991; Nelson, 1991; Mader, 1994; Eichenfield, 1996; Schwab et al., 1998; Spennemann and Look, 1998), which indicates that historic buildings face extra issues due to their special nature.

    b) **Time of recovery for buildings, both historic and non-historic, will vary according to the importance of their functions to restoring normal life back in the city.**
        a. **Emergency Functions, such as fire stations and health care, will be the first to recover.**
        b. **Art facilities such as museums and theaters will be among the last.**

This hypothesis is based on the above literature (Seismic Safety Commission, 1991) on time recommendations that indicate that the seismic performance of buildings is based on their function. Certain functions usually have priority for recovery as they perform critical services that are needed in emergencies (Schwab et al., 1998). Nonetheless, residential buildings are also assumed to be among the early buildings to recover (Wu and Lindell, 2004).

2) **For buildings that faced delays, what are the variables that affected the recovery? What were the dynamics of the process?**
    a) **The variables affecting the process will be mainly related to the historic status of the building.**

    This hypothesis builds on the findings of the previous questions and investigates the process and its dynamics for chosen delayed buildings.

3) **How did the key issues of sustainable recovery for historic buildings play in the recovery period, specifically in regard to historic character and community participation? And how can the recovery of historic buildings be more sustainable?**
    a) **Historic character and public participation are two principles that are built in the existing laws and process and need improvement.**

    These questions and hypothesis are based on the literature mentioned above which identified the issues of participation and historic character as critical to the preservation and recovery of historic buildings (Fielden, 1987; Merritt, 1990; Nelson, 1991; Mader, 1994; Look, Wong and Augustus, 1997; Schwab et al.,1998; Spennemann and Look, 1998; NHRAIC, 2001; Hague and Jenkins, 2005).

General Research Design

Since the objective of this research is to investigate the sustainability of recovery in regard to specific variables, the inquiry is mainly about a process. As such, the focus of the analysis will be on the dynamics of the process and its outcome. This leads to conducting investigation using two methods. The first method uses statistical analysis of

a few variables on a large number of cases to identify broad patterns in the data. The second method carefully examines three cases to understand why the broad patterns emerged. Case studies are helpful in that goal, as they can use different analysis approaches (Yin, 2003). The combination of methods is intended to help the study as the investigation proceeds. This has a developmental purpose, with the first phase used to inform the second (Creswell, 1994).

Yin points out that the use of case study methods is needed when the research aims at investigating a "contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 2003). He points out that it is for situations when the study is inquiring about the "why" or "how" of a situation over which the researcher has little or no control. This principle applies to this inquiry. The contemporary phenomenon is earthquake recovery process. That process is part of a context that, as yet, cannot be isolated for study purposes. Also, the investigator has no control over the events, thus the case study approach would be most suitable.

The case study for this investigation is San Francisco recovery after the 1989 earthquake, which had its epicenter in Loma Prieta. The earthquake struck on October 17, 1989 at 5:04 p.m. leaving 62 people killed, 3757 injured and a total of $5 to $7 billion in direct costs (California Seismic Safety Commission, 1991). The 1989 Loma Prieta earthquake was the largest earthquake to strike California since 1952 and the most devastating to hit the San Francisco Bay Area since 1906 (Tierney, 1994).

San Francisco was selected since it has many buildings of historic and architectural significance. According to the Planning Department, there are more than 10,000 historic buildings and buildings of architectural significance in the city (San Francisco Planning Department Help Desk, Personal communication, July 2003). Also, the 1989 earthquake initiated research in emergency management for historic buildings that provided a good background material for this research. The geographic context of the city, being semi-isolated, helps in defining the boundaries of the study. The relative

proximity of the site, as an example for an earthquake-affected city, was also a variable in the choice.

The investigation of the case study was done through two field visits:

1. The first field visit was done in the summer of 2003 for two weeks. The objective was to investigate the possible data sources and provide background investigation of the city and the recovery process. The primary data sources were identified as: 1) FEMA, which provided a copy in digital format of the data they had about buildings' recovery funding after Loma Prieta (discussed below). They also had hardcopy files for all correspondence for each building, to be requested later in the research. 2) The City of San Francisco's public access computer available in the Planning Department, which contained Assessors' data about buildings in the city, in addition to planning and building permit data. This database contained most of the data about the individual buildings. 3) The SHPO had files containing all correspondence about the historic buildings regarding Section 106 process, thus providing an additional source, even though FEMA files would contain the same information. That field visit resulted with some of the data for Phase I and II.

2. A second field visit was done in the spring of 2005 and lasted for about three months. This visit was intended to provide more data for the analysis. However, several changes had happened within the previous two years that had a negative impact on the study:

a. All data about public buildings in the public access database was removed. This was a decision done in relation to the 9/11 terrorist attacks. Since the intended service in the department is for private property owners, this data about public buildings was not relevant to them.

b. FEMA became part of the Department of Homeland Security, which subjected it to new regulations and thus, they were no longer subject to the Freedom of Information Act. The data files that FEMA had, which are significant sources of information about the dynamics of the recovery process, are no longer available for researchers. It is only possible to obtain such data with special permit, which also

requires the researcher to pay for the photocopies and the time spent in preparing the copies. This amounted for hundreds of dollars for each case study, which was not practical for this study.

c. The same FEMA files should be available with the City or State, as applicants. But neither had access to their files. In both cases the reply was that the files have been moved to deep storage and no one knew how to find them.

Therefore, this study had to use other sources of data, which are discussed below under each phase. Most data collection was done in the field through street walks and site visits to buildings, visits to the SHPO's offices, the Planning Department, and City Hall.

CHAPTER IV

PHASE I

This phase uses statistical methods to determine whether historic buildings needed more time than non-historic buildings to recover, and if the function of building has an effect on the needed time.

Data Sources

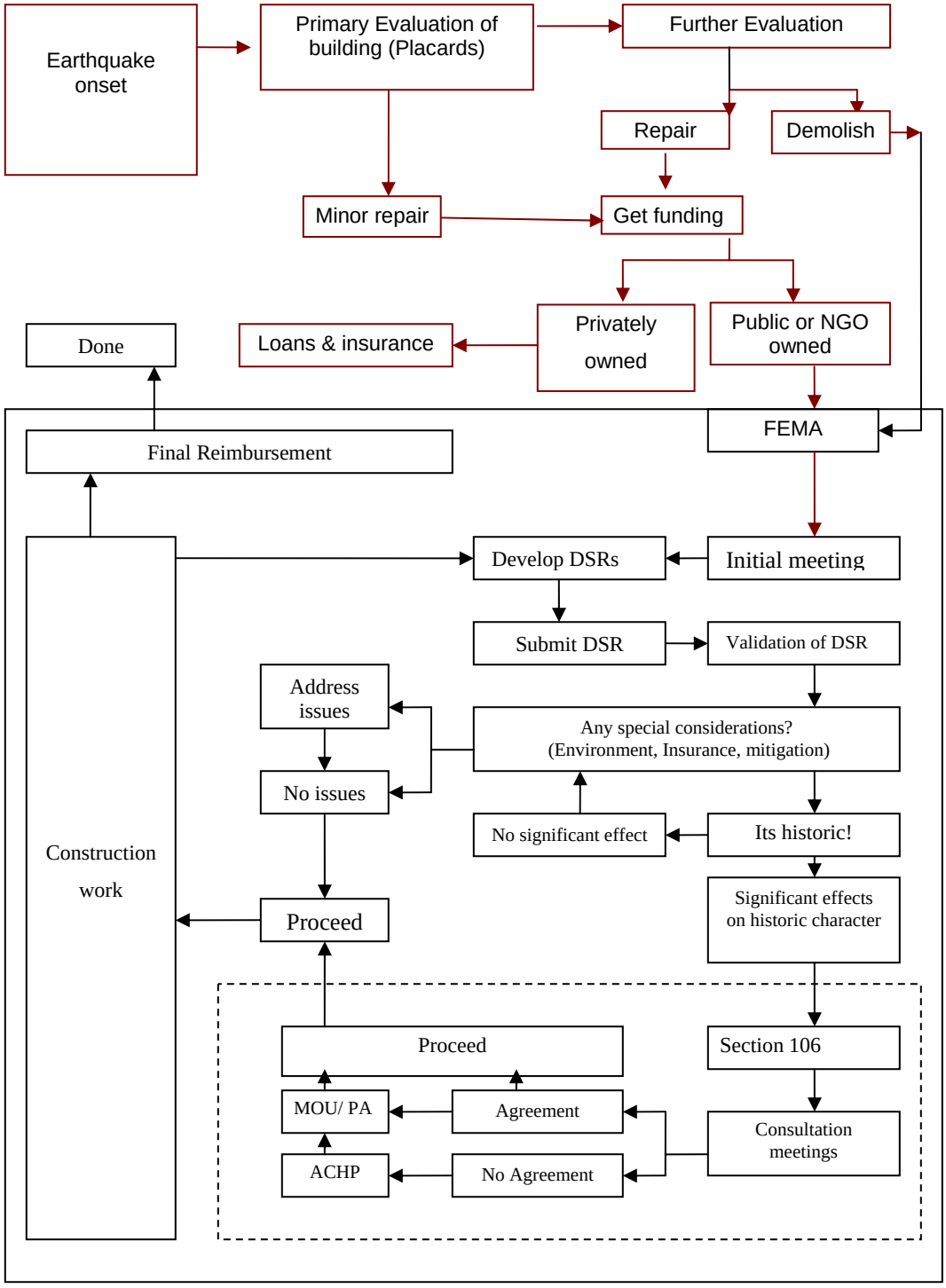
The main source of the data was the database that FEMA developed for the Loma Prieta records. The database has all public and NGO-owned buildings in San Francisco that obtained funding for recovery after the earthquake. Once an eligible applicant submitted an application, they were led through a process of evaluating the damage, and assessing its eligibility (figure 2). This resulted in a Damage Survey Report (DSR), which contained detailed information of the damage assessment and the required repairs and their cost. Such DSRs were then filed in a computer database. Not all of the information from the original DSR was obtained, as it contained sheets of repair calculations and detailed cost estimates. The data that was obtained form FEMA contains lists of the worksite number, DSR number, Date of DSR, name of applicant, name of building, location of building (mail address), short description of repairs approved, cost, and comments about the application (i.e if the building is historic), other related DSRs, or requirements for the owner to get the approved monies. Each project would normally have two DSRs, the first one at time of first application, the second at the time of closing out. Sometimes the project would have one DSR, when it was small and the applicant had finished most of the work by the time of application. If the project takes a long time, though, the project (worksite) would have many DSRs, documenting any changes in cost, repairs scope, new approvals or additions. The database can be assumed to contain the entire population of public and NGO buildings in San Francisco, as FEMA is the major source of recovery funding. This database does not have

information on age of building, floor area, or construction. These variables were obtained mainly from records in the Department of Planning and the Department of Building Inspection in the City of San Francisco, in addition to other sources discussed below.

The raw data is organized by DSR, so a new list was created that was organized by project, or worksite[5]. As such, all DSRs for each worksite were combined. The first and last dates and the total cost were identified for each. Many DSRs and worksites were not related to this research, such as sewer lines, open parks, sidewalks, roads, and so on. Such worksites were deleted from the analysis list. Also removed were DSRs identifying costs that are not related to architecture, such as professional services or costs of food supplies, gas, communication, transportation, etc.

Most worksites had only one building, but some contained several small buildings. Buildings on campuses were given different worksite numbers and thus they were treated as separate worksites. If a worksite contained a minimum of one historic building, it was labeled historic since it would have to go through Section 106 process (see Appendix A).

Figure 2 Simplified FEMA application process for a typical project.



Sample

The data taken from FEMA represent the entire population of public and NGO buildings that received funding after Loma Prieta. Simple random sampling was used to generate two main groups: historic and non-historic. Random numbers were generated using Excel. The number of worksites in the population frame was 562, and the number of non-historic worksites in the population frame was 429 (see table 1). Since the two groups are not equal, around 80% of historic buildings were chosen as a sample, while about 50% of non-historic buildings were chosen. The total number of projects in the sample was 318.

To keep the proportion of building functions in the sample similar to that in the population, a stratified sample was used for both historic and non-historic projects. A simple random sample was taken from each stratum.

Table 1 Research design

Total population for all worksites				562
	Historic		**Non-historic**	
Total population	133		429	
Sample # (%)	107 (80.5%)		211 (49.2%)	
Functions	**Sample**	**Population**	**Sample**	**Population**
- College	14 (82.3%)	17	40 (50.6%)	79
- Cultural	31 (81.6%)	38	32 (47.7%)	67
- Emergency	8 (80%)	10	21 (50.0%)	42
- Health	8 (80%)	10	11 (50%)	22
- Multi	11 (78.6%)	14	15 (50%)	30
- Office	7 (77.7 %)	9	20 (51.2%)	39
- Residential	12 (80%)	15	37 (49.3%)	75
- Infrastructure	16 (80%)	20	35 (50.7%)	69

Measures

FEMA records do not contain complete information on when a building became usable again. This information was not available from any single source as it is not clearly documented. FEMA data show the time span that was needed for a project to finish the funding process. For some projects, that is when the building was usable again. For others it was less, as the project needed further work afterwards. Usually, the last portion of the funding is given after the last of the approved repairs has been done, unless there is an alternative project[6]. As such, the FEMA data is used as an indicator of recovery. Since obtaining funding is the initial phase of recovery (see figure 2), it is assumed that the time needed to finish the funding process is indicator of the overall time needed for recovery. The more time needed to obtain the funding, the more time needed for recovery.

Dependent Variable

Time to recovery is a continuous variable that was measured as the number of days needed to finish the FEMA process and obtain the funding. The time variable should not be understood as the time needed to finish the repairs but rather as the time needed to obtain all funding, which sometimes corresponds to the time needed for construction, but not always. This variable does indicate the complexity and the issues that faced the recovery of the building, as FEMA funding an essential phase for public and NGO buildings.

Independent Variables

There were two independent variables:

- Function is a nominal categorical variable defined by the planned use of the building after the earthquake. It identifies the use intended for the building as described in the FEMA database. The number of categories was derived based on the literature review above. The functions that the literature identified were

established first, then other similar functions were collapsed with it in order to limit the number of categories. As such, eight functions were identified:

1. Infrastructure: includes water plants, sewage plants, power plants, bus stations, warehouses, piers, the airport, subways, etc.
2. School: contains all educational uses such as university, college, K-12 school, and daycare centers.
3. Residential: all apartment buildings, dormitories, hotels, and public housing projects.
4. Offices.
5. Multi-use: any worksite that has more than one use.
6. Health: includes hospitals, clinics, health centers, drug abuse centers, etc.
7. Emergency: police and fire stations.
8. Cultural: museums, recreation centers, community centers, pools, theaters, libraries, and any building housing functions that serves the community in any social or cultural way and does not fall under the seven function categories identified above. This contained the largest group of buildings. It is important to note that none of the categories contain religious buildings, as they are not eligible for repair funding, however, there are buildings owned by religious organizations that are used for schools, community centers, or other uses.

- Status of building is a dichotomous variable, 1) historic, 2) non-historic. This was identified based on information within the database taken from FEMA[7] . All buildings that underwent the Section 106 review were identified as historic, the rest were identified as non-historic.

Control Variables

The analysis was statistically controlled for building construction type, floor area, and damage level. The analysis of historic buildings was controlled for age of building.

- The floor area is the total square foot area of all floors of the buildings. It was difficult to obtain and presented many limitations. The floor area of a building is important as it affects the cost and time for any repair project. Large projects would naturally have higher cost and longer time, thus, any comparison would not be informative unless it was controlled for area. FEMA database did not have the floor area of buildings, and the City of San Francisco did not have all the square foot area needed, as most public buildings are not on their database. Thus, the data were taken from several sources (table 2):

A. The database in the City Assessor's office had floor area mainly for private property. However, it contained some information on buildings owned by NGOs and some publicly owned buildings.
B. When the floor area of the building was not found in the Assessors data, the Sanborn map for that block was obtained (from the Department of Planning database) and the area was calculated based on measurements from that map multiplied by the number of floors.
C. When the Sanborn maps were not available, the area was calculated from aerial photos of the site printed from the web GIS of San Francisco. Such aerial photos did not include information on the number of floors for the building, so the site was visited to identify the number of floors. This, clearly, has many limitations.
D. For buildings that are of complicated nature, such as theaters, the opera house, and museums, a web search was done for the official websites of such buildings and for pages of professionals who worked on the project, and in some cases the total floor area was found on such pages. For most such buildings, however, no floor area was available unless it was historic.
E. Some buildings, such as some libraries, some public housing units, and some public hospitals, had floor area data available on the internet. This was used if the information was on the webpage of a public agency responsible for managing the building.

The accuracy of such different sources is variable. For example, the accuracy of measurement from aerial photos is limited, as the scale is in miles and the resolution is relatively low. Similar limitations appeared when measuring from the Sanborn maps since they were printed from the city's Planning Department public access computer. The originals were scanned into the computer and the scales were wavy in many of the print-outs, in addition to their small scale.

There were many cases that remained without the floor areas. This occurred when no Sanborn map was found and the aerial photo was not helpful due to lack of clarity. Or when the address was not found, the address in now empty, the building was changed, a visit to the site was not possible due to location issues or time shortages, or the building plan was too complicated and a measure of the area was not possible. Also, it is possible that some buildings had expanded thus making the available data in the databases not representative of the situation that existed during the recovery period. But since the study period is a total of 10-11 years, it is not expected that many building have undergone enlargements within the past four years. So, it is assumed that any changes that took place are not significant or that they are minimal.

Table 2 Distribution of sources of data.

		Asses-sors'	Planning Survey	Sanborn Maps	Aerial Photo	Website	FEMA
Historic	Area	29.2%	-	20.8%	40.6%	9.4%	-
	Construction	42%	-	-	-	-	58%
	Age	37.8%	12.2%	5.6%	-	44.4%	-
None Historic	Area	21%	-	29.3%	49.7%	-	-
	Construction	52.7%	-	-	-	-	47.3%
	Age	69.6%	-	8.7%	-	21.7%	-

- Damage level was measured as a categorical variable based on the damage description available in the FEMA database. Three main levels of damage were generated from damage description on the FEMA DSRs.

There are different studies investigating seismic damages of historic buildings after earthquake (cf. Fielden, 1987; 1994; Croci, 1998). For Loma Prieta, damage patterns were investigated through several publications (cf. Kariotis et al., 1991, Look, 1991; Lew, 1990) providing overview and general conclusions on the patterns of damage.

According to ARG (1990), 363 buildings were tagged in San Francisco. The accessibility status of a building (green, yellow, or red tags) changed with time. Communications with the San Francisco Department of Building Inspection revealed that they lost the complete list of yellow-tagged buildings, but they provided a list of red-tagged buildings that contained 50 buildings. Checking the list against building permits showed that it was a list of demolished buildings only. Other resources have reported more than 200 buildings being red-tagged in San Francisco (Fratessa, 1994), which indicates that the list of red-tagged buildings is lost too. Therefore, this research had to develop its own scale for damage level measurement. Based on the damage description in the FEMA data, three main categories were identified:

1. Minor damage: damage only to non-structural elements (plaster cracks, damage in windows, doors, parapets, etc.).
2. Medium damage: damage to structural elements (cracks in beams, walls, and columns). Also damage to contents of buildings when mentioned, such as replacement of tens of book shelves, furniture, and tools.
3. Significant damage: damage explicitly described as significant, major, severe, considerable, serious, or that the building was red-tagged. Damage of structural elements with very large area or length (cracks in beams, walls, and ceilings, each of several hundred feet or square feet in addition to damages in non-structural elements). In addition to severe damages in contents requiring replacement or repair of large amounts of items such as thousands of

damaged books, hundreds of book shelves, furniture, machinery, tools and so on.

There were buildings with damage levels that could be either 1 or 2, but were not described in sufficient details to make a categorization. Such a damage level was identified as 1.5. Similarly, damage levels that are either 2 or 3 were given 2.5. These two levels are not intermediate level of damage, but are levels of damage that can be either category. When the damage level was completely unclear, this variable was left missing.

- Construction type was taken directly from the Assessor's database in the City of San Francisco. This variable was measured by the city in four categories:

  A. Structural steel-fire proofed.

  B. Reinforced concrete- fire resistant.

  C. Masonry or concrete.

  D. Wood frame.

  E. Multiple construction. This is an additional category that the researcher added to include some worksites that had multiple construction methods, such as piers, which had reinforced concrete platforms and steel sheds.

This variable was initially missing for most of the buildings, so the FEMA database was used as a source through their description of damage as it sometimes reflected the type of construction. This reduced the percentage of missing data to 14.8%- see table 3.

- Age of buildings was defined as the age of the building at the time of the earthquake (1989-year of construction). The year of construction for buildings was obtained from the City Assessor's database. The database did not have such information for all buildings, and it contained an error as most buildings were given 1900 as a date of construction. Consequently, the internet was searched to obtain information for most of the historic buildings. Similar data were not available for non-historic buildings. This resulted in a lot of missing data regarding age of building among non-historic buildings in particular. Therefore,

since this variable is important mainly for historic buildings, it was only used in the analysis of historic buildings.

Table 3 Missing data.

VARIABLE	MISSING DATA (%)	HISTORIC	NON-HISTORIC
Damage level	6 (1.9%)	2 (1.9%)	6 (2.8%)
Construction type	47 (14.8%)	7 (6.5%)	40 (19%)
Floor area	41 (12.9%)	11 (10.3%)	30 (14.2%)
Age	129 (40.6%)	17 (15.9%)	112 (53%)

Procedure

Once all the data was obtained from the different sources, they were added to the projects table. As explained above, a list of projects (worksites) was created from the original FEMA database. Also, to that table were added the new variables: construction type, floor area, damage level, function, and status. The new table was organized to contain: project number (worksite number), address (mailing), name of project (as taken from FEMA database), recovery time (in days), floor area (square foot), function, status, construction type, cost, building age, and damage level.

The status of building was coded as (1) for historic, and (2) for non-historic. The functions received codes 1 to 8, representing infrastructure (1), school (2), residential (3), offices (4), multi-use (5), health (6), emergency (7), and cultural (8). The damage level was coded (1) to (5), with (1) being the least damaged and (5) being the most damaged. The construction type was coded so that structural steel was (1), reinforced concrete (2), masonry or concrete (3), wood frame (4), and multiple construction as (5). All missing data were left as empty cells. This list was used for hypothesis testing.

Another table was developed to facilitate analysis of correlations. Each of the categorical variables was expanded to several variables. So, “status” was replaced by

two variables, historic status, coded (1) for historic and (0) for non-historic, and non-historic status, coded (1) for non-historic and (0) for historic. All the construction types and functions were coded so that each became a 0/1 variable. This allowed for a correlation table to be developed. All tables were created in Microsoft Excel and then moved to the Statistical Package for Social Sciences (SPSS) for analysis.

Analysis

First, the data were explored through a table containing simple correlations among all variables. The table used Spearman's rho and Peterson correlations to investigate the possible relations among all the variables. This helped in identifying the specific variables that will be explored in the hypothesis and helped in understanding the relationships between all variables.

1) **Did the recovery of historic buildings require more time than non-historic buildings? If so, what were the historic buildings that required more time?**
    b) **Time required for recovery of historic buildings is longer than time required for recovery of non-historic buildings.**

    The analysis of this hypothesis used a simple random sample from the population of public and NGO owned historic and non-historic buildings that obtained FEMA funding. The analysis used t-test for comparing means, without taking into account any confounding variables. The t-test provided a direct comparison of the means of the two groups.

    c) **Time of recovery for buildings, both historic and non-historic, will vary according to the importance of their functions to restoring normal life back in the city.**
        a. **Emergency Functions, such as fire stations and health care, will be the first to recover.**
        b. **Art facilities such as museums and theaters will be among the last.**

The analysis of this hypothesis used the same sample of projects above. The analysis used ANOVA tests for multiple comparisons of means to see if the means for all functions are equal. Then, for ranking the functions according to their mean, post hoc tests were used (Least Significant Difference and Scheffe tests).

Then a factorial model was used, in order to take the effect of other variables into account. It allowed for statistical control of the covariates. The model allowed for testing the effects of the covariates on the time needed for recovery.

Results

The correlation table (table 4) suggested several relationships between variables. The table shows that:

1. Unsurprisingly, historic buildings tend to be older; also, most cultural buildings are older (mainly since most of them are historic). Health care facilities are newer, so are residential buildings. Also, the table shows that older buildings have smaller area.
2. Most construction materials do not have a significant correlation to damage, except wood frame, which is negatively correlated to damage, and reinforced concrete, which is positively correlated to damage. The last point was surprising as it is against what is known of reinforced concrete seismic behavior. It could be explained in the way damage assessment was made and its relation to area. The damage assessment, which was based on the damage description in the FEMA database, took into consideration both the area of damage and the damage to the contents of the buildings. Since, as shown by the correlation table, the area is positively correlated to damage and most reinforced concrete buildings have large area, then there would be a positive correlation of reinforced concrete to damage. This is may be because the correlation is not controlled for area. Similarly, most wood frame buildings

have less area, probably due to the fact that they are mostly residential. This would also affect the correlation and may be the reason for having a negative correlation to damage. However, sine wood frame construction is also negatively correlated to cost and time, this leads to affirming that it is negatively correlated to damage.

3. Most functions do not have a significant relationship to damage. However, infrastructure, offices, and colleges have positive correlation to damage. That may be due to the effect of area, both offices and infrastructure facilities have larger areas. College (which includes all schools and educational facilities), however, have less area but contain furniture elements which could have increased the damage level.
4. Status of buildings, as historic, has a significant positive correlation to time, cost, and damage level.
5. Time, cost, and damage have a highly significant positive correlation with each other.
6. Construction materials have a significant effect on cost, except for masonry and concrete buildings. However, the same construction types have significant correlations to area, thus the correlation could be an effect of the area variable.
7. Floor area is has a significant correlation to damage level and cost, but not to time according to the Spearman rank order correlation (rho).
8. Some interesting findings of the table are that there is a significant negative correlation of wood frame construction with damage, time, and cost. Also, multi-construction, which is mostly infrastructure, is positively correlated to cost, and time. This also may be a result of infrastructure having larger area, mainly because piers had large areas.

Table 4 Simple correlation table. Pearson's correlation at the bottom left corner and Spearman's rho at the upper right.

		N	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	Building's age	189	55.05	26.34	1.00	0.03	-0.04	0.22**	-0.20**	-0.02	-0.22**	0.48**	-0.01	-0.17*	-0.04	0.12	-0.16*	0.04	0.24**	-0.06	0.08	0.13	0.13
2	Multi-construction	21	2408	1241.9	0.08	1.00	-0.18**	-0.17**	-0.17**	-0.10	0.28**	0.21**	0.52**	-0.13*	-0.08	0.06	-0.08	-0.09	-0.15*	-0.11	0.10	0.25**	0.34**
3	Wood Frame	77	350	749.7	-0.04	-0.18**	1.00	-0.38**	-0.38**	-0.22**	-0.38**	-0.04	-0.25**	0.26**	-0.11	-0.13*	0.00	-0.04	0.18**	0.02	-0.36**	-0.39**	-0.25**
4	Masonry or Conc.	71	637	1103.1	0.17*	-0.17**	-0.38**	1.00	-0.36**	-0.21**	-0.13	0.08	-0.17**	0.01	0.10	0.12*	-0.02	0.03	-0.04	0.04	0.09	0.01	-0.05
5	R. concrete	72	1002	1327.4	-0.17*	-0.17**	-0.38**	-0.36**	1.00	-0.21**	0.25**	-0.17**	0.03	-0.13*	0.10	-0.09	0.14*	0.09	-0.13*	0.08	0.21**	0.13*	0.05
6	Structural Steel	30	1088	1366.6	-0.02	-0.10	-0.22**	-0.21**	-0.21**	1.00	0.14*	0.00	0.11	-0.09	-0.05	0.10	-0.09	-0.04	0.11	-0.10	0.02	0.16**	0.07
7	Area (ft.sqr.)	277	162240.93	1435775.04	0.07	0.00	-0.06	-0.05	0.14*	-0.02	1.00	0.10	0.25**	-0.06	0.09	0.20**	-0.02	-0.28**	-0.15*	-0.01	0.40**	0.46**	0.28**
8	Historic	107	1428	143.6	0.55**	0.21**	-0.04	0.08	-0.17**	0.00	-0.03	1.00	-0.02	-0.08	-0.05	0.05	0.05	-0.04	0.16**	-0.07	0.24**	0.34**	0.36**
9	Infrastructure	51	396	821.6	0.02	0.52	-0.25	-0.17	0.03	0.11	-0.01	-0.02	1.00	-0.19	-0.13	-0.13	-0.11	-0.14	-0.22	-0.20	0.12	0.21	0.23
10	Residential	49	439	351.7	-0.22	-0.13	0.26	0.01	-0.13	-0.09	-0.04	-0.08	-0.19	1.00	-0.13	-0.13	-0.11	-0.14	-0.21	-0.19	-0.09	-0.21	-0.34
11	Office	27	887	1316.6	-0.05	-0.08	-0.11	0.10	0.10	-0.05	-0.20	-0.05	-0.13	-0.13	1.00	-0.09	-0.08	-0.10	-0.15	-0.14	0.16	0.05	0.03
12	Multi-use	26	1390	1668.95	0.06	0.06	-0.13	0.12	-0.09	0.10	0.00	0.05	-0.13	-0.13	-0.09	1.00	-0.08	-0.09	-0.15	-0.13	0.11	0.13	0.06
13	Health	19	818	1160.5	-0.14	-0.08	0.00	-0.02	0.14	-0.09	-0.01	0.05	-0.11	-0.11	-0.08	-0.08	1.00	-0.08	-0.13	-0.11	0.04	0.02	-0.01
14	Emergency	29	177	478.58	0.05	-0.09	-0.04	0.03	0.09	-0.04	-0.03	-0.04	-0.14	-0.14	-0.10	-0.09	-0.08	1.00	-0.16	-0.14	-0.10	-0.07	0.16
15	Cultural	63	1533	1437.9	0.29	-0.15	0.18	-0.04	-0.13	0.11	-0.04	0.16	-0.22	-0.21	-0.15	-0.15	-0.13	-0.16	1.00	-0.22	-0.04	0.00	0.07
16	College	54	804	1241	-0.05	-0.11	0.02	0.04	0.08	-0.10	-0.03	-0.07	-0.20	-0.19	-0.14	-0.13	-0.11	-0.14	-0.22	1.00	-0.12	-0.08	-0.16
17	Damage	310	2.50	1.36	0.10	0.10	-0.36	0.09	0.20	0.02	-0.04	0.25	0.13	-0.10	0.17	0.10	0.02	-0.11	-0.04	-0.11	1.00	0.64	0.43
18	Cost ($)	318	373476.82	1679687.76	0.16	0.23	-0.38	0.00	0.12	0.17	-0.02	0.36	0.19	-0.22	0.06	0.15	0.03	-0.08	0.00	-0.10	0.66	1.00	0.63
19	Time (days)	318	775.96	1195.36	0.17	0.35	-0.26	-0.04	0.04	0.07	-0.04	0.35	0.24	-0.32	0.03	0.06	-0.02	0.14	0.05	-0.15	0.46	0.64	1.00

Note: Sample sizes are from 189 to 318 depending on missing data. * p< .05 ** p< .01; Cost and time variables transformed twice

It is important to note that damage levels and construction materials were estimated based on descriptions in the FEMA database, so any bias in the description is passed to the assessment. The construction materials, in particular, is prone to bias as it is based on the damage description, thus non damaged elements were not motioned. This may affect the categorization of building construction type due to lack of sufficient data. Still, the findings of the correlation table indicate that in the most part, the data is indicating recovery behavior, which needs to be controlled for some variables. The hypothesis testing below investigated that aspect.

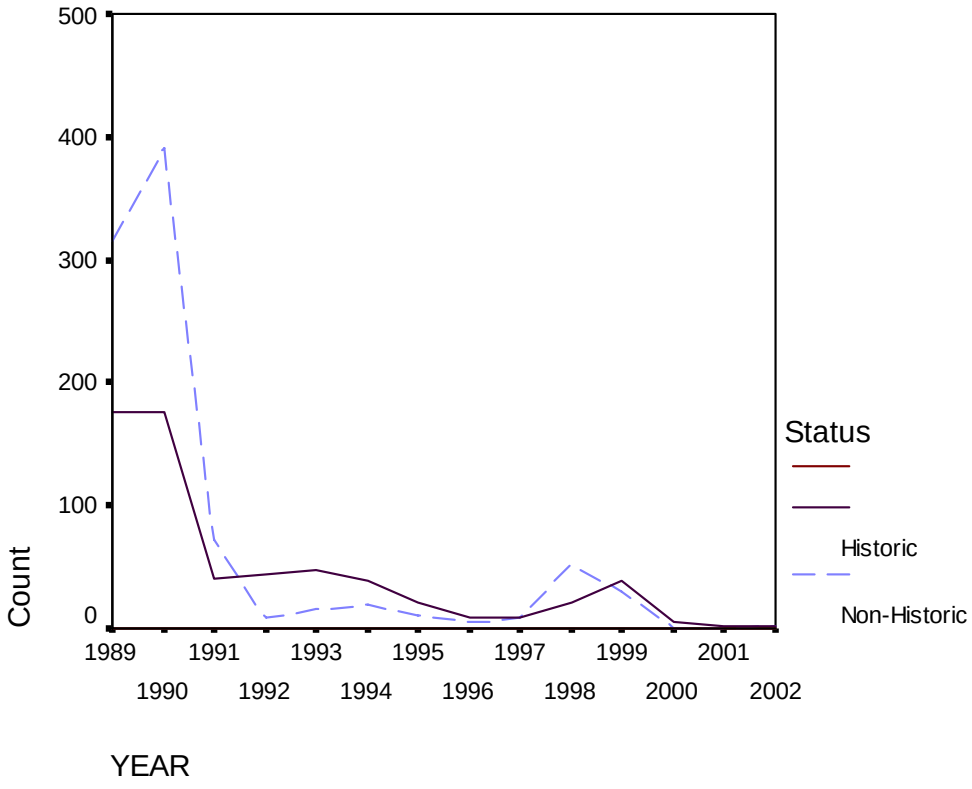
Figure (3) shows the timeline of recovery, the lines represent the count of DSRs in each year. The timeline shows how historic buildings were less progressing compared to non-historic buildings. By 1990, only 50% of the DSRs for historic buildings were done, while 75% of the DSRs for non-historic buildings were completed. Historic buildings are not 75% completed until 1993, three years after non-historic buildings. Historic buildings' DSRs catch up with non-historic buildings by 1997, where historic DSRs are 83.3% done, and non-historic DSRs are 88.5 done.

The peaks on the graph correspond to deadlines by FEMA. The first deadline (April 1990) was for emergency work. Next, effort progressed on permanent repair work. Finally there was a push for finishing all projects by 1999 (email, David Gardener, FEMA, 2003). Only five projects remained after 1999, and all were historic. The timeline is for funding progress, thus it should only be considered an indicator of the progress of recovery. Yet, it is an important indicator as funding is a major part of the recovery process for public buildings.

Comparing the timeline to those shown by Wu and Lindell (2004: figures 1 and 2). Their study shows timelines for private housing recovery based on building permits in two earthquakes, 1994 Northridge in Los Angeles and 1999 Chichi in Taichung. The Chichi timeline shows a shallow curve while the Northridge time line, like that of Loma Prieta, shows a high peak during the first two years after the earthquake. Although the Wu and Lindell graphs are for a different kind of buildings (i.e. private housing), it is

interesting that both timelines show more work done at the early stages of the recovery. This is different from the recovery timeline for the Chichi earthquake where work was distributed over the entire recovery period. Wu and Lindell point out that pre-earthquake planning had an effect on the fast progress of recovery work. This suggests that, for the timeline of historic buildings vs non-historic, changes to improve the speed of recovery require pre-earthquake planning, so that most of the recovery work can be done in the early two years after the incident. The timeline of historic buildings indicate more work after 1990 (figure 3).

Figure 3 Timeline of recovery DSRs for all projects in San Francisco**.**



A variable that may have affected the recovery process in general is the economic context. Eadie (1998) points out that the Loma Prieta recovery of Watsonville and Santa Cruz was delayed due to the economic recession in California and local market factors. San Francisco was affected by a national recession from 1989 until around 1994 that would have affected the recovery process. The economy started improving around 1994 and it reached its height in 2000 (San Francisco Government, 2004). This could help in explaining the slow progress of recovery work in the mid 1990s, however, the timeline is mainly for public buildings and the effects of market factors would be limited as their funding came mostly from FEMA in addition to public bonds.

An interesting comparison of the timeline is with the timeline suggested by Haas et al., (1978) which shows four main stages of recovery as consecutive. Emergency work is followed by restoration work, then reconstruction and finally commemorative work. Although their graph showed four peaks, the timeline for this study indicates that the process of recovery has some of these stages overlapping. Figures (4) and (5) show the timeline for non-historic and historic buildings respectively. They are coded to represent the category of work as indicated by FEMA (FEMA 323) categorization system.

A. Emergency work (debris removal and immediate threats to life).
B. Emergency protective measures and permanent restorations (taking measures to protect lives or repair facilities in general).
C. Road systems (road and pavements repair and replacement).
D. Water control facilities (levees, dams, channels, natural streams, and other water works).
E. Buildings and Equipment (restoration work to pre-earthquake design according to certain criteria and some types of equipment).
F. Utilities (electrical and sewer systems).
G. Parks, recreation, and other (beaches, grass, trees, and park contents).

The graphs show that the emergency functions (categories A, B) were finished within the first two years, but the applications for permanent work started at the same

time (1989) and continued until 1999, with few exceptions. This shows that for public and NGO buildings, the restoration phase does not come after the emergency phase, but coincides with it and continues after it. The timeline of this study does not show any of the work in the commemorative phase, as that would not be funded by FEMA. The timelines show three peaks:

1. The first peak is for emergency and repair applications and work.
2. The second peak in figure (4) is mainly related to one project that had several DSRs. However, in figure (5) there are several projects that are part of the second peak and they are delayed repairs, which supports the hypothesis that historic status affects time needs for recovery.
3. The third peak is all reimbursement DSRs for projects that started earlier. Those three peaks should not be confused with the peaks that Haas et al. (1978) talks about, as all of these peaks in figures (4) and (5) are repair and emergency work only, but Haas et al.'s four peaks contain reconstruction and commemorative work. These peaks correspond to FEMA deadlines, and the last two peaks represent DSR submissions for ongoing repair work. The graphs indicate that the repair phase continues for up to 10 years after the earthquake, even if only as paperwork and submissions.

Figure 4 Timeline of recovery by work category for non-historic buildings.

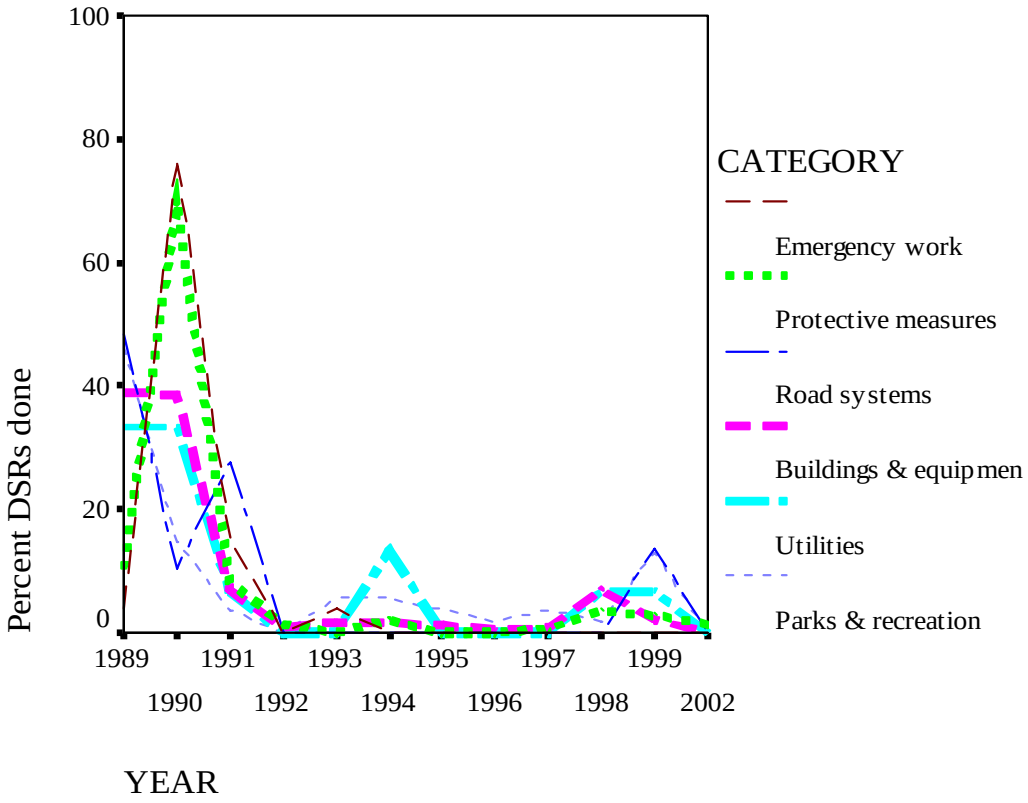
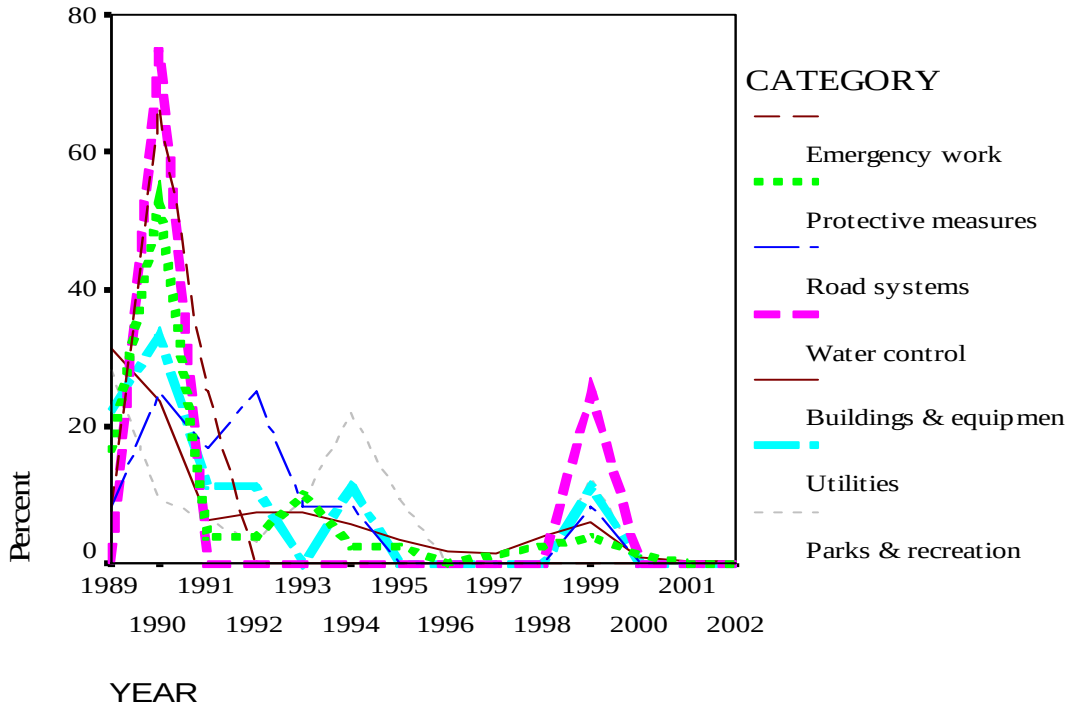


Figure 5 Timeline of recovery by work category for historic buildings.



The analysis above supports the choice of the variables that are examined in the hypotheses. The results below further explore the relationships between the variables statistically.

Hypotheses Testing

1. **Time required for recovery of historic buildings is longer than time required for recovery of non-historic buildings.**

   There were 107 historic and 211 non-historic projects. The distribution of time data (in days), was tested and found to be not normally distributed (positively skewed). A logarithmic transformation (log 10) improved the Q-Q plot but the Shapiro-Wilk test and the Kolmogorov-Smirnov test yielded p=.000 and p=.000 for all historic and non-historic projects. Thus the data was transformed again using the

same logarithmic transformation. After the second transformation the normal Q-Q plot showed significant improvement, but many outliers still affected the normality test. The Shapiro-Wilk test yielded p=.003 and p=.000, but the Kolmogorov-Smirnov test yielded p=.012 and p=.000, for non-historic and historic respectively (df=318). Since the Q-Q plot showed an acceptably normal distribution, the results are considered to be acceptable for the use of the t-test (Newton and Rudestam, 1999).

Testing for the equality of variance suggested that it is homogeneous, Levene's test for equality of variance was F= 1.87, p=0.171. The comparison of the two means was done using a one-tailed t-test, t_{316} (7.20), p=.000. Thus, the null hypothesis was rejected. This result indicates that, within a 95% confidence interval, the mean time needed for historic buildings (M= 1428.70 days) is larger than the mean for time needed for non-historic buildings (M= 454.18 days).

This does not take into account covariates such as construction type, building area, or damage, which will be taken into account below.

Since the raw data do not satisfy the normality or homoscedasticity conditions. A nonparametric test was done. The two-sample Kolmogorov-Smirnov test gave p=.000, which also rejects the null hypothesis and supports the hypothesis that funding time for historic buildings is larger than funding time for non-historic building.

4. **Time of recovery for buildings, both historic and non-historic, will vary according to the importance of their functions to restoring normal life back in the city.**
    a) **Emergency Functions, such as fire stations and health care , will be the first to recover.**
    b) **Art facilities such as museums and theaters will be among the last.**

The hypothesis was partly supported because emergency worksites (M= 176.96) are among the earliest in finishing the funding process and recovery, and cultural worksites (M= 1532.98) are among the last. However, contrary to the hypothesis, healthcare facilities (M= 818.55) were shown to be among the last worksites to finish the

funding process. An ANOVA was done with post-hoc tests. Levene's test of variance homogeneity for the time variable done above had p=.000, indicating that the variance is heteroscedasticity. Also, the normality test (above) indicated that this variable is not normally distributed. Since the normality Q-Q plots show a conservatively normal plot, the ANOVA is used to rank these variables. The ANOVA produced a test statistic of $F_{df1,\ df2}$= 9.38, df_1=7, df_2=310, p=.000, thus rejecting the null hypothesis that the means for the different functions were equal.

The post-hoc tests utilized LSD and Scheffe tests. According to Sheffe test, there are significant differences between time needs of emergency functions on one hand and health, residential, and cultural on the other, with the first being the least in time needs and the latter being the highest in time needs. The ranking for the mean time needs from lowest to highest is: emergency, infrastructure, office, multi-use, schools, health, residential, and cultural. The first five are not significantly different from each other, nor are the last six significantly different from each other. The LSD test indicated somewhat different results. Only emergency and cultural worksites are significantly different from the other functions, with the residential worksites being not significantly different from cultural worksites, and all the rest of the functions not significantly different from each other. The ranking in LSD is, from lowest to highest: emergency, infrastructure, multi-use, office, health, school, residential, and cultural. In both tests, emergency and infrastructure functions required the least time needs, while cultural and residential functions required the most time needs. The rest of the functions seem to be not significantly different from each other. It is alarming that health facilities are not among the earliest to recover, but rather lie somewhat in the middle (table 5).

Table 5 Mean time to recovery in days, by building function.

Function	Emergency	Infrastructure	Offices	Multi-use	Schools	Health	Residential	Cultural
Mean time to recovery	176.96	396.37	887.16	1390.11	804.05	818.55	439.38	1532.98
Standard Deviation (S.D)	478.57	821.59	1316.57	1668.95	1241	1160.48	351.71	1437.87

In order to statistically control for the effects of the covariates[8], a factorial analysis was done. Factors were status (historic/ non-historic), construction type and function. The covariates were floor area and damage level. Damage level was treated as continuous, even though it is categorical, as the categories indicate a direction (more damage or less damage). The model was specified in different ways until the residual was normally distributed. The best model was achieved using the second log transformation of time.

The model significantly explains the variance in time to recovery (R^2 =.655). This model showed that the effects of all of the variables were significant except floor area. Also, the model shows that the interaction of status of building (historic/ non-historic) and its function are significant, as is the interaction of status of buildings and its construction (figures 6 and 7). However, the interaction of function and construction is not significant, nor is the interaction of the three factors: status, function, and construction (table 6). (This model uses the time variable that was transformed once, not twice, although both have similar results).

The interaction between function and status of building (figure 6) shows the great variance in time needs for different functions in historic buildings, compared to on-historic buildings. It also shows that all historic buildings have more time needs than non-historic buildings, except for Health care facilities and residential buildings. This finding is interesting. A re-examination of the data shows that there were only eight

historic buildings and 11 non-historic buildings in the sample for health care buildings. The sample of residential buildings is larger (table 4), yet the percentage of historic buildings in that sample is small (only 12 samples), thus for both cases, the number of historic buildings in the sample was small, which may had an effect o the result.

Figure 6 Time to recovery funding (transformed) for historic and non-historic buildings with different functions.

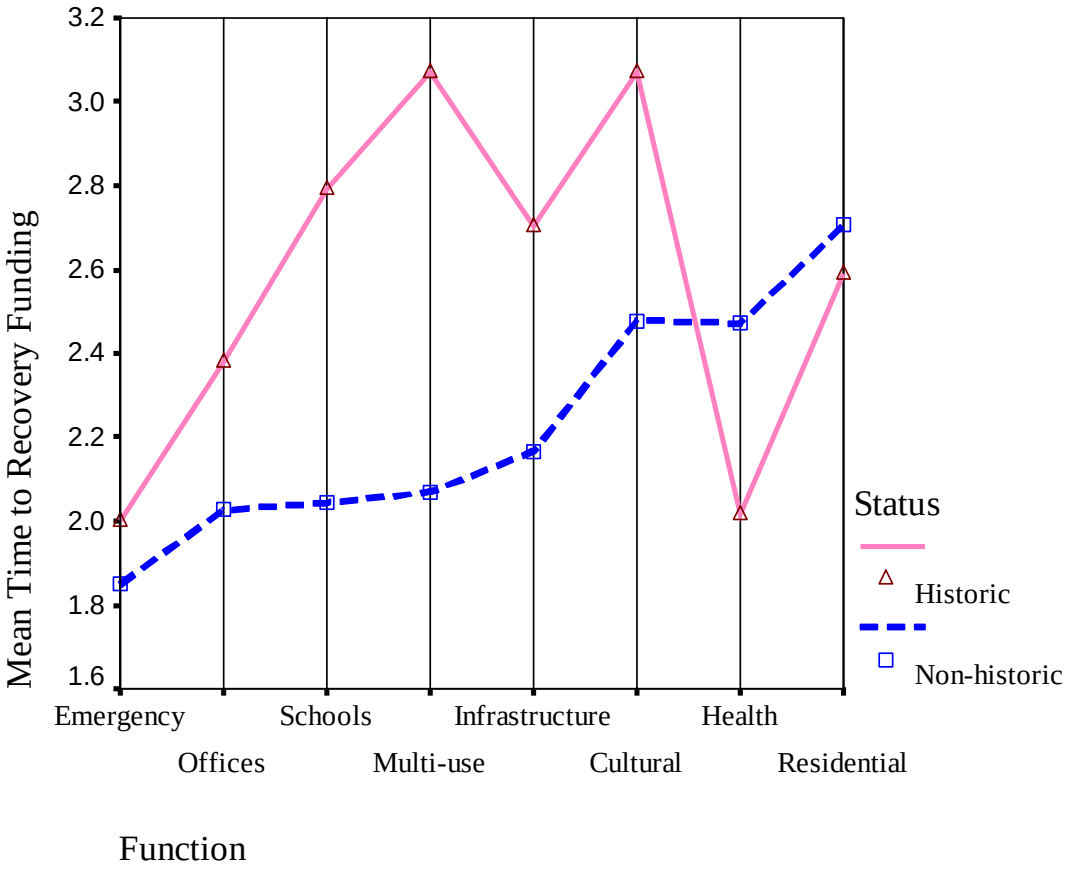
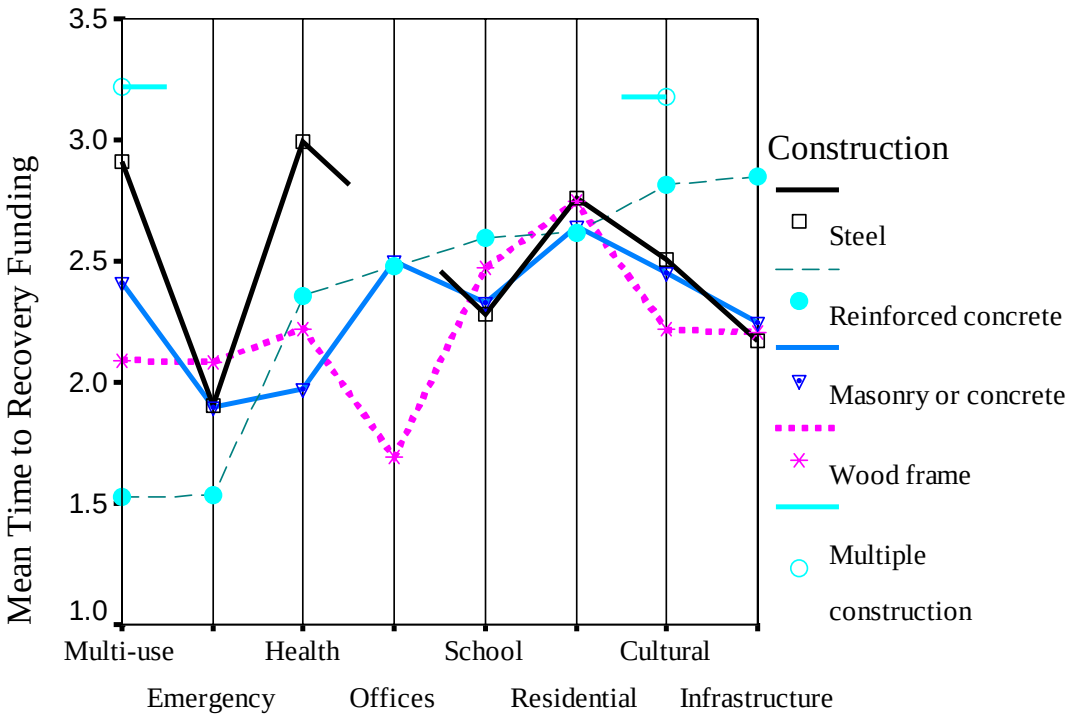


Figure 7 Time to recovery funding (transformed) for different construction materials with different functions.



Non-estimable means are not plotted

Table 6 Model of tests of between-subjects effects.
Dependent variable: time (by days-transformed).

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	71.90	52	1.38	6.48	.00
Intercept	95.45	1	95.45	446.10	.00
AREA	.28	1	.28	1.33	.25
DAMAGE	11.07	1	11.07	51.84	.00
STATUS	1.89	1	1.89	8.86	.00
FUNCTION	4.04	7	.58	2.70	.01
CONSTRUCTION	3.88	4	.97	4.54	.00
STATUS * FUNCTION	4.69	7	.67	3.14	.00
STATUS * CONSTRUCTION	2.61	4	.65	3.06	.02
FUNCTION * CONSTRUCTION	6.18	21	.29	1.38	.14
STATUS * FUNCTION * CONSTRUCTION	1.56	6	.26	1.22	.30
Error	37.80	177	.21		
Total	1459.10	230			
Corrected Total	109.70	229			

R^2 = .655 (Adjusted R^2 = .554)

The standardized residual for the model was approximately normally distributed with the two tests yielding conflicting results. The Shapiro-Wilk test of normality yielded a p =.123, but the Kolmogorov-Smirnov test yielded p=.019. But since the Q-Q normality plot of the residual is normal, the residual is treated as normally distributed. Levene's test of equality of error variances yielded F=1.804 (p=.003), indicating heteroscedasticity.

To account for age as a possible covariate, and since it relates to historic buildings only. A separate analysis was done for historic buildings (table 7). A better test of normality for standardized residuals was achieved when the model tested main effects only, as the Levene's test of homogeneity yielded F=1.208, $df1$=17, $df2$=55, p=.29, thus accepting the null hypothesis that the error variances are equal. The Shapiro-

Wilk test yielded *p*=.656 and the Kolmogorov-Smirnov test yielded *p*=.200, thus indicating that the standardized residuals are normally distributed. The results of the factorial analysis show that construction type, age, and area have no effect on recovery time for historic buildings, while function does have an effect.

Table 7 Model of tests of between-subjects effects.
Dependent variable: time (by days) –for historic buildings.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	24.52	14	1.75	7.77	.00
Intercept	6.81	1	6.81	30.22	.00
CONSTRUCTION	1.77	4	.44	1.96	.11
FUNCTION	5.09	7	.73	3.22	.01
AGE	.15	1	.15	.65	.42
AREA	.14	1	.14	.63	.43
DAMAGE	7.78	1	7.78	34.50	.00
Error	13.07	58	.23		
Total	593.12	73			
Corrected Total	37.59	72			

R^2 = .652 (Adjusted R^2 = .568)

Summary of Findings for Phase I

Status

The results show that funding time needed by historic buildings was longer than funding time needed by non-historic buildings. Based on the analysis above, that time was affected by variables related to the building, mainly its function and construction.

The correlation table shows that the status of the building is significantly correlated to some other variables as well. Historic buildings, naturally, are older. However, while the Spearman's rho did not show a significant relation between historic status and age, time needs are affected by age according to Pearson's correlation. The factorial analysis showed that age does not have an effect on time needs for historic buildings. It is possible that the Pearson's correlation is affected by the many missing

age data for non-historic buildings, which prevented using that variable in the factorial analysis that included non-historic data.

Also, table (4) show that there is no significant correlation between historic building status and types of construction, however, two types of construction showed significant correlation to historic status. On the one hand, there is a positive correlation between historic buildings and multi-construction, mainly due to the many historic piers in San Francisco which all received a multi-construction category. On the other hand, there is a negative correlation between historic buildings and reinforced concrete, since most reinforced concrete buildings are not historic. There was no significant correlation between historic buildings and masonry or concrete construction, which is interesting, even though the relation between them is positive. This may be because there are masonry or concrete buildings which do not have a "historic" status, even though they maybe older. Such buildings maybe significant on the local level, but they were not treated as historic by FEMA because they are not eligible for the National Register.

Since there is no significant relationship between historic status and time needs based on construction types, age, or area, then the delays in funding time are due to reasons that is not related to the historic fabric itself. This is explained by the significant relation between function and time needs for historic buildings. The delays are mainly due to aspects of function type. Function type affects code requirements; as such requirements are based on the use of the building. Also, function type affects the significance of the building for the community and the priority given to its repair. This indicates that funding delays are based on issues with the process itself and not the building. Such issues seem to be facing historic buildings in particular, thus the significant relationship between status and time.

Construction

Time needs for buildings in general are significantly affected by construction; however, time needs for historic buildings alone are not significantly affected by construction. Construction types, according to table (4), are partly related to time needs. Wood frame construction and multi-construction are the only two types that have a

significant correlation to time and only multi-construction is correlated to historic buildings. This explains why construction type was not significant for historic buildings.

According to table (4), multi-construction buildings have larger area (due to the piers), it is mostly historic, and has higher cost and time.

The factorial analysis (table 6) also shows that time needs are affected by the interaction between status and construction type. Certain construction types may need more time depending on their status: historic or not historic. This may be due to the significant correlation of multi-construction buildings and historic infrastructure, especially piers, since multi-construction take longer time to recover.

Wood frame has less area than other buildings, probably due to the fact that most wood frame buildings are residential. Wood frame construction is also associated with cultural buildings, such as community centers, which is also smaller in area. Wood frame has less damage levels and less time and cost needs. This may be related to the fact that it is mostly residential and damage estimate did not include furniture repair.

Masonry or concrete are highly correlated to the age of the building as older buildings are more likely to be from masonry. Most infrastructure buildings are not of masonry or concrete unlike most multi-use buildings. This is because most multi-use buildings are downtown buildings that have commercial use on the first floor and residential use in the upper floors. These buildings are usually brick masonry. Interestingly, masonry or concrete is not significantly correlated with damage, time, or cost. This is important as it shows that masonry or concrete buildings do not necessarily need more time or cost. Yet, buildings of historic status do need higher time and cost. As mentioned above, there are masonry buildings that are not of historic status, thus they do not take longer time to recover. This also provides direction that time needs are process related and not building related, especially since the time understudy is time to attain FEMA funding.

Reinforced concrete is mostly used in newer buildings (less age), and non-historic buildings. Reinforced concrete buildings tend to be of larger area. Reinforced concrete is predominately used in health care buildings, and it is not significantly used in

residential or cultural buildings, both of which mainly use wood frame construction. The damage and cost related to reinforced concrete is higher as it also includes large areas and contents of building, however, it does not require more time to recover indicating that repairs may not be a significant part of their recovery, or that since they are mostly non-historic, the process of funding is simpler.

Structural steel is also associated with buildings of large area. This also explains the correlation to high cost. It does not, however, have any significant correlation to time or damage level, indicating that structural steel buildings are not different than other buildings in the damage level or time needs.

The analysis did not attempt to rank recovery time by construction; however, future research can investigate the differences of time needs according to construction type. Damage level is significantly correlated with two types of construction, but damage level may not be the only variable affecting time needs. Also, it was not possible to investigate the interactive effect of construction type, age, and damage, due to the data limitations. This can be addressed in future research as well.

Age

The factorial analysis (table 7) showed that age has no relation to the time need of historic buildings. Data limitations did not allow for analysis of age for all buildings. Still table (4) shows that buildings of older age have smaller area, tend to be historic. Also, most cultural buildings are older, but most health facilities and residential buildings are newer buildings. Older buildings are of masonry and concrete, but of reinforced concrete buildings. Age was not shown to be significantly related to time, cost, or damage level in the Spearman's rho, but was of significant correlation to cost and time in the Pearson correlation. the significance is at an edge point and that may be due to the significant missing data especially for non-historic buildings.

Area

Interestingly, floor area did not have a significant effect on the time needs. This is because this time variable represents time needed to process funding applications with

FEMA. That processing is different from construction work and is based on bureaucratic processes (figure 2). It entails meetings, applications, cost estimates, bills, and approvals. This result indicates that the time needed to finish such a process has nothing to do with the size of the building, but it relates more to the issues that face the building (such as code requirements and strengthening needs).

Damage Level

Shown to be of significant effect on time needs for all buildings, especially for historic buildings. Less damage levels are associated with wood frame construction, while higher damage levels are associated with reinforced concrete, but the latter is due to the fact that buildings of larger area have more damage and most reinforced concrete buildings have large area. Historic buildings in general, infrastructure facilities, and offices have higher damage levels, the latter two may be affected by damages to their contents which were part of the damage assessment. Colleges, schools and educational facilities have less damage, yet higher cost and time needs.

Cost

Cost has been shown to increase with damage, time, and historic status. Also, higher cost is associated with larger areas, multi-construction, reinforced concrete, and infrastructure, all of which are associated with large areas as well.

Less cost is associated with residential buildings and wood frame (which is mainly used for residential buildings).

Cost may increase with building age, but there is a significant correlation to most construction materials. Wood frame cost less, multi-construction, reinforced concrete, and structural steel cost more (probably due to large building areas). Masonry or concrete do not have any significant relation to cost.

Function

The results of the statistical analyses show some positive and negative aspects of recovery time requirements. It is positive that emergency functions and infrastructure

facilities take less time. On the other hand, historic health care facilities are important as well and they should not take a long time to recover. There are three groups of buildings in recovery time needs:

1. Least time: emergency buildings and infrastructure facilities.
2. Intermediate time: offices, multi-use buildings, health care, and schools.
3. Most time: residential and cultural buildings.

Recovery time was shown to be influenced by construction type, damage level, status of building: historic or non-historic, and function of building, but not floor area.

It is important to note that some of the covariates might influence each other. Function affects structure and materials. Cultural buildings have large spans (theaters, community centers, recreational centers) while office spaces and residential facilities have smaller spans. Schools have multiple types of spaces. Construction type also varies with function; large spans require steel frame or reinforced concrete, unlike residential buildings, which mostly use wood frame.

Infrastructure

For infrastructure, the analysis was about buildings, not the utility lines themselves. These are buildings serving power, transportation, water, and other infrastructure sections. Their fast recovery does not necessarily mean a speed in the service itself, but it indicates repair speed compared to other buildings. The correlation table (table 4) shows that such buildings were mostly of multi-construction, and faced delays mainly due to the high damage and area. When such covariates were controlled, the analysis showed fast recovery indicating less procedural complications.

Residential

Residential buildings have been found to be among the latest to recover, however, historic residential buildings were shown to recover before non-historic buildings. This result may be a result of the sample size, since there are only 12 historic

residential projects compared to 37 non-historic projects, with 58% of the historic building sample made of wood frame, which needs less time for recovery.

The time delays indicated in the analysis can just be funding process delays, not delays in functionality. However, the recovery delays of residential buildings have been cited by research. Most of the residential buildings on the analysis list are downtown hotels, apartment buildings, and public housing projects. As such, many of these buildings are used for limited income residents. Research about Loma Prieta in the Bay area points out that most low income population live in older, seismically weak buildings that were severely damaged in the 1989 earthquake increasing the homeless population after the response stage. In 1993 many of the damaged residential buildings were still empty, mostly due to the high cost of strengthening. Homeless advocates are against seismic strengthening as it increases the rents, thus making such houses beyond the reach of the underprivileged. On the other hand, regulators push for seismic retrofit for safety concerns. Some owners chose to demolish rather than mitigate (NRC, 1994). Two years after the earthquake none of the red-tagged or yellow-tagged residential hotels (single occupancy rooms), multi unit brick buildings (more than 13000 units) had begun repairs (Comerio, 1998b). These buildings were left empty and fenced. In the light of such complications for housing recovery, it is important that public housing and housing owned by NGOs have less recovery time.

Also, San Francisco has a high percentage of its inhabitants living in multi-family buildings (Comerio, 1998b). In San Francisco there were 360 red-tagged buildings, one third of them was residential and two thirds of the red-tagged and yellow-tagged buildings were for low and moderate-income people (Comerio, 1998b). Taking into account that San Francisco has a serious homelessness problem, housing recovery should be further investigated to identify ways for reducing delays.

According to Brady and Perkins (1998), the total damage in Loma Prieta was $2.7-2.9 billion, out of which there were $1.32 billion in home damage, and $9.2 billion in uninhabitable housing units. This indicates the importance of quick housing recovery.

Office

Offices are shown to take intermediate time, when controlling other variables. Fratessa (1994) contends that public office buildings should not have any delays in functionality. This suggests that office buildings should be among the buildings that receive pre-earthquake recovery planning, so that their recovery time is reduced to minimal. Fratessa stressed the importance of strengthening such buildings to facilitate recovery management. Public office buildings are shown by the correlation table to suffer high damage. Since such buildings are newer non-historic facilities, this indicates that their contents had influence on damage level. Thus, reducing recovery cost and time for offices would entail addressing their contents through proper securing of furniture.

Multi-use

Mostly of masonry or concrete construction, the results show that such buildings are intermediate in their time needs. Multi-use buildings are mainly buildings that have commercial first floor and residential upper floors, yet other buildings of more than one use are categorized within it as well. Table (4) shows that such buildings have higher cost, yet there is not indication that its related to damage. The high cost could be a result of outliers, as there are two projects that have extremely high cost of more than $5 million. It also may be due to large area of these buildings, as indicated by the Spearman's rho correlation (table 4).

Health

The analysis showed that health care facilities in general take longer time to recovery. Some professionals pointed out that health care facilities have extra work involved because there are more codes related to them, thus more permits and approvals. The data show that historic health care buildings recovered faster than non-historic buildings, this can be explained by a closer look at the sample. The sample size is one reason, as historic health care buildings are 8 while non-historic are 11. Also, 50% of historic healthcare buildings (the sample of 8) are smaller buildings of less than 7,000

square feet in area (i.e clinics) compared to larger health care facilities (mostly hospitals) in the non-historic sample.

Emergency

As mentioned above, emergency facilities should be among the earliest to recover. The results have supported that as shown by the ranking. However, table (4) show emergency facilities to face delays, which is a result of correlation without controlling for other variables. This indicates that they face delays due to some of the variables. Yet their relation to damage and cost in not significant nor positive. Also, the mean time of recovery for this function is is 2 years, therefore, the correlation table's significant time correlation may be due to other variables.

Cultural

Theaters and arts buildings are challenging due to architectural and artistic special treatments. These include elaborate details that are difficult to replace in kind, complex structural systems when theaters and large galleries are involved, and many ornaments of symbolic nature, gold inlays, marble, and painted decorations. They are challenging when considering structural retrofit and repair without damage to artwork or special finishes, and with minimal intervention to areas of special significance. Most of these buildings in San Francisco are historic, as indicated by the correlation table. However, the table also shows that they are mostly wood frame thus indicating less damage levels. Also, when looking at table (4), it shows that they do not face delays. Delays are only apparent when controlling other variables. So the delay is mainly due to their historic status. As historic buildings, repairs would require specific professional work, such as a historical report including a detailed study of the building, it history, finishes, and significance areas. Also, in-situ explorations and tests for materials might be needed. All that would be done before the preliminary design.. Moreover, many professionals have indicated that such places of large occupancy face delays because they have more code requirements for safety, accessibility and so on.

Colleges

School recovery does not indicate significant delays, which is a positive outcome. This might be due to the limited damage suffered by schools in San Francisco. Fratessa (1994) reports that public schools survived well with minimal damage after Loma Prieta due to the performance code. Tobin (1994) also points out that public school buildings performed well in the earthquake even when they were constructed according to older codes that are not adequate anymore. This was probably due to plan checking by engineers and thorough inspection of the buildings as they were built. The California Field Act to protect schools and the California Hospital Act to protect hospitals resulted in successful mitigation efforts. However, research indicates that there is still a need for local governments to provide incentives (NRC, 1994). Nevertheless, historic hospitals faced delays, as many were not up to code and required upgrading during repairs.

The simple correlation table shows that time, cost, and damage level are positively correlated. This is important as it suggests that time delays lead to increasing cost, and vise versa, thus the significance of finding ways for reducing time. High cost would lead to delays when such cost is contested between the applicant and FEMA. High damage leads to more time needs and more costs in repairs and in design work. This indicates the need to address the recovery of historic buildings in a way that would reduce delays, thus saving cost. Since the cost of recovery for disaster has been escalating over the past years, reducing time delays can be a factor in reducing such costs. As more disasters happen each year, the effect of such a variable can be significant.

Understanding why historic buildings required more time in their funding process requires further analysis of case studies, which is done in Phase II. It can be deduced from the available literature that because there was no pre-incident recovery planning there was some confusion over historic buildings. Some owners tried to demolish them, others tried to repair them in ways that did not meet acceptable standards

for historic buildings (Spennemann and Look, 1998). Some professionals were of the opinion that code requirements cause delays for historic buildings, as repairs sometimes triggered such codes based on the scope of needed repairs, which in turn in based on the damage level. Upgrades to code require more time in design and approvals, thus the delays.

Time needs are significant because, as indicated by the correlation table, time and cost are positively correlated. As such, extra time will lead to extra cost. This also works vice versa. This is a significant indicator to the importance of investigating why historic buildings take longer and how that can be changed.

CHAPTER V

PHASE II

Methods

This phase provides an in-depth investigation of the recovery of historic buildings by analyzing selected cases in detail. Case studies are intended to allow for collection of detailed information that will build a better understanding of a situation or an event that has not been investigated before (Creswell, 1994). They are chosen to find out what is common to all cases, what is particular to each case, and what is similar or different to others. The use of case studies is considered the best strategy when asking questions such as "how" or "why" (Creswell, 1994; Miles and Huberman, 1994). Since this study investigates how the recovery process commenced for historic buildings, what variables affected it, and how chosen sustainability variables played in it, a case study approach would best serve these objectives.

An important limitation of case studies is that they can be affected by the bias of the researcher (Yin, 2003) therefore two approaches were adopted. First: I developed a journal in which all ideas and thoughts about the case studies were recorded. This helped the study develop alternative explanations for the developments in the cases, so that all possibilities were visited. Second: the analysis results and narratives were shown to individuals involved in the recovery process for each of the cases. In order to include diverse voices and limit bias, the cases were emailed to some of the involved players like the owner, historic preservation consultant, architect, structural engineer, SHPO, LAPB, and FEMA. The names of the groups involved were taken from the correspondence documents, and in some cases the individuals involved were identified.

Three historic projects (worksites) were chosen for this phase and were selected based on the time of recovery (i.e., recovery after 1995). The three buildings are investigated on the individual level and on the comparative level.

Also, the initial research design required selecting three historic buildings that recovered early in the process (pre 1995) in order to provide parallel comparisons to the three buildings that faced delays. The intention was to compare the two groups in regard to the variables under study. As mentioned above, the City, the State, and the SHPO had removed all projects to deep storage, and none of the buildings that had an early recovery (pre 1995) were found. Also, no documents could be obtained from FEMA. Thus, the study had to use only the data available.

Using multiple methods for data gathering and analysis is common in case studies as it allows for verifying data and establishing validity (Yin, 2003). Therefore, this study uses two main sources of data:

1. Records and documents available from SHPO. These documents helped in providing a detailed view of the decisions, the problems, and the solutions as they developed over time. These records are diverse in themselves, they include letters, agreements, memorandums, and reports made regarding the recovery of the building. Also, there were minutes of meetings, documentations of public hearings, public comments, and professional reports. Such documents helped in identifying what issues occurred during the process and how they were handled. In themselves, they provided a varied source that helped in getting different perspectives on the process.
2. Newspaper clips, covering the period 1989 to 2002. Such clips provided another perspective on the process.
3. A supplementary source of data was short questions with individuals involved in the projects. This helped clarify some points. Later, some of these individuals reviewed the narrative and case analysis.

This approach has some limitations. Newspapers do not necessarily present facts about the project but present the writer’s perception of the situation. But since several articles were used, in different time periods, by different individuals, this provided more perspectives. That information was checked against what is available from the DSRs and

from the SHPO documents. The subsequent interviews helped in expanding the understanding of the situation.

A positive of this method is that it allowed a view that is based on multiple perspectives: the SHPO document contained letters of correspondence between all interested groups until the Section 106 review was done, in two chosen projects this corresponds with the time the project was going. In addition to that, the documents include memos between members of the SHPO office or emails between FEMA, the OES, and SHPO. Both of which provide insight into the discussions that were happening between these managing groups. It reflects their perspective on what was happening outside the formal letters. In addition to that, the documents contained minutes of related public hearings and meetings, which provided insight into the perspectives of different groups involved.

Analysis

The analysis of the data was done in several steps:

1. Creating matrixes. Three matrixes were used, a chronological matrix (see Appendix B) and a variable/project matrix (Appendix C). The creation of these matrixes involved categorical, descriptive, and analytic coding as described by Miles and Huberman (1994) and Richards (2005).

The time ordered matrix was created first, it contained descriptive information of the documents, but also in contained an analytical part that included identification of the stage of project and type of function being performed, in addition to identification of the main issues in that document. This provided a series of developments for the project. The finished product led to an identification of the main stages and a sequence of functions done in them, in addition to the main issues faced in them. The topics covered in the correspondences were considered issues, also, public comments and complaints, in addition to whatever the meeting minutes identified as issues. This matrix helped in developing the narrative of the dynamics of project development.

The second matrix was created for variables for each project. The matrix contained variables developed as the coding progressed. This helped in identifying the main variables, and also helped in developing the analysis of participation and historic character issues.

All identified issues for the three projects were listed in a third matrix (Appendix D). The objective was to compare the three projects in terms of these issues. As the lists of issues were being compiled, they were being grouped, and thus more general categories emerged.

2. Recording reflections and insights. As coding was being done, reflections on the progress of work and sources of issues were documented. This served as a source for the comments of the dynamics of the recovery. It also helped in investigating alternate explanations.

The Case Studies

The following provides an overview of the development of three projects, with the results identifying the issues that were faced in each. This is followed by a discussion of the two main sustainability variables under investigation (participation and historic character). Finally, a comparison between the issues faced by the three projects is done with regard to the issues that were faced in order to generate better understanding of how such issues play.

Since the data available for the projects was not equal in terms of coverage and depth, the analysis depended on what was available through the different sources cited above. As mentioned earlier, the choice of the cases (table 8) came as a result of data availability.

Table 8 The chosen case studies.

	OWNER	FUNCTION	DAMAGE	DSR TIME (FUNDING PROCESS)	PROJECT TIME (FUNCTIONALITY)
The Williams Building	Independent Public Agency	Multi-use (Office/hotel)	Red-tag	1989-2001	1989-2005
SFUSD Administration Building	Independent Public Agency	Multi-use (school/ arts)	Red-tag	1989-2001	Not finished
The Geary Theater	NGO	Cultural	Red-tag	1990-2000	1989-1995

Case Study 1: The Williams Building

Built in 1907, the Williams Building is an eight story building of 50,000 square foot area. It was mentioned in the survey done by San Francisco Architectural Heritage (Heritage), Splendid Survivors (Corbett, 1979) and is listed as eligible for the National Register as part of a historic district. The building is one of three remaining downtown commercial structures by local San Francisco architect Clinton Day.

The building is owned by the San Francisco Redevelopment Agency (SFRA). It occupies an important corner at the intersection of two streets in downtown San Francisco, Mission and 3rd Streets. This is part of the Yerba Buena Center Redevelopment Project Area Development.

Figure 8 The Williams Building.

According to the survey done by the Foundation of San Francisco's Architectural Heritage (Heritage), the building is important due to its unique ornamental brickwork and its environmental role at an important urban corner in downtown San Francisco. The composition contains a three-part vertical block with the end bays differentiated from the middles. The building has Renaissance/Baroque ornamentation.

The building's construction is steel frame with brick aggregate concrete floor slabs and masonry cladding. It is most notable for the distinctive artwork on the east and south facades. The earthquake's damage was described as severe in some sources, however, some of the individuals who assessed the damage perceived the damage as not

critical. The earthquake left several minor cracks in the building; but there were some major cracks in one of the external walls, which gave it a red-tag status.

The time needed for the building to recover is unclear. At the time of visiting the site (spring 2005), it was still undergoing final repair work. Based on the FEMA Damage Survey Reports (DSRs), the project started on Oct.1989, and ended on April 2001. This, of course, identifies the time needed for the funding approvals and process to be concluded. The total funding given to the building was $6,876,692 (~$138/ft).

Stages [9]

The investigation of the project revealed the following stages in its development:

1. **1989-1993: Project initiation**

At the time of the earthquake, the building was not fully occupied. Some respondents stated that it was a residential building and others said that it was an office building, but all agreed that it was almost empty at the time of the earthquake and that it was not well maintained.

Initially, SFRA wanted to demolish the building based on the red tag status. Since some external walls needed shoring, due to serious cracks, the building was perceived as a public threat and that was used to support the demolition argument.

There were several letters concerning the significance of the building, which indicates that its significance was not initially clear. The owner perceived the building not to be of high significance but historic preservationists provided arguments of its importance. Once the building was determined eligible for the National Register, Section 106 came into play and no demolition funds could be approved until Section 106 was complete. The State Historic Preservation Officer (SHPO) did not concur with the demolition, as the building could be repaired.

Since demolition was not an agreed-upon option, initial repair studies were prepared. SFRA's estimates for repair costs were higher than those expected by the SHPO and FEMA. The SHPO's structural consultant also felt that SFRA was planning structural work that was not needed. SFRA responded with a letter from their consultant

explaining that they intended to do strengthening work, based on their consultant's view that the building needs seismic strengthening.

Strengthening the building was a major issue. That involved two questions: 1) is strengthening needed, and 2) if so, then what should the level of strengthening be? SFRA believed that since the building would not be demolished and would be used, then it should have an acceptable level of safety for its inhabitants for future earthquakes. The owner's consultant had a specific level of safety in mind, but the SHPO's consultant believed that the building did not need all the strengthening proposed by SFRA. The letters discussing this issue span several years.

The question of whether the strengthening was needed was introduced on two parts. First, SFRA's consultant believed that the local code required it. This was later shown to not be the case. Second, the consultant decided that the building was not strong enough. There were several letters and meetings about these issues between the two structural consultants. There are no letters available to show the final decision. Yet, at a certain point, SFRA decided that it would be better for them to use temporary shoring for the building and not to permanently strengthen it, since they were planning to have it empty for several years until an investor was found.

The fact that the building was almost empty at the time of the earthquake complicated decision-making. The building did not have a specific use. SFRA, a redevelopment agency, was interested in the use of the building for redeveloping the area. It is obvious that the site itself was considered of value, being at a downtown intersection in an area crowded with high-rise office buildings, cultural institutions, and multi-use buildings. Thus, the choice was between finding an investor for an empty lot in the downtown area, and finding an investor for an historic building that needs earthquake repairs and strengthening in addition to rehabilitation according to specific standards. At the time, there was no developer.

The high cost of the requested temporary strengthening was an issue. Suggesting a million dollar scheme that is only temporary and would eventually be removed was not initially acceptable to FEMA. SFRA wanted to provide a solution that was not

permanent, so that the future developer would do the final work based on its plans for the site. The cost implications of these decisions can be profound. FEMA proposed spending $27,000 to repair the cracks, while SFRA contended that the building should be strengthened at a cost of $1.128 million. The full seismic upgrade of the building would cost $6.8 million, which SFRA did not have. Thus, SFRA considered the temporary strengthening to be a viable solution. SFRA expected FEMA to fund the temporary bracing based on the Stafford Act[10] as a mitigation cost.

SFRA already knew that the building would not be used immediately as they intended it to be part of a redevelopment project, which was planned for 1998. Thus, SFRA insisted that the temporary strengthening was better as it could easily be removed. But FEMA would not approve the strengthening unless it was proven that it was required by codes, and the SHPO would not concur with the demolition, which created an impasse.

The available letters reveal discussions about the cost of strengthening and the effects of the temporary shoring on the historic character of the building. The Section 106 consultation included the SHPO, San Francisco Landmarks Advisory Board (LPAB), the Foundation of San Francisco's Architectural Heritage, FEMA, and the Advisory Council on Historic Preservation (ACHP).

In May 1993, The SFRA asked for funding assistance to demolish the Williams Building from the state Office of Emergency Services (OES). This intent was not conveyed to FEMA nor to the SHPO, in spite of the ongoing Section 106 consultation and in spite of a Section 106 Memorandum of Agreement (MOA) among SFRA, SHPO and ACHP dating back to 1984 (Letter from FEMA to OES August 1993). Nonetheless, FEMA was informed of that letter and they sent a letter to SFRA pointing out that such a demolition would result in losing the already approved repair funding of $651,140 for that building. This decision came after the City's Department of public works addressed SFRA about the state of the building as a public hazard.

2. 1993-1996: Primary decisions

In 1993, four years after the earthquake, SFRAs decided to demolish as they had originally intended. As a result, in September of 1993, the SHPO withdrew from the consultation and the Section 106 had to continue with the ACHP. But FEMA would not provide the funds for the demolition because the building is historic and Section 106 review was not completed yet. With this escalation of the conflict, FEMA sent a letter to SFRA that attempted to develop new alternatives, and suggested SFRA apply to the "Hazard Mitigation Fund" to cover the costs of the strengthening. Also, the ACHP decided that there was no need for a new or amended MOA as SFRA had more alternatives of action under the predisaster MOA. The ACHP recommended that the issues between FEMA and owner about the funding be resolved first. Once the funding problem was solved, then the ACHP could address the Section 106 compliance.

Early in 1994 a disaster-specific Section 106 Programmatic Agreement (PA) was executed between FEMA and the SHPO, which aimed at reducing the time needed for project approval. In part, the PA aims at reducing the number of projects going through the full Section 106 process if that process is not required. Such "exempted" projects have minimal repair work done in kind, or temporary work that will not affect the buildings. The PA was an improvement to the process as it significantly reduced the number of projects going to the SHPO by limiting this review to projects that have a significant effect on the historic property's historic character. This PA was not developed for the Williams project, but was a general agreement that reduced the complexity of the process of funding approval, and therefore had an indirect impact on the Williams project.

In 1994, SFRA submitted plans for the seismic strengthening of the building to FEMA. The proposal was to use temporary steel bracing on the inside of certain walls, in addition to shear walls on the interior of the building. This plan seems to have been prepared after an agreement with FEMA had been reached about the cost of the bracing. FEMA determined that, since the proposal was temporary, there was no need for Section 106 as per the PA with the SHPO. However, the SHPO indicated concern that the

proposal was not temporary as it introduced shear walls and bracing inside the building in several places. The problem was that the building was severely damaged on one of its exterior walls and needed scaffolding and bracing to maintain public safety. This caused pressure on SFRA as it not only had to plan for the building's long-term strengthening, but also for the strengthening that was needed immediately to prevent public injury.

The SHPO urged FEMA and SFRA to reconsider the strengthening option. Another, letter from FEMA indicated that the Foundation of San Francisco's Architectural Heritage got involved. They had meetings with SFRA and provided proposals for the strengthening that would be less intrusive. The effects of the proposed strengthening on the integrity of the fabric were of concern for historic preservationists. Letters indicate that SFRA took into consideration some of the suggestions. Yet, correspondence in April 1994 indicates FEMA approved the temporary strengthening because the building was still a public hazard, studying new alternatives would cost SFRA more delays, and there was no legal ground under Section 106 for FEMA to ask SFRA to do more studies.

Nevertheless, a letter from SFRA in June 1994 indicates that they had had meetings with San Francisco Heritage, and were investigating the use of steel bracing and shear walls on the outside of the building. The letter points out that the cost of the suggested scheme would reach more than $6 million, while their initially approved scheme would cost $1.544 million. The letter indicates that SFRA studied the alternative presented by the preservationists. The letter asked FEMA if that alternative would be funded. This was done in conformance with the MOA, which required SFRA to investigate feasible options in their work. FEMA pointed out that it would not fund the exterior bracing as its funding was based on the bracing being part of permanent strengthening. The external bracing would have an effect on the historic character of the building so it would have to be subject to Section 106. In turn, that would delay the project until that process was over, which could take several months. However, the project brief on the website of one of the contractors indicates that the final temporary seismic strengthening scheme was a mix of the two proposals: interior steel bracing with

exterior shear walls, installed in 1994 (Webcor Builders, n.d.). There is no available information on the comparative cost of this choice, but it indicates that SFRA changed their planned retrofit to accommodate some of the changes suggested by historic preservationists.

The Section 106 process became more complicated because SFRA chose an "Alternate Project"[11] status. As such, the funding needed to repair and temporarily strengthen the building would be given to SFRA, who will use part of the funding to establish the temporary bracing and use the rest of it for other projects. SFRA used the funds for several other projects: the California Historic Society Project, the Jewish Museum Project, and The Japanese American Religious Federation Assisted Living Facility. All These projects were also subject to the Section 106 review separately.

3. 1996- Around 1998: Unresolved

During this period, work was continued on the building to provide the temporary strengthening as planned, but the building was standing empty without use. In a publication by the General Accounting Office online (May 1996), the building is mentioned as an example of buildings that should not have received funding, as it was almost empty at the time of the earthquake. At that time, the building was still braced awaiting repair; however, SFRA was negotiating with investors about it.

4. 1998-2002: Final decisions

In May 1999, an informational hearing about a proposed project at the Williams Building and an empty site next to it was conducted before the LPAB (San Francisco Government, May 1999) as part of the Yerba Buena Center Redevelopment Project Area Development. The proposed project included the adaptive reuse of the Williams Building and a new building that features a tower of up to 430 feet in height containing approximately 95 residential units, 410 hotel rooms, a museum/cultural center, and associated parking making a total of 750,000 square feet. Known as the St. Regis Museum, the tower was constructed and by spring 2005, it was almost finished. The Williams Building was still under reconstruction.

In this period the final shape of the project took place. Funding from FEMA ended 2001, and the "Alternate Project" was approved. In 2004, a publication by the city's Planning Department mentions the Williams Building as an example of the downtown hotel construction trends, since it contains 95 luxury rooms to be completed in September 2004 (San Francisco Government, 2004).

In December 2004, a resolution by SFRA online refers to the new Museum of the African Diaspora (MoAD), which was planned to occupy the third floor of the Williams Building and extend to the neighboring St. Regis Museum Tower. The Museum consists of three floors of new construction and one floor inside the historic structure totaling 20,000 square feet. The MoAD was applying for permits to redesign the floors, including the historic building, which was approved. The MoAd would lease the space for 99 years. According to the resolution, the Williams Building's space will be redesigned "into a series of smaller learning, educational, and donor spaces" (SFRA, 2004).

The available literature online indicates that SFRA required the investor to restore the building. The economic viability of restoring the building was challenged again, but the investor managed to find a way to incorporate it with the tower proposal. SFRA stated that they preferred not to demolish it, due to the agreement with the ACHP and FEMA, unless it was proven that repairs are infeasible (Gordon, April 5 1999). This shows how the viability of repairing historic buildings can be contested at every phase of the project. It is commendable that SFRA pushed the investor in the direction of preserving the building.

The final work on the project is described on the website of one of the contractors: *"The retrofit of the building included asbestos abatement and exterior restoration including masonry, terra cotta, windows and sheet metal cornice. The temporary steel seismic brace frame was removed from the interior of the north and east facades and replaced with interior shotcrete walls. Additionally, the existing roof deck was removed and the 9th floor deck was converted to a rooftop garden terrace.*

On the interior of the building, the basement will house the electrical entrance for the project. A restaurant will occupy the ground floor with a kitchen on the second floor. The 3rd floor will be exhibition space for the Museum of African Diaspora. The 4th floor will contain the support areas for the banquet room including offices and public restrooms. There will also be a spa and fitness center and administrative offices for the hotel operations" (Webcor Builders, n.d.).

Variables Affecting the Recovery

Context

a. Economic challenges of the period.
    i. SFRA wanted to find an investor to redevelop the site and that was not immediately possible.
    ii. The need to provide investments for redevelopment of that area.
b. Administrative: SFRA is a redevelopment agency with powers to manage its own property. They are accustomed to making their own decisions about their property. The relationship among the SFRA and the other public agencies involved in the recovery process and their jurisdictions is worth further investigation.
c. Regulatory:
    i. The requirements of related laws and codes for the repair of historic buildings were not sufficiently clear, especially with regard to how they are triggered and if they require seismic strengthening.
    ii. The PA allowed for the project to quickly clear the Section 106 process.
    iii. Section 106 made a difference in preventing demolition.
d. Technological: technological context reflects the knowledge available to professionals about different construction materials and systems.

Players

a. Consultants' disagreement over professional evaluation.
b. Perceptions of the other parties; trust and cooperation were missing.
c. Perceptions of important values. As shown above, the building has economic, aesthetic, historic, cultural, developmental, functional, and civic values. Each player perceived certain values as more important than the other values.

Process

a. Clarity of the red tag. SFRA thought it indicated need to demolish.
b. FEMA program requirements and SHPO pulling in different directions: FEMA wanted the strengthening to be cost-effective whereas the SHPO and historic preservationists wanted to use methods that are sensitive to the integrity of the building, but increase cost.

Building

a. Archaic construction materials left the consultants in disagreement over its seismic strength.
b. The major damage in one of the walls.
c. Location of building as part of a redevelopment area.
d. Previous neglect.

Historic Character and Integrity of Fabric

The issues of historic character and integrity of fabric were faced in the early part of the project. The proposed schemes for strengthening were discussed in terms of their effect on the integrity of the building. Since the proposed bracing was temporary, that helped in reducing the conflict about it. Still, the historic preservationists worked on developing alternatives to strengthening that would reduce impact on the building.

The main issue with the historic character is in the final product. The redevelopment project was processed outside the Section 106 process. The final project,

the tower with concrete and glass façade, has no relation to the historic character of the building. It is obvious that the final project did not take the character of the exiting building into account. This raises the question of the appropriateness of such a solution. Since the building and the tower are one project, one would hope for a better treatment that incorporates some elements from the older building.

This does not mean the tower should not have happened. What this calls for is a more sensitive treatment of that corner, a treatment that would have allowed for the historic building to retain an element of its value-which is its effect on the urban space.

The outcome of the project indicates that the economic values superseded cultural and aesthetic values. The building, based on the available data, has historic value, for historic preservationists and LPAB, civic value, for the people of the city represented by LPAB, economic value, for the developer, developmental value, for the SFRA, aesthetic value, for historic preservationists and LPAB, and functional value, for the developer. In a redevelopment area, the economic and developmental aspects are significant. There are no indications of requirements of SHPO review or public input on the final design except through LPAB. The final project was not a federal undertaking, thus Section 106 regulations did not apply. The project was approved by LPAB, and there is no documentation available of their discussions.

Public Participation

The available documents are not sufficient to draw any conclusions. But there were three routes of public participation:

1. The early SHPO review, which was ended after the PA was signed.
2. Public hearings before LPAB, which do not have detailed documentation.
3. The early predisaster MOA, signed in 1984, which required that interested parties be allowed to comment on proposed work. This allowed for the Foundation of San Francisco Architectural Heritage to become involved and provide suggestions.

The important note here is that the MOA had requirements that helped in maintaining public input, which was helpful. However, the "public" in this case is a reference to historic preservationists.

Case Study 2: The SFUSD Administration Building

This complex is composed of four buildings occupying a block on the edge of Civic Center Historic District. The complex has two addresses: 170 Fell St. and 135 Van Ness Ave. The first DSR was in 1989 and the last in 2002. Part of the complex is still standing empty and unrepaired seventeen years after the earthquake.

<u>170 Fell St.</u>

The building was constructed in 1910 as the Norton Tharp Commercial High School on Grove St. between Larkin and Polk Sts., which lies in what is now the Civic Center. It was moved to its current location in 1913 as part of the Civic Center Master Plan construction. The move, which was completed in eight months, was "unprecedented in scale and still ranks as one of the largest moves in San Francisco if not in the nation" (ARG, September 1994:1).

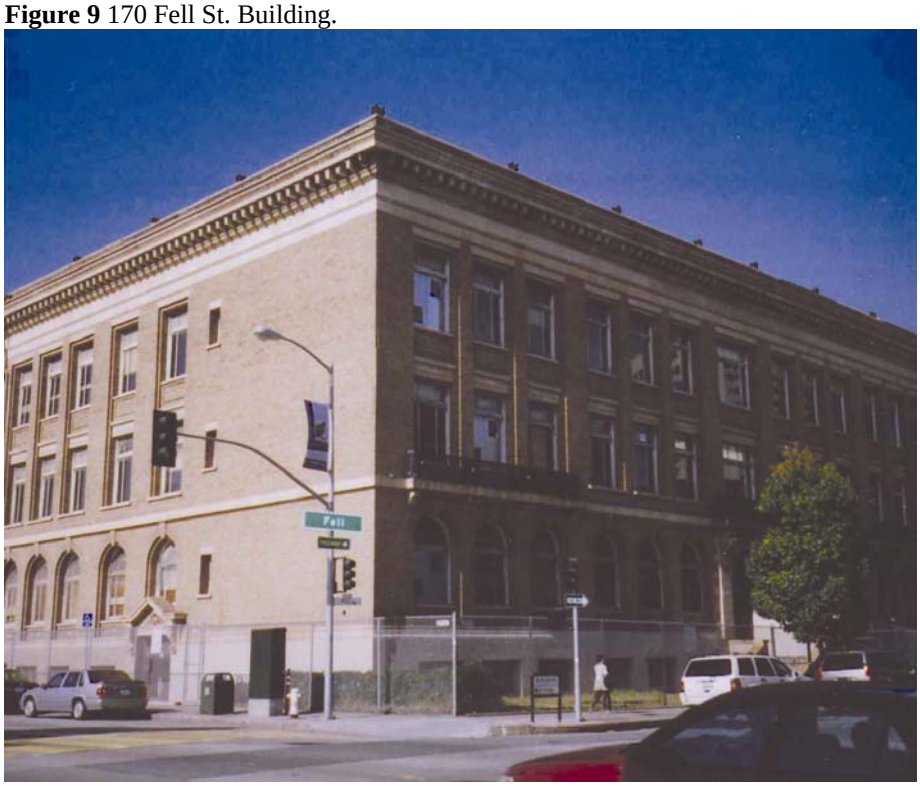
The building is a three story steel-framed structure with brick infill and reinforced concrete slab floors spanning between steel beams and girders. The exterior walls are un-reinforced brick masonry while all interior walls are unreinforced hollow clay tile construction. The building also has an attic and basement (figure 9). It is rectangular in shape (119 by 141 feet) and has a terra cotta trimmed brick parapet above roof level extending three feet.

According to the Historic Structure Report (ARG, September 1994), the building is of high significance. It dates to an important time that witnessed reconstruction after the 1906 earthquake. It was designed by a significant San Francisco architect, Newton Tharp, whose works are now rare. The report shows how the building represents the educational architecture of its time, which does not have many other examples in the city. The architect designed the building during his short service as City Architect to replace buildings lost in the 1906 earthquake. The architecture of the building represents

the philosophies of the 19th century which designed schools “as bastions of classical architecture” (ARG, September 1994: 3).

This building is significant mainly because of the engineering skill in moving to its new location in 1913. The building frame was separated from the foundation below the first floor. It was elevated onto a system of steel rails that guided it to its present location, where the frame was lowered into place, and spliced to provide column continuity with foundations (Foster Engineering, 1990:6).

Figure 9 170 Fell St. Building.



The building is also important because the school was a significant institution in the history of education in San Francisco. It was one of three schools in the United States

teach commercial high school and few of its type were open to women at the time. It was an important educational institution in the city until 1952.

The building gains higher significance since it is part of a complex of educational buildings. The block also contains two other buildings designed by another prominent San Francisco architect. Together, they reflect the change that took place in the design of educational buildings during the early twentieth century.

The Page and Turnbull Cultural Resources Evaluation (October 1996b) points to the importance of 170 Fell St. for the complex as a whole. It states that the loss of the building would affect the value of the complex, as it was the original building that shaped the development of the High School of Commerce (Page& Turnbull, October 1996b, 12-13).

The building continued to be used as a high school until 1952 when it was closed and the building was used for SFUSD administrative offices. This use continued until 1989 when the earthquake took place.

135 Van Ness Ave.

Built in 1923-1926 as the High School of Commerce by the architect John Reid, Jr., who also helped in the design of the Civic Center. It was built as a three story building to complete the block where the Tharp building was placed. This group of loosely connected buildings consists of: a one story library, a three story academic building, a 1,800-seat auditorium (the Nourse Auditorium), and a two-story gymnasium. The buildings form a “J” in plan with 170 Fell St. at the end of the sequence. The architect, Reid, intended that the three buildings have Spanish colonial revival style. The main entrance of 135 Van Ness Ave. was flanked with stone projections decorated with figures representing medieval men of learning (figure 10).

The academic building has simple interior spaces. The gymnasium has arched windows for light and upper balconies at east and west of the space. The second floor housed the gym and the first accommodated supporting services. The library has a ceiling bordered by ornamented plaster and wood casework at all wall perimeters. The

auditorium, on the other hand, was the richest in detailing. It has decorative plaster walls and ceiling and ornamental chandeliers. All the buildings have similar material on the outside, with stucco and terra cotta ornamentation at entry portals, parapets and stair towers. The terra cotta has color glazing in orange, green, and blue.

Figure 10 135 Van Ness Ave. Building.

The 135 Van Ness Ave. Building is significant because it is one of few buildings remaining that represent the educational architecture of the early twentieth century. The building represents educational concepts that prevailed in California in the 1920s and 1930s, through its open educational style and Spanish colonial character. The building plays an important role in the formation of the urban space for Van Ness Ave and the San Francisco Civic Center, which it borders (ARG, November 1993; Page and Turnbull, 1996b)

According to SHPO and FEMA letters and memorandums, both buildings are collectively listed as San Francisco City Landmark #140, and both are eligible for the

National Register. However, some documents only refer to 135 Van Ness Ave. as significant.

According to the Foster Engineering report (May 1990), the earthquake caused serious cracks in the exterior walls of the 170 Fell St. building, and severely damaged the parapet and the chimney, which later had to be removed. All interior hollow clay walls were severely damaged. The building was red-tagged by the Bureau of Building Inspection. The Foster Engineering report found the building hazardous due to loss of lateral load bearing strength, which is a finding SFUSD focused on (Irons, August 28, 2002). Because the building is owned by the SFUSD, the red-tag designation was later changed to "secured" shifting the responsibility from the City to SFUSD. No explanation was provided, but it allowed for the building to be entered with restrictions. The building can not be occupied until that status is changed and it has not changed since the earthquake. The City requires that secured buildings comply with the current applicable building code.

The earthquake damage on 135 Van Ness Ave. was less severe. The DSRs describe minor damage to drywall partitions; plaster walls, stucco walls, and exterior finish. However, there was also major damage to clay tile walls, a concrete roof slab, roof beams, and columns in the Gymnasium wing.

Initially, SFUSD moved its offices out of both buildings, but in 1990 it moved back to the 135 Van Ness Ave. Building with FEMA covering the cost. In addition FEMA approved the cost for debris removal and emergency protective measures from both buildings.

Stages

1. **(1989-1991) Uncertainty: repair and reuse as offices**

Most of the work in 1989 was for emergency stabilization, removal of hazardous brickwork, and damage assessment. Early in 1991, several aftershocks lead to further damage in 170 Fell St., so one of the corners had to be stabilized and some brickwork removed. According to letters to FEMA in 1990 about the intended repairs, the consultant pointed out that the exterior facade will be restored to pre-earthquake

conditions and historically significant interior finishes maintained. Removal of chimney and parapet, which happened after an aftershock almost destroyed them, and emergency stabilization work were not going to prevent the proper reconstruction of the facade to pre-earthquake appearance. The consultant understood the importance of maintaining historic character (Foster Engineering, letter to SHPO June 21, 1990). Also, the consultant mentioned that they planned to do as much in-situ repair as possible to save historic fabric, but some parts were severely damaged and had to be reconstructed. More letters indicate that, at that point, the consultant and owner did not have a problem with the preservation of the building, they were planning to restore the facade to its original condition using the State Historic Building Code (SHBC) and the Secretary of the Interior Standards (Standards), which clearly indicates that work can commence when the consultant is aware of such requirements and follows them.

During that time, the consultant prepared reports on the feasibility of repairing and code upgrading 170 Fell St. as offices, which was found to be feasible (Foster Engineering, May 1990). Plans were prepared for the selective demolition of parts of 170 Fell that were too damaged, and reconstruction according to the Standards and the SHBC to pre-earthquake appearance.

A 1990 DSR, indicates that SFUSD moved back to 135 Van Ness Ave. because the Academic building of the complex suffered less damage and was reusable as office space by that time whereas there was more work to be done on the Gymnasium and Auditorium.

At this stage, SFUSD thought that they would retain the original use. However, as time passed by they seemed uncertain about the course of action. This came about as complications were faced through the funding process. Initially they wanted to repair the building, but the problem was the scope of repairs. The initial DSR was approved by FEMA and the SHPO, with conditions regarding the use of SHBC and the Standards. However, SFUSD disagreed with that DSR, as it did not encompass all their needed repairs. SFUSD wanted to strengthen the building but FEMA did not allocate funds for that. A new DSR was approved in the second quarter of 1991, but until the end of that

year SFUSD was stating that the building lost most of its strength to resist earthquakes and needed strengthening.

In the last quarter of 1991, FEMA indicated that the cost of the suggested repair work would exceed 50% of the cost of replacing the building, thus FEMA would not fund its repair but, instead, would fund its replacement[12]. This did not mean that SFUSD had to demolish the building; it just meant that the funding would be on the basis of replacement. That funding amount was less than what SFUSD needed for repairing the building to functionality and upgrading it to required code level. At the same time, analysis of the seismic upgrades that were required by current building codes showed that high cost would be incurred and thus it was deemed not feasible.

Early in 1991, FEMA transmitted SFUSD's funding appeal to the SHPO, explaining that FEMA would not approve the cost of restoration but replacement, and requesting SHPO's comments as per Section 106 requirements. In the middle of 1991, FEMA determined that the entire complex is eligible for the National Register.

According to FEMA, there was no local standard that required restoration, noting that SFUSD can also have it as an Improved Project[13]. Thus, demolition was proposed to SFUSD as a feasible solution. However, the Improved Project status would bring to SFUSD less funding than they needed.

SFUSD was in a position where 170 Fell St. and the Auditorium buildings needed upgrading to code in many aspects, but FEMA rejected funding such upgrades or repairs. At the same time the SHPO would not consent for them to demolish 170 Fell St. as it can be repaired.

According to SFUSD's attorney (Letter from Barkley, Attorney at law, to Interested Parties, Section 106 Process. Dec 14, 1996), because FEMA funding is based on the prior use of the building, SFUSD focused on keeping that function. Thus, all repair studies at that time were based on the assumption that the buildings should continue to be used as offices. They admit that "large sums of money" were put in these studies. This indicates how lack of information by owner can increase expenses and create delays.

There are no further documents available of that issue, but it can be concluded that FEMA was consulting with SFUSD about their options.

2. Waiting, studies, and reports, 1991-1994

By the end of 1991, SFUSD requested an "Alternate Project" status. As such, they could use the repair money for the construction of two elementary schools. Combined, the schools would cost $14+ million to construct. In response to that request, FEMA informed SFUSD that the 170 Fell St. was eligible for the National Register, thus subject to Section 106 review. Also, the new cost estimates showed that the cost of replacement was more than FEMA's previous estimate. Because it was less than 50%, FEMA would not pay for demolition or replacement. The letter did not say what would become of 170 Fell St., but letters from subsequent dates indicate an intent to demolish it. The buildings at 135 Van Ness Ave. did not seem to be under discussion. The only severe damage in that part of the complex was in the gymnasium.

In 1993 FEMA requested that SFUSD submits a status report commenting on the case and cost issues for 170 Fell St., so that FEMA could make a fair funding decision. That report was delayed as the position of Facilities Director in SFUSD was vacant for a year, and then occupied only briefly (1992-1993). SFUSD requested time extensions to 1994.

In 1995, FEMA approved the SFUSD cost estimates of $9+ million, which included repairs, hazardous material abatement, and seismic upgrade to section 104 (f) of the City code, in addition to upgrades to other codes (i.e. life safety and handicap access).

The correspondence available in the SHPO files, and the DSRs from this time period indicate two activities:

1. Several studies by professional consultants were under way to assess the strength of the buildings in the complex, and to identify the detailed needs of repair. A new architectural consultant was brought in and the report indicated that the objective was to find a more feasible alternative for the repair and reuse of the

gymnasium in 135 Van Ness Ave. The available DSRs show approval of payments for professional studies.

2. Letters show that SFUSD prepared a bond issue proposal in 1993 to cover several costs related to school construction and upgrades. The bond issue was approved in 1994. The bond included estimated costs for several school projects, including a School of The Arts (SOTA). SOTA already existed in a building that was no longer able to satisfy the educational needs of the growing number of students.

According to a letter from the attorney (A Letter from Barkley, Attorney at law, to Interested Parties, Section 106 Process. Dec 14, 1996), the idea of using the complex for SOTA was first raised publicly in 1990 by a local artist in an awards ceremony honoring her. She and her husband were also actively involved in teaching arts in San Francisco and with the SFUSD. There was a general support for the idea, as shown by the public hearing about it later in 1998. People felt that that is the best location for SOTA because of its proximity to many art centers such as the Opera House and Davis Symphony Hall (among other buildings). SFUSD studies indicated that FEMA funding alone could not cover the cost, so they presented the bond issue to cover the construction and renovation of seven schools, among which was SOTA. SFUSD allocated around $10 million towards SOTA, anticipating that they would be obtaining funds from FEMA for the damage repairs in 135 Van Ness Ave. and 170 Fell St.. Thus the total SOTA cost was expected to be around $23 M.

According to the draft Environmental Impact Report (SFUSD,1997), SOTA already existed in another building, which was needed as an elementary school for that neighborhood. Thus, supporters for the idea of relocating SOTA were not only parents of the students who attended SOTA and needed a new improved facility, but also parents of children who could attend the new school once SOTA was moved.

In November 1994, many architectural firms submitted responses for the Request For Proposals, which specified renovation of 170 Fell St. and 135 Van Ness Ave. as the new SOTA. In the same period, SFUSD had meetings with FEMA and SHPO and

pointed out that they no longer want to demolish 170 Fell St. but they would be renovating the complex to become a K-12 school for the arts. As such, the new proposal would be an Improved Project under FEMA regulations. The funding would be used to improve the status of buildings and not only to repair them. However, FEMA would only cover 75% of the estimated costs of repair and SFUSD should cover the rest. This meeting happened after SFUSD made many arrangements for the new SOTA.

3. School of the Arts

a. Before Section 106 (1994-1996)

The project architect was chosen in March 1995, and work started on the schematics for SOTA. SFUSD also hired an Arts Education consultant, who in their earliest meetings, and before the studies for the building were completed, declared that achieving the SOTA vision would not be possible unless the building at 170 Fell St. was demolished (Gordon Chong + Associates, December 14, 1995).

According to SFUSD, the architects started working on the project in March 1995, and by June 1995 it was clear to them that the SOTA program, as envisioned by SFUSD, would not fit into the spaces of the existing complex. However, historic preservationists and architects argue that this finding resulted because the program was based on the assumption that there would be a new building.

The proposed SOTA program had two phases. Phase I: renovation of 135 Van Ness Ave., and Phase II: developing a program for the Fell St. site. It is noteworthy that even the proposal indicates the intention of not renovating the Fell St. building. According to their attorney, SFUSD was not comfortable with having a vacant damaged building on the same site with an operating school, so they decided that demolishing the Fell St. building would be better than keeping it for later use (A. Barkley, Letter to Interested Parties, Section 106 Process. December 14, 1996).

In July 1995, SFUSD officially notified the State Office of Emergency Services (OES) of their intent to demolish 170 Fell St. by June-Sept 1996 and applied for an Alternate Project. In September of 1995 the Board of SFUSD passed a resolution to demolish 170 Fell St. (A. Barkley, Letter to Interested Parties, Section 106 Process.

December 14, 1996). This was taking place without any coordination or consultation with the SHPO about the matter, unlike the first stage, in which the SHPO was being informed of the intent and progress of the project.

In September of 1995, the 170 Fell St. building was occupied by homeless groups. This action was part of an activists' protest supporting the homeless in San Francisco. Their objective was to draw attention to the availability of space for solving the housing problem.

By the end of 1995, a state bond provided SFUSD with more funding for the SOTA. Meeting minutes of the time for SFUSD's consultants indicate they were taking into account that FEMA funding regulations had changed after the 1994 Northridge earthquake, and that the new bond money could help in covering cost because FEMA coverage might be less than anticipated.

Based on the letters and minutes, it seems to have been the culture of SFUSD's institution to make decisions alone. They later pointed out that they needed approval only from the State Architect, not the City (SFUSD, 2000). SFUSD justified the demolition decision by proposing that they wanted the school design to be program driven, not forced it into an existing space. To further indicate SFUSD's confidence in their decision, they authorized the architect to proceed with a design for a new building at 170 Fell St. in Sept. 1995 (A. Barkley, Letter to Interested Parties, Section 106 Process. December 14, 1996), before there was any approval for such a project by FEMA and before the Section 106 consultation on the proposed project was initiated. In December 6, 1995, the SHPO sent a letter to SFUSD reminding them that there were historically significant buildings under their stewardship, but this letter does not seem to have had an effect on SFUSD's plans.

Meanwhile, the Arts Education consultant conducted intensive focus groups with teachers, students, parents, and arts providers to develop an arts education plan for SOTA. The meeting minutes indicate that the consultant on several occasions in 1995 and 1996 said that for the SOTA vision to succeed, 170 Fell St. had to be demolished.

The architect worked with a historic preservation consultant on plans for rehabilitating 135 Van Ness Ave., taking into account the Standards, the SHBC, and other issues of preservation. 135 Van Ness Ave. did not seem to pose problems to SFUSD. That may be a result of having less damage, and, consequently greater functionality after the earthquake. The argument SFUSD presented was that the program could not fit into the existing complex as they had large spaces that needed to be constructed anew. Thus, demolishing 170 Fell St. was not necessarily due to the building itself, but rather to the fact that one of the two buildings had to be demolished to make room for the large spaces they needed. Since 170 Fell St. was more damaged, and requires extensive seismic strengthening, it was chosen to be demolished.

By mid-1996, the program and schematic designs were ready, after which SFUSD determined that an Environmental Impact Report (EIR) was required under the California Environmental Equality Act (CEQA)[14]. Also, SFUSD instructed the architect to "investigate alternatives" for demolition of the 170 Fell St. building, as required for the EIR. A few months later they informed SHPO that 170 Fell St. could not be economically rehabilitated as a school and that they were trying to investigate if the building could be economically rehabilitated for any other use.

The alternative costs of the project were mentioned in a letter from SFUSD's historic preservation consultant to the EIR consultant. The cost estimates for different options were: use as offices: $10.8 million, use as a school $13.7 million, replacement of the building: $10.8 to $12 million (Page & Turnbull, October 1996a). So the cost difference in the work on 170 Fell St. was $ 1-3 million, which could not be compared to the cost now, estimated to be about $100 M (Irons, letter to OES, 2003). This is an important indicator of how project delays result in cost increases.

b. 1996-mid-1998 Section 106

Once SFUSD formally submitted their SOTA proposal to FEMA in November 1996, the Section 106 process formally started with the Advisory Council on Historic Preservation (ACHP), San Francisco Landmarks Preservation Advisory Board (LPAB),

OES, FEMA, SHPO, SFUSD, and Heritage. The meetings included many deliberations on the options available to SFUSD to save the buildings. Yet, it was soon obvious that the solutions being presented by the attending professionals were not adopted by SFUSD. The district had a strong conviction that SOTA would not be successful if the 170 Fell St. building was reused. The consultation reached a dead end by the end of the 1996 as no agreement was made about the building.

The proposed project at that point was: demolition of 170 Fell St., construction of a new building to replace 170 Fell St. of the same floor area, and the adaptive reuse of 135 Van Ness Ave., which includes the Academic, Gymnasium, and Library wings. In addition, the project would rehabilitate the 135 Van Ness Ave. Auditorium wing, also known as Nourse Auditorium.

The Historic Structure Report (Page & Turnbull, 1996a) points out that 170 Fell St. is a City of San Francisco Landmark, in addition to being part of the Civic Center National Historic District. It clarifies that removal of the 170 Fell St building would have a detrimental effect on the landmark status of the complex and that its architectural integrity would be affected, thus the eligibility of the complex for the National Register of Historic Places would be changed. Still, SFUSD was convinced that 170 Fell St. building was not of significance.

During the consultation process, in December 1996, the San Francisco Mayor tried to intervene. A memo in the SHPO's office (December 16, 1996) documents a phone call from the Mayor's office saying that the Mayor wants the SOTA project to happen, "*historic preservationists should not stop it*", and their requirements are "*unreasonable*". The individual who received the call explained the process. Apparently, the Mayor's office was not aware of the Section 106 requirement of the federal law. This incident is interesting, as it not only indicates political effects on the recovery process and the preservation of historic buildings after disasters, but also the lack of knowledge among decision makers of the importance of cultural heritage and the laws and regulations that are set for managing it. Also, it shows the important role Section 106 has in the protection of cultural heritage.

Memos in the SHPO's office indicate that during the consultation process, there were many suggestions on how the suggested SOTA program could fit into the existing buildings. The sessions were active in the sense that professionals provided sketches for SFUSD's consultants suggesting solutions for the issues preventing the reuse of 170 Fell St. Also, preservationists provided a lot of compromise in the preservation of the interior spaces in order to allow for maximum accommodation of the new spaces and save the building. Interestingly, the suggestions of the preservationists were taken by the consultants for further development. The consultant's approach was to remove columns from spaces that needed large area, thus increasing the cost of the new proposal. The preservationists, however, stated that the proposal could be done at less expense. Among the main issues was the program itself, which the preservationists criticized[15] and SFUSD upheld as encompassing of their vision for SOTA.

In April 1997, FEMA approved the project pending completion of environmental and Section 106 historic review. The initial total estimated cost of SOTA was $40 M, anticipating $10 million from FEMA for 170 Fell St. (for demolition and replacement building), $2+ million from FEMA for 135 Van Ness Ave. repair, and $24-27 million from school bonds approved by voters in 1994-1996. FEMA approved the DSR cost and established a 75% FEMA funding cap, as required for an Alternate Project.

By the end of 1997, the draft EIR was published for public comment (SFUSD, 1997). It suggested 1998 as the year to start demolition and construction work, to be finished in 2000 with a budget of $46 million. It identified funding sources as FEMA (for the amount of $14 million), and bond issues for $32 million. This was not supported by the SHPO who commented that the Section 106 process was not finished yet and FEMA might still not approve that project.

The draft EIR attracted comments form the SHPO and preservationists. There were many concerns over what the draft implied. Comments were accepted from Dec. 1, 1997 to Jan. 19, 1998, and there were public hearings in February of 1998 about the draft report. The main comments accused SFUSD of inflating the costs for the option that preserved the 170 Fell St. building, intentionally not mentioning the significance of that

building, not appreciating the cultural or historic aspects of the building, assuming the amount of FEMA funds to be granted, not taking Section 106 seriously, and using the EIR to justify the demolition decision. The draft EIR was accused of being not accurate, complete or objective, among many other comments on architectural and planning aspects (SFUSD, 2000).

Other comments came from the public who were worried about the school itself. Many parents were talking about the need for SOTA and urged SFUSD to work these problems out and get the project underway. However, the EIR and the responses SFUSD provided to the comments presented the issue with incomplete information. An image for the proposed project showed that the project would work if 170 Fell St. was demolished. This put the preservationists into a defensive mode in one of the meetings, and they had to clarify the importance of historic preservation.

4. Revised Improved Project mid 1998-1999

It was clear that the consultation process was stalled. In 1998, FEMA advised SFUSD to submit another request for a Revised Improved Project. SFUSD was planning to buy and relocate to a new building. The proposal was to earmark the money allocated to relocate SFUSD staff to a new building for the SOTA, while FEMA funds would be used for the move to the new office building. The project was approved in a letter dated Sept. 27, 1999. A total of $15+ million was approved for the complex.

SFUSD applied for the Revised Improved Project at the end of 1998, and the decision on the project was only finalized in March 2000 when the Section 106 process was complete.

During that time, a new elected board came to SFUSD and the approach to the project completely changed. They provided presentations in public hearings to the LPAB, which clarified the earmark of the FEMA money for SOTA, that the 170 Fell St. building would be mothballed awaiting funds to fully rehabilitate it, and that they would not demolish 170 Fell St. as long as it could “feasibly” be repaired.

This phase ends with the signing of the PA. According to the Section 106 PA, SFUSD had two years to develop an alternative for the use of the buildings, would

provide public hearings and presentations before the LPAB, and allow for interested groups and individuals to comment.

In 2000, SFUSD made their final resolution about the EIR. The resolution adopted an option that keeps 170 Fell St. and allows for adding a new two-story building on the site to accommodate any spaces that could not fit in any of the existing buildings. On the basis that they did not have sufficient funding, the renovation of the complex was planned to be implemented in three phases, starting with 135 Van Ness Ave., then the auditorium, (with or without the two story building), and finally 170 Fell St. (with or without the two story bldg). According to the chosen option; 135 Van Ness Ave. would be rehabilitated, 170 Fell St. would be strengthened, and a new two-story building would be constructed between 170 Fell St. and the auditorium. 170 Fell St. would remain "mothballed"[16] until SFUSD obtained funds to renovate it. Also, indicating the new attitude of the new board, the new resolution acknowledges the historical significance of 170 Fell St.

This time is tinted by confusion over what happened to the SOTA project. A letter from Eureka (Eureka Valley Trails & Art Network, letter to FEMA, April 19, 1999.), an art foundation in San Francisco headed by the same artist who suggested the project, was sent to FEMA and to all parties involved in the consultation process. They said that FEMA money was supposed to go for SOTA, and that that was the resolution that the former SFUSD board made. They also said that the new board should respect the earlier plan by keeping the money and using it for SOTA. Later, there were several presentations for the public held at LPAB that explained the new plan. The minutes of the last meeting of the SOTA task force (August 10, 1999), states that the SOTA project would start in two years, that for two years the buildings would be used by SFUSD to save funds on rent, and that SOTA would stay in its current place for three years. By the end of the three years, the complex on Van Ness Ave. and Fell St. would be ready for them to move in.

The PA was implemented in January 2000 and provided SFUSD two years to develop a plan and provide public presentations on their intentions regarding the complex's future. However, they did not follow through on this commitment.

5. 2001-2003 Deterioration by neglect

After the PA was signed, little was done on the project. Available letters indicate that early in 2001, about 95% of the SOTA plans were done. On the other hand, towards the end of 2001, the homeless, again, broke into the building. For a time SFUSD was without a Facilities Manager, which left the project without attention.

In December 2001, there was an informational presentation about the complex for LPAB (LPAB, December 19, 2001). Some of the public pointed out that it was wrong to use the SOTA money for a new office building for SFUSD, as that meant the administrators are more important than the children. LPAB members were trying to understand where the project stood. The new Facilities Manager was not sure of the details and was under the impression that all funds were spent. He was not aware of the special bank account for the project which still had the money. However, members of LPAB were frustrated about being told different things in the past by other SFUSD representatives. They pointed out that they were given assurance that SOTA would happen and that Fell St. building would be rehabilitated, neither of which had happened.

The presentation is important in that it reveals many issues. LPAB was told different things by various SFUSD staff and but had no jurisdiction over the outcome. LPAB expressed concern about the accountability of former employees who presented information that was not true and about SFUSD for leaving the buildings to deteriorate. The public attending the meeting, especially parents of students, also expressed anger and frustration over the project's turnout.

In February of 2002, SHPO sent a letter to FEMA pointing out that SFUSD was compromising the building's historic integrity through neglect, that SFUSD did not do what was required by the PA, and that it was obvious that the repairs of the buildings would not be cost-effective anymore. It seemed that that was the intention of SFUSD. The SHPO pointed out in a memo in 2002: "there is a mountain of evidence in the public

record that indicates that the SFUSD's desire to demolish this building accounts for the history of neglect". As such, maintaining a historic property could not be successful by postponing action (mothballing), especially if the buildings were mothballed while they were damaged.

The required mothballing covered protection from pests, proper ventilation, securing the building, and removing hazardous materials from the building (i.e. asbestos). The SHPO's letter led FEMA to follow up on the project, leading SFUSD to start the required procedures. Mothballing was not performed until November 2002. Since SFUSD was not in conformance with the PA, FEMA could have cancelled it and required SFUSD to repay the $15+ million they were given. However, memos show that FEMA, SHPO, and OES were aware that SFUSD could not pay back the funds. Thus, they pushed SFUSD to comply with the requirements of the PA: mainly mothballing and the public presentations. In December 2002, SFUSD was given until Feb 2003 to complete all these tasks. However, SFUSD still had no concrete plan for the future of the buildings.

The final documents related to the building indicate that SFUSD finished the tasks required by the PA in 2003, but later than the initial agreement. A visit to the site showed that the 170 Fell St. Building was still mothballed and that 135 Van Ness Ave. Building was being used as offices. There are no indications of progress on the SOTA project.

Variables Affecting the Recovery

Context

1. The context's main effects were:
    a. Regulations and laws: Requirements of Section 106 and CEQA made a difference in the project outcome.
    b. Local educational needs: Needs of schools and students for more space and a specialized arts school. This set SFUSD's priorities.

c. Political support. SFUSD had the support of the Mayor, and that might have had an effect on their attitude towards Section 106 consultation.
d. Administrative hierarchy: SFUSD is not accountable to the local government.

Players

1. Owner's internal issues:
    a. Instability of staff. Director of facilities kept changing, which delayed the project and created confusion.
    b. Change of leadership. The change of the board led to a more flexible approach.
2. Attitude:
    a. Early position on demolition reveals attitude about the historic building: Even before the final documents and studies for SOTA were done, parties in the professional group claimed that for SOTA to succeed, 170 Fell St. had to be demolished.
    b. Compliance with PA. The SFUSD was not in compliance and allowed the building to deteriorate.
    c. Public participation is just a formality: SFUSD did not take it seriously in their own meetings or in the Section 106 meetings. "Resolution will be approved after a public hearing" appears many times in their letters. Public hearings and meetings are just paperwork they have to go through. Section 106 was considered a political problem, not a process for developing better alternatives.
    d. Lack of compromise or cooperation from owner, even after historic preservationists provided compromise on the adaptation of interior spaces. SFUSD insisted that they had a specific vision for the SOTA.
    e. Perception of buildings' ability to accommodate the new functions. SFUSD was not demolishing the gymnasium or auditorium even though they were severely damaged, and even though they might be hard to

reconfigure to accommodate a new function. There was a perception that a new building had to be built, and thus a building had to be removed. The attorney's letter (Dec 1996) referred to this in passing.

3. Stewardship: A public agency that is a steward of a complex eligible for the National Register does not understand what that implies, as being entrusted with cultural property of future generations.

Process

1. Complications of applications and process:
    a. FEMA initially pushed for building replacement funding (i.e. demolition), as requested by FEMA program, because restoration appeared to be more expensive than replacement. FEMA would not approve funding for any retrofitting stating that local code does not require it.
    b. Red tag understood as a demolition recommendation.
    c. Application process needs specialized people to manage it.
2. Lack of early consultation with SHPO: in 1995 the board of SFUSD, after a public hearing, decided to demolish 170 Fell St. without consulting with SHPO.
3. Perceptions of values. The complex has aesthetic, historic, cultural, educational, functional, residential, and civic values. But there was no process for communicating the values among all stakeholders effectively. The homeless were one group that tried to indicate the value of the building to them, without having voice in the process. Parents were also frustrated for the lack of power over the outcome and LPAB voiced their concern several times.
4. Deferring repairs: mothballing led to postponing needed repairs and now the cost is much higher.
5. Project management:
    a. Too much change of consultants. Consultants were replaced many times during the project sometimes doing the same work.

   b. Late decision: The decision about what to do with the building came only in late 1995.
6. Effect of professional services:
   a. The program was developed based on preconceived assumptions that affected the development of the entire project.
   b. The perception that some of the consultants had of the viability of keeping the building may have affected SFUSD's decisions.
7. Significance of building: The significance of the 170 Fell St. building remained contested until the very last EIR meeting.
8. Insufficient funding: SFUSD needed bonds to cover expenses, thus they issued bonds based on cost estimates and got them approved. However, the owner still lacked funding.

Building

1. Serious damage.
2. Strengthening and code upgrades requirements increased cost.
3. Needed to modify building spaces to adopt the new function
4. The type of intended occupation, schools, has special code requirements.
5. Location of building, determined it as best suitable for a school of the arts.

Historic Character and Integrity of Fabric

There were many times during the progress of the project where issues related to maintaining the historic character or integrity appeared. However, the issue soon became about the maintenance of the cultural resource itself.

During the early years of the project, no issues surfaced in the correspondences despite the ongoing work of repairing the buildings. The consultant's letters indicated an understanding of the importance of the integrity of fabric. It may be due to the limited effect of the planned repairs as no major rehabilitation work was being done.

Also, it was constructive that the SHPO provided guidance early in the project. Letters of consent about repair work referenced important codes and standards. Thus,

although many perceive the problem to be that of ignorance of required codes and standards, the problem may be the unwillingness to follow such codes and standards. One suggested explanation would be that owners are used to negotiating required city codes and thus they expected that negotiating standards related to historic buildings would also work. This indicates the importance of the organizational culture of SFUSD. And it also explains why, in one early meeting for planning the SOTA project, the project team anticipated that the demolition of 170 Fell St. would not be easy and referred to it as "a political problem".

The issues that were raised were in relation to the following:

1. Strengthening requirements. SFUSD had proposed shear walls but was asked to investigate an alternate theme as it would have an effect on the historic character of interior gymnasium spaces.
2. Demolition of 170 Fell St. This was related to:

   - Initial indifference to the importance of historic buildings. In one of the earliest meetings, the art director responsible for developing an art education plan for SOTA stated that the objective is "*to create a center for the arts education for the entire district, and the 170 Fell building* (i.e. a new building) *is essential to this ultimate purpose. The effort to demolish 170 Fell, therefore, impacts the ultimate vision directly and its resolution may mitigate the success of the project*". This idea was introduced by the art consultant and thus created a perception that if 170 Fell St. remained, the project would not succeed. Also, in one of the early Section 106 meetings, one of the consultants referred to the use of historic buildings for schools as a form of "child abuse", which was not well received by the attendees (memo, SHPO, December 20, 1996).

   - Perception of significance. SFUSD disputed the significance of 170 Fell St. several times. Their understanding was based on the application for the National Register of Historic Places. They point out that under the Description section of 170 Fell St.: "*It is curious that such a talented*

architect as Reid did not redesign the older structure, incorporating it more gracefully in the new complex. But a search through the School District's archives uncovered no information to the contrary. Instead, the new complex, in spite of its value as part of the "Golden Age" of San Francisco school construction, provided clumsy and unattractive connections to the older building, which are lacking in skill, grace, or respectful articulation or even sympathetic materials or colors" (Irons, 2002: 3). This indicates how early assessments of significance are considered by some professionals to be the final assessments. Such an assessment does not mean that 170 Fell St. is not important. It is still significant as part of the development of the site, as part of the school, and as an example of its own age.

In 1981, the San Francisco LPAB designated the building a Landmark rated 2 in the 1976 Department of Public Works Architectural Inventory scale. SFUSD presents the information focusing on how little is mentioned of the 170 Fell St. St building. They also mention that on the application for the National Register of Historic Places, designation of the entire site "*was sought to provide the Landmarks Board with an opportunity to review designs for a replacement structure for the older building, thus assuring its compatibility with the newer building*" (Irons, 2002: 3).

But SFUSD fail to mention that Reid, Jr. was the one responsible for moving 170 Fell St. to its present location, that he designed the facade of the building for its present site, and later became the architect for 135 Van Ness Ave. (G. Bland Platt, comment, SFUSD, 2000: 7-7). SFUSD's rejection of the building's significance is apparent also as the EIR does not mention that 170 Fell St. is significant, while it mentions that 135 Van Ness Ave. is a City Landmark. This indicates how SFUSD could not see the cultural or historic value of the complex. On the other hand, the public, who had interest in the educational value of the complex, could not voice that concern through the Section 106 process. It is only through the EIR public hearings that that value

could be identified. It can be argued that SFUSD, as a public entity, represents the parent of the students in Section 106. This indicates that sometimes such assumptions are not true.

According to the PA (2000), which was signed and approved by SFUSD, the buildings were collectively listed as San Francisco City Landmark No. 140, and were both determined eligible for the National Register and listed as "contributory" to the City of San Francisco Civic Center National Historic District. And the area for Potential Effects, for the purpose of the EIR, is the entire District. Yet, SFUSD continued to affirm in their presentations, letters, and reports, that 170 Fell St. is not significant in spite of the fact that their historic preservation consultant pointed out in their Historic Structure Report that the building's demolition would affect the value of the entire complex and that it is highly significant.

This aspect is significant as it reflects how many professionals and owners do not understand that lists are not the final determinants on what is significant, and that heritage value is dynamic. Thus older reports that failed to identify the significance of a building do not revoke that significance. This also stresses the importance of having a new assessment with every study for an EIR or a Section 106 process, as it not only provide for new assessments, but also would identify new values for buildings.

3. SFUSD compromised the building's historic integrity through neglect, which was significant in the last phase of the project. Repair of the buildings would not be cost-effective in time. As such, maintaining historic property may not be successful through postponing action (mothballing), especially if they are mothballed while damaged and not usable. Mothballing seems to be a bureaucratic solution for unresolved conflicts, which suggests that a conflict management approach is needed.

Public Participation

Participation in this project was essential and made a difference in the outcome. Opportunities for participation were mainly through:

1. Section 106 consultation, which provided the interested public an opportunity to participate in consultations on the project in an attempt to provide a solution that would be acceptable to all parties.
2. EIR public hearings requirement. CEQA and NEPA require the preparation of an EIR, and for that report to be available for the public. It requires that the public be afforded a chance for making written and verbal comments and that those comment are included in the EIR. Initially, 45 days were provided; then it was extended to a 70 day review for the EIR, followed by a public hearing. People were also able to submit their comments in writing during the hearing.
3. The involvement of the public through public hearings before the LPAB, which is a body with advisory status for the planning commission. Presenting a project before the LPAB allows for representatives of the public to comment and to provide recommendations about it.

Thus, the participation process took place because of laws on three levels of government.

The documents had different aspects of participation issues:

1. Time of participation: All forms of participation took place after decisions were made. SHPO pointed out in their comments that SFUSD's consultation with the SHPO (Section 106) should take place early in the planning stages so that there would be a wide range of alternatives open for consideration and that SFUSD did not seek such consultation early enough. SFUSD did not approach the 106 process as a consultation process that would help them reach a satisfactory solution for all parties. Instead, it approached the consultation with a specific decision already made and as a bureaucratic step towards getting FEMA funds. What is important here is that SFUSD had control of the timing of participation after they developed the project. The participation here is that of comment making, not necessarily being part of the decision making.

2. Effectiveness of participation: The existing process provided interested parties an opportunity to make their concerns public and to halt the demolition of a cultural resource. The significance of this is even apparent after the Mayor tried to intervene. The Mayor's attempt to halt the intervention of historic preservationists was only stopped because Section 106 is a federal requirement.

When considering the effect of both the public hearings (for the ERI) and the 106 consultations. EIR only required for public opinion to be presented; but the public had no power. Section 106 does not provide real power to the public or the SHPO, but it requires that options be investigated, the SHPO be given sufficient opportunity to comment on the project, and the public be involved. The dynamics of the consultation requires that Section 106 be complete before the funding is approved.

The importance of Section 106 is better clarified when considering that SFUSD made it clear that the project does not fall under the authority of the LPAB, and that SFUSD made two presentations as a courtesy to LPAB[17]. Thus, the local government, as representative of the people had no power over SFUSD in that respect. And members of the LPAB, in their comments on the EIR, were shocked that this would happen in spite of the bond measures that were approved by the City and paid for by San Francisco citizens.

Section 106 provides participation for the public who are interested in preserving the historic property. It's a process that does not necessarily provide open participation. On the other hand, the EIR public hearings are open to the general public, and different points of views are expressed there. However, the effectiveness of any of these participatory elements is limited. It is subject to the context of participation. As shown in Table (9), all the participation opportunity provided the public with limited powers. The public had the power to comment, but not to be part of the decision-making process. This is more critical in the Section 106 process, which did not incorporate members of the public. Section 106 was mainly to allow for the preservation of the historic and cultural values of the buildings as they are identified by the historic preservation community. The value that he public had for the building, mainly as an educational

facility, is only documented in the public hearings fort the EIR. As such, Section 106 did not work as a public participation tool.

Table 9 Levels of participation in the case study.

	WHO	**HOW**	**RESULT**	**WHEN**	**REGULATORY LEVEL**
EIR	General public	Public hearing to be part of final EIR	Documentation of opinion	After all project studies is done	State and federal levels
Section 106	Parties interested or invited	Consultation	Development of new solution	During project development	Federal
LPAB	General public	Presentation and public hearing	Recommendation of LPAB to the planning commission: approval or not	Just before Implementation (permits)	Local
SFUSD	General public	Public hearing	Adoption of resolution by the board	After studies are done	Local

3. Which public? The public hearings for the EIR showed many responses. Two main perspectives were presented: those who wanted SOTA to materialize and were confused because of the delays, and those who did not want any demolition to take place. These two values were present in most of the public hearings. The LPAB public hearings also identified the value of the building as part of the civic cultural heritage of the city and an important part of the urban fabric.

Those interested in SOTA were mainly parents of students. Their concern was over the delay in the project. The information presented in the EIR was not accurate. The report failed to mention many points about the significance of the 170 Fell St. building. Also, it presented the project as if the historic preservation element was a hindrance for

its progress. This made historic preservationists defensive during one of the meetings as they had to explain why historic preservation is important.

What is significant here is the fact that the public had no power to influence the outcome. They were given many promises in many public hearings, yet the project did not proceed. This concern was voiced during the last public hearings in 2003. This also applies to LPAB, who voiced concern over the progress of the project and sent letters to the SFUSD, but had no jurisdiction over the outcome. This is a result of the level of public participation provided, since it provided the public with a chance to voice their concerns only. The decision-making power was in the hands SFUSD mainly, but the funding process, through Section 106, provided temporary indirect powers for the historic preservation community, which helped save the 170 Fell St. building from demolition. Sine literature stresses the importance of having the public as partners in the decision making process. This outcome of the project led to isolating the building, which is part of the built heritage of San Francisco, from the people. This is not in accordance with principles of sustainability.

Case Study 3: The Geary Theater

Initially built as the Columbia Theater and Annex, the building permits date to 1909, and the building was opened in 1910. It was built as a cultural center for San Francisco in the reconstruction period after the 1906 earthquake and fire. The building was constructed as one of the early theaters to replace the theaters lost in the fire. The name: Columbia, was taken from the original Columbia theater lost in the fire, which the new building was to replace as a state-of-the-art building. The owners, Gottlob and Marx, wanted to make it a showpiece of their operation. They organized performances for nationally and internationally acclaimed performers. In 1924 it was briefly renamed as the Wilkes and the Lurie, but in 1928 it became the Geary Theater.

The building is significant because of the detailed elaborate architectural design and ornamentation both inside and outside, consistency of use and remarkable state of preservation (it had minimal changes over the years), and because of its role in the

service and development of the cultural and artistic life in San Francisco. The Historic Structure Report points out that the Geary is not only significant because of the building, but also because of the American Conservatory Theater (ACT) as an important professional theater in San Francisco that fostered quality performances over time.

ACT, the owner and manager, was founded in 1965 as a non-profit organization interested in theater and education. They provide nine plays each year (according to their application for a mitigation grant), and they are the only organization as such that is accredited for providing a Masters of Fine Arts degree. They have many other educational activities with different age groups in the Bay area. ACT bought the Geary Theater in 1975 yet they had been performing there since 1967.

In 1975, five months after it was transferred to ACT ownership, the Geary was officially listed on the National Register of Historic Places. And in 1976 the Geary officially became a designated Landmark of the City of San Francisco.

According to the historic report, the areas of significance are the Geary Street façade, the auditorium, and the main lobby. On the other hand, the annex is not considered significant and its only element of significance is the Mason Street façade. The building is assumed to have been added on at a later date to provide the much needed service spaces (Page and Turnbull, May 1992).

It is noteworthy that according to a FEMA DSR, the Geary was constructed in 1912 and is listed as appearing eligible for the National Register as part of an Historic District #4101-0675-0355. This differs from the Historic Structure Report.

The Geary is a building of two parts: the theater and the annex. The theater is the main building and has a dumbbell shape. It is a steel frame structure that supports reinforced concrete floor and roof slabs. It has concrete exterior walls on the rear and the sides, in addition to the proscenium wall. The front wall that faces Geary Street is steel frame and unreinforced masonry infill, and it has cast-stone and terra cotta ornamentation.

The building was constructed in the Neo-Classical style with Corinthian columns framing high arched windows on the front façade. Elaborate four-color terra cotta has

Baroque spiral columns around the windows, with images from classical Greek mythology symbolizing the origins of drama. The architects were Bliss and Faville, one of the prominent architectural firms in the city at the time of construction.

The annex, which is attached to the stage part of the theater building, is rectangular in shape and almost half the height of the main theater building. Its function is mostly supportive as it is used to transport stage sets from the side street (Mason St.) and houses the rehearsal and dressings rooms. It has wood framed walls and roof with unreinforced brick masonry walls and is four stories in height (Page and Turnbull, May 1992, 5-6).

The Loma Prieta earthquake caused extensive damage. The most significant was in the theater where the plaster proscenium ceiling and the light grid fell on the seats and orchestra. Also, the mechanical penthouse fell through the roof, and there were cracks in the plaster and walls. The damage was sufficient to trigger the San Francisco code's requirements, including seismic upgrade. The ACT was already planning to improve the theater, so all upgrades had to be implemented at once.

The theater planned improvement to the amenities provided to patrons: restrooms, handicapped accessibility, additional lobbies, improved audio-visual systems, and electrical mechanical systems. The improvements also included backstage facilities to update the theatre's technology. In the initial proposal, ACT had planned to demolish many parts inside the theater, mainly circulation spaces, to make the required changes; demolish the entire annex building's interior to accommodate the upgrades in backstage; and strengthen the buildings. They planned to preserve the auditorium and the facades.

Stages

Pre-earthquake

In late 1980, ACT prepared studies for the rehabilitation of the building. The fact that the building is historic was taken into account and a preservation consultant was involved through the development of options.

1. **1989-1991: Understanding the FEMA process**

The main issues that were faced during this period were: understanding what was eligible for FEMA funding, what the roles of all players were, and how to go about the application for funding. There were complications in understanding eligibility of mitigation work for FEMA funding.

According to a letter by ACT, they came into contact with FEMA in a public meeting held on November 13, 1989 for not-for-profit institutions. The meeting tackled what FEMA would consider eligible and FEMA announced that they covered costs for code-related work that resulted from repairs of the earthquake damage. Thus, ACT assumed that upgrade to the local code would be eligible. In that letter ACT provided an outline of their estimated expenses. The cost distribution showed 23.83% emergency work and repair, 10.65% operating expenses resulting from the earthquake, and 54.70% for seismic stabilization required by San Francisco Building Code totaling $2,250,000, with the State of California/ACT share being $1,238,100 because FEMA covers 75% only.

The owner was planning to amend the application and add expenses for mechanical and electrical work required by the San Francisco Building Code, as well as additional earthquake related operating expenses. That would bring the total cost of seismic stabilization to be 41.4% of all work. It is noteworthy that the other estimated code work (mechanical and electrical) was about 30% of the total cost. However, FEMA did not approve all these funds at the beginning.

In 1990, ACT and FEMA were still debating the cost and eligibility of strengthening code requirements. FEMA stated that they only acknowledged state code and not local municipal code. This led ACT to ask Congresswoman Nancy Pelosi to intervene, and she addressed FEMA on that in a letter in which she pointed out that federal regulation states that seismic costs do qualify for reimbursement. Letters between FEMA, ACT, and Pelosi indicate that FEMA personnel were unconvinced at the time that upgrades to local code requirements were eligible. They said that the State Historic Building Code (SHBC) took precedence over the local municipal code. However, a newspaper clip (Hamlin, March 26, 1991) about the Geary Theater, FEMA director

stated that the local code was covered by FEMA and that since FEMA has not worked in an urban setting before its personnel were not aware of all applicable codes.

In another political intervention, in 1990 the Mayor tried to follow up on the project thinking that it was the SHPO who was delaying it. His office called the California State Departments of Park and Recreation who clarified that the SHPO had no role in the disputes; the dispute over the scope of damage and repairs was with FEMA.

There were issues about the damage assessment and eligibility of repairs and strengthening. ACT was not clear on the role of the SHPO and thought they needed SHPO approval for the funding. When ACT asked for help, the SHPO clarified that they were not part of this dispute between FEMA and ACT. This shows the confusion at the early stages, which did not help the project to proceed.

2. 1991-1992: Starting the project

In a letter of April 1991, the SHPO provided comments on the DSR for the Geary. The SHPO directed the owner's attention to areas of possible future conflict. These included the need to use the SHBC as the prevailing code, the potential conflict between that code and Section 104 (f) of the City code, and the need to work with the local building officials so that there were no delays. Also, they were advised that there are certain requirements in the SHBC that they would need to take note of, such as the Historic Structure Report, which they would need to prepare. This approach from the SHPO helped prepare the owner and reduced later problems. The SHPO pointed out that these were issues that usually created project delays.

A letter in June 1991 reflects that the owner had consultants working on the project and the architects were studying code related elements in the plans. The project was being developed and there were negotiations with the City, FEMA, and the SHPO about the code requirements. Issues of Americans with Disabilities Act (ADA) and restoration of certain spaces were identified. The original date of design submittal was set for November 1991.

The SHPO called the owner in July 1991 to stress again the possible conflicts between local and state codes, that they would need to provide a Historic Structures

Report, and that plans and specifications should be according to SHBC-especially regarding new additions and alterations. This clarifies that the owner did receive guidance about such issues which always creates delays.

3. 1992-1993: Preparing the Project

Consultants were studying the alternatives for the seismic strengthening. These alternatives were weighted in relation to their cost and effect on the historic character of the building. The plans were developed by architects, structural engineers, and a historic preservation consultant. A shear wall was suggested in the lobby at the plane between the lobbies and the auditorium. This addition was considered of significant effect on the historic character and required a Section 106 consultation. It seems that the owner did not expect the consultation to take place or to take time: their scheduled date of construction was missed as the project was going through the consultation.

In a letter to the interested parties, the owner pointed out the challenge of building a theater audience in the age of TV and cinema. Also, they mentioned that the downtown area did not encourage people to come since there was no urban civic life in that area. Consequently, ACT was trying to attract and keep their patrons by providing attractive, comfortable harmonious public spaces, which they expected to provide by new patron amenities. Thus, ACT advised FEMA that they planned to upgrade the building with regards to updating stagecraft, patron amenities, fire safety, and handicapped access. The last two were driven by codes. They clarified that the addition of the suggested shear wall allowed for capturing space that could be used for much needed restroom facilities.

The revised ground breaking schedule was for April 1992 (delayed from 1991), but the Section 106 consultation started in September 1992. The consultation faced several issues as the owner was proposing a grand rehabilitation plan. Most interior spaces of the Geary Theater were affected by the changes and all spaces of the annex building were to change. The consultation aimed at reducing the effects of such changes on the historic character of the building. This required the owner to make some alterations to their plans, or provide more detailed plans for their proposal. An important

positive effect of the improvements is that they demolished the toilets behind the main facade's windows, thus allowing for those windows to be open again, restoring the historic character.

One aspect of delay was that the submitted drawings did not provide sufficient information on the proposed changes. ACT was asked to provide drawings for the consultation that clarified what they planned for specific spaces and materials. The drawings they submitted did not have annotations and thus FEMA was not able to provide any comments or decisions. This created delays later in the project, when the construction work started.

As the design progressed, there were more submittals to SHPO and FEMA for approvals.

The effects of the suggested changes were to be examined and SHPO identified more issues regarding the auditorium, annex, paneling, and other spaces. They asked the owner to provide clarifications. Also, the owner had a historic preservation consultant, which is frequently the case for such projects. This shows that owners usually have professional advice available on the effects of their proposed changes.

4. 1994-1995: The MOA and Construction

The Section 106 Memorandum of Agreement (MOA) for the project was signed on February 14, 1994. Early in 1994, FEMA sent a reminder to the owner through OES that they had not responded to any of the comments on the plans, which they were required to do. This was a source of delay from the owner's side as well. A month later the owner responded, and the SHPO had comments on the proposed work. Most of the issues were about finishing and maintaining historic materials in place, such as keeping original balustrades, medallions, and glazing. All that would not affect the theater's work and should not have been an issue for the owner.

The owner suggested an addition over the annex, which required sight-line studies. Such studies investigate the visibility of the addition from the streets and evaluate the visual impact on the historic character of the building. However, there were

delays in submitting some work to the SHPO and FEMA. The first floor plans were not submitted even after the project construction started.

Some issues remained unresolved until the construction work started and the contractor had to address them on site. They included the lobby that the owner never submitted the plans and drawings for, the decorative plaster work in the theater and lobby that was still to be resolved, and the annex building additional floor that was still under study and negotiations. The latter issue was not critical (as it came later in the construction schedule), but the first floor elements could have been resolved earlier. They created pressure on the owner, as construction delays would increase cost. There were other changes that the SHPO approved, such as the demolition of the entire annex buildings except for its façade and the reconstruction of a new building behind that facade. This was approved on the grounds that the only significant aspect of the annex building was its façade.

One problem that appeared after construction began was how to keep the façade of the annex building in place while constructing an entire building behind it. The proposal for that building did not address the details of realizing the plans. The contractor suggested three methods: 1- to demolish the façade then replicate it using new and used materials; 2- to remove it in reinforced sections, and rebuild it after the new structure was built; or 3- to shore the façade in place and construct behind it without removing it. While the third option might seem the best in terms of maintaining historic fabric, it has a negative safety aspect as it is hazardous during construction because that area is also the main access for the theater construction project. The second alternative was preferred by the SHPO representative[18].

In May 1994, a meeting was conducted to resolve remaining issues, which were the Mason St. façade and auditorium finishes. Most issues were resolved, and sight line studies required for the roof addition on the annex were requested to finalize the decision on the roof addition. In the meeting ACT pushed for finishing as soon as possible. However, the SHPO was clear about the requirements for the addition approval.

In June and July some issues were pressing. The question of how to handle the façade, the repairs of the lobby ornamental plaster, and the rooftop addition became issues mainly due to time criticality. These issues were being discussed as the project was running. That created delays, which, in turn, produced pressure on the owner to solve them. The owner tried to pressure the SHPO but the latter was clear on the required standards.

In August 1994, tension escalated as ACT became frustrated about the rooftop addition. That addition was visible from all streets and was not homogenous with the existing brick building, since it was of concrete. ACT could not understand what the "effects on the historic character" meant. Later, budget constraints led ACT to decide not to construct that addition, yet they remained discontented with the SHPO's position about it. Once that last issue was resolved, Section 106 was concluded in December 1994 and work commenced as planned. The owner was informed that they should notify FEMA and the SHPO of any changes, and that FEMA would make visits to the site.

The project was finished a few months afterwards, in 1995, one year after the original scheduled date of completion.

Variables Affecting the Recovery

Context

1. Economic conditions: The ability to get the extra needed funding through donations and grants.
2. Owner's state of mind: The theater was closed until all strengthening and repair was done. Meanwhile, ACT was performing in many rented theaters around the city, thus they were pushing for a quick finish for all paper work. The extra expenses were a negative impact on ACT, incurred because they had to perform in many theaters.
3. Political intervention: Congresswoman and Mayor's support.

4. Perception of the recovery process: The owner's initial schedule shows that they assumed less time needed for the Section 106 consultation and FEMA funding approvals and reimbursements.

Players

1. Owner's position about historic buildings: The owner wanted to save the building, but they were not familiar with the required standards. Owner's valuation of the building was mainly as it relates to the theater, it patrons, and theatrical performances. While they understood the historic value, they were not aware of the standards that relate to it.
2. Trust in FEMA and other government organizations seem to be limited.
3. Flexibility: the owner canceled the rooftop addition, and were flexible on other sources of complications in their design
4. Perception of process: owners often provided logical explanations for what they wanted, but FEMA was interested in management of federal funds; even if the project made sense, that did not make it eligible for funding.
5. Unfamiliar concepts: "adverse effect" or "visual effects", were not understood by the owner.

Process

1. Funding:
    - Initial information: FEMA said in an initial meeting that they would fund work required by code, thus the owner demanded it. Initial information is critical as it sets the scene for decisions that follow and the owner loses their trust when rules change.
    - Not understanding the roles of different players.
    - Information flow: there were a few hindrances when some letters did not reach the owner through FEMA or OES in time or at all.

2. Construction and document preparation:
    - Team of owner consultants. Their knowledge of standards and process can either help or complicate matters.
    - Pre-construction detailed planning: The contractor faced some issues that were not investigated earlier or that needed SHPO approval. This increased cost and time during construction.

3. Pre-identification of sources of complications:
    - Providing early information and warning of sources of conflict.
    - SHPO and FEMA awareness of sources of conflict was helpful.

4. Following directions and procedures. Submitting what is needed.

<u>Building</u>

1. Degree of change anticipated. The more change, the more the SHPO will have to approve.
2. Building occupancy type, which affects code requirements. Theaters, as public gathering spaces, have different seismic strengthening requirements.
3. Previous building upgrades affect how much work is needed to upgrade now. In this building they had to remove all mechanical and electrical systems and conduct a complete rehabilitation.
4. Previous plans for the buildings. ACT were planning a rehabilitation before the earthquake, so it happened during recovery.
5. Details in the buildings: ornamental plaster, terra cotta details, any special details that will need special attention and care.

Historic Character and Integrity of Fabric

The building faced many issues, as it is rich in ornament and detailing. The major issues were:

- Effects on internal spaces character:

  1. Strengthening requirements: The added shear wall- resolved by creating larger openings to reduce the architectural effect of the wall on the auditorium.

  2. Upgrading of amenities: Demolition of many staircases, walls, rooms and restrooms, for either code requirements or improvements. This included demolition of ornamental plaster from one of the lobbies. The owner's architect suggested replicating that plaster but the SHPO pointed out that that would be a fake solution.

- Effects on external historic character:

  1. The Annex: Code requirement of SHBC and the Uniform Building Code (UBC) for strengthening led to demolition of the entire annex except for the facade. Also, ACT added a penthouse above the annex. The SHPO required that all the details of the front wall be kept, and that the additional floor be set back so that the penthouse was not too visible from the street. The issue was that the building is not historically significant and only the façade was of interest; this is critical as it results in "Façadism", the focus on facades and neglect of the building fabric otherwise.

  2. The addition on the rooftop of the annex, which was an unmitigated endeavor as it would be visible from all sides. It was of glass and concrete while the building is brick and the side of the theater is painted concrete.

- Details:

  1. The plaster ornamentation in the lobby, which needed restoration.
  2. The balustrades, medallions, and other detailing.

This project was a major rehabilitation, and this case poses interesting points. Lovie (2001), reviewed the heritage management actions in Granger Town, Newcastle Upon Tyne, United Kingdom, and he points out that the most difficult task for conservation in urban centers, other than preventing demolitions, is the adaptation of

historic buildings. He identifies two main approaches in this regard: 1) Façadism, which reduces the historic building to its facade and builds a new building behind it. This assumes that the value of the building is in its façade only and that is the sources of its historic character. 2) Seeking maximum reversibility, this attempts to construct all needed adaptations using methods and materials that could be removed later. This can lead to changes that compromise the integrity of the historic building while the adaptation lasts. And sometimes the work may not be as reversible as anticipated.

This clearly identifies part of the issues that the Geary faced, as its annex was completely rebuilt except for the façade. A SHPO memo pointed out that they realized this later in the project. This happened mainly due to the fact that the annex was determined to be of less significance.

This relates to the issue of value: how different spaces are valued in general, and especially after a disaster, when there are pressures for resuming functionality. That is strongly influenced by the use of the space and the context of the rehabilitation. As the owner wanted renovations, it is important that improved amenities and services are introduced and this includes service spaces. The strengthening of the building meant that most of it needed to be changed. And since the annex contained only spaces used for serving the main building it was not considered significant. A question that this creates is: what is the value for service spaces in historic buildings?

Public Participation

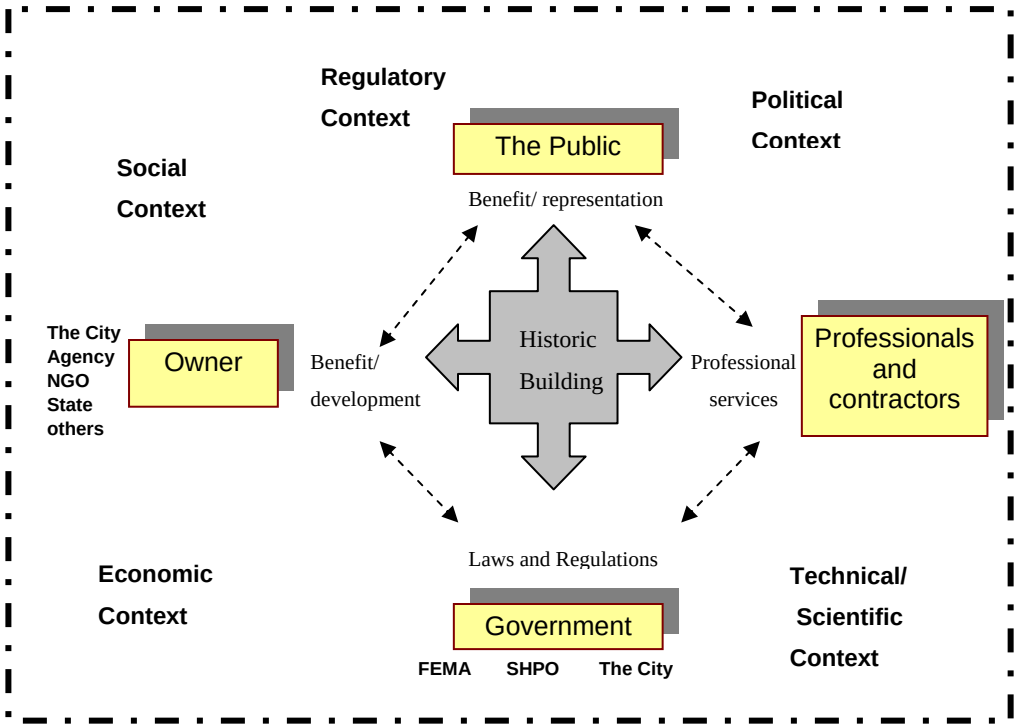
There was no serious public participation in this project. The consultation took place among FEMA, the SHPO, and ACT. The Foundation for the Architectural Heritage of San Francisco received copies of some correspondence. This suggests that public participation becomes essential when an issue is controversial, mainly if demolition is a possibility. In other situations there is no active participation in decision about historic buildings.

General Discussion of the Case Studies

Variables Affecting the Recovery

The variables affecting the recovery are under four categories (figure 11). 1) The building itself. 2) The process that identifies the type of communication and cooperation that takes place. 3) The players, each have their own relationship with the historic building, which is regulated through existing laws. 4) And the general context of the recovery, which will affect all the other variables. The arrows between the players are significant as they indicate the communication of values, beliefs and ideas, which is what the participatory process is for. However, the study indicates that such communication was not always efficient, thus it is shown in dashed lines.

Figure 11 Model representing the variables that affect the recovery process.



Based on comparing the three projects, the following variables were identified:

The Process

- **Initial Positions:**

  Owner's initial position. The initial position of the owners was different. Unlike the first two projects, the ACT knew that they want to repair the building and had no doubts about what they wanted to do. Their problem was that they were lost in the procedures and eligibility of suggested strengthening for a while. The SFRA wanted to demolish the Williams Building and were convinced that it would be feasible. On the other hand, SFUSD were not sure of what the future of the building should be. They initially decided to keep the building and repair it to its original function, however, they were told that FEMA would not support that, and FEMA pushed for its demolition. Having early specific plans for the building help reduce delays.

  Clarity of initial information from FEMA. FEMA initially pushed for the demolition of 170 Fell St., then changed their position. Also, they stated in a public hearing that strengthening will be covered then they withdrew that statement (for the Geary). Initial confusion about such elements wasted time as it set the owner in a certain mind set, and then expected them to change it.

- **"Dancing with FEMA".** This statement is borrowed from a similar expression that was used by one of the newspapers to describe the negotiation process of ACT with FEMA (Winn, February 18, 1991). It captures the spirit of the process as there was a lot of give and take, appeals, and changes. The

follow up on the process requires experience and all three projects had complex application processes and several appeals. The path to repairs, as such, is not a straight line and needs more processing time. This indicates a need for streamlining the process.

- **Early consultation with SHPO**. This reduces surprises for the owner and makes a difference as it facilitates early preparedness for possible complications. This also indicates attitude towards the consultation process.
- **Clarity of the SHPO's role**. The SHPO was sometimes a representative of the historic preservation interest (Geary and Williams Buildings) and in other times an outside mediator (Fell St.). A party in a negotiation process cannot be both one of the negotiators and a mediator, as that would have negative effects on the negotiation process.
- **Project management.** Choice of consultants, switching professionals, and delaying major decisions had a significant effect on the 170 Fell St. and the Williams projects. The Geary project, however, made less major changes throughout project development as they had most of the important decisions made early. This may be a result of their pre-earthquake plans and studies of the needs of the theater buildings, which supports the importance of pre-incident planning.
- **Effectiveness of stakeholder participation.** The buildings had different values to community groups. Not all values for stakeholders were addressed, which, as in the case of 170 Fell St., created conflict and supported an environment of rejection for the preservation of the buildings.
- **Misunderstanding of red tag.** The red tag was misunderstood by owners. For both the Williams and Fell St. owners, it was used to support the argument for demolition. A point to be made is that all demolished buildings were red tagged. This had helped in constructing a meaning for the red tag for the public. It may be better if a red tag just leads to detailed evaluation, and if

a building is decided to be demolished, then a new tag is given to it (ex. black). That way, a red tag would not be associated with demolition.

The Building

- **The level of needed Intervention.** Complete rehabilitation for a building requires more time than simple repairs since there will be a detailed assessment of suggested work in relation to the Standards.
- **Location.** The location of the buildings affected the decisions about them. The 170 Fell St. complex was determined as the best place for SOTA, based mainly on location. To become a school, the buildings code requirements were different from their code requirements had they been left as offices. The Geary theater location affected their decision to renovate to attract patrons to that part of the downtown. And the Williams Building was part of a redevelopment area.
- **Visibility.** The visible buildings were in newspapers and followed up by the public. Both Geary and SFUSD were highly publicized. Also, landmarks were of importance, as they generated income through tourism. Some respondents pointed out that the Opera House and War Memorial received early attention and were finished quickly mainly due to their importance as income generators for the city. However, this does not seem to be part of a conscious plan for addressing sites that are of relevance to tourism, which is surprising as San Francisco, and the Bay Area, are important tourism destinations.
- **Ornament and detailing played limited effect**. For Geary, that needed a study of maintenance and restoration. It requires attention during construction and requires specialists for its repair.

The Players

Access to resources. Extra funding was needed. SFUSD did not have sufficient funding, ACT managed to collect several grants and donations over a six-year period, and the SFRA did not work on the project but left the repairs for an investor.

Lack of understanding not lack of knowledge. SHPO and FEMA were providing information about the process and possible sources of complications. Sometimes the owners had problem understanding why such requirements had to be. Because of that there were a lot of attempts to negotiate and push for proposals that would not be accepted according to exiting standards, which complicated the recovery.

Perceptions of significance. Both the Williams Building and Fell St. building had arguments about their historic significance early in the process. This may have an effect on the owner's willingness to put the extra effort for maintaining its historic fabric or character.

Perception of the consultation. The consultation was not considered a process for developing better solutions. Instead, for both public agencies, it was a procedural requirement, more like a "hoop' to jump through. For the Geary, the process was about getting the SHPO's approval.

Trust between players. Lack of trust between players leads to conflict and lack of cooperation.

Stewardship. Whether the owner understands their role as stewards of cultural property. This was missing in the case of 170 Fell St. building.

Attitude: cooperation, flexibility, foresight, and compliance, were all elements that made a difference in the projects.

Internal factors for owner

- **Stability of staff and leadership.** This Created delays for Fell St. Building. The effect of the change of leadership and staff is clear in the progress of the project and the delays it faced.
- **Institutional culture**: for SFUSD and SFRA, both agencies are used to doing things in a certain way. They have developed a method of

management that was independent and did not allow for accommodation of the change that came after disaster. Their processes supported individual decision-making in which participatory events were merely formalities.

The Context

- **Historic preservation activism within the community.** Local community having diligence and proactiveness made a difference in the outcome; two buildings were saved from demolition.
- **Political context.** Political support led to politicians trying to intervene in the process, which happened in two projects. This may be related to the visibility of the project.

Other disasters. Northridge lead to reduction of coverage, then 9/11 lead to de-obligation of funds not used by 2001.

Needs of the community. Education, economic, cultural, and development needs provide context for use of the buildings. The Geary delivered cultural needs, the Fell St. buildings were to provide for education, and the Williams was part of its area's economic redevelopment.

Regulatory context. Existing laws and regulations created the environment within which everything was taking place and it set the relationship between the players and the building, and between the players themselves.

Technical context. This laid down the type of knowledge and technology available for the treatment of historic buildings. It is reflected in the available options for strengthening of exiting buildings or costs of conserving paint and historic materials.

Social context. The 170 Fell St. building was occupied twice by homeless groups and the building had to be secured to prevent that from happening again. On the other hand, the Geary Theater was interested in upgrading heir amenities to be able to attract more patrons in a time when society is turning to other forms of cultural entertainment.

Historic Character and Integrity of Fabric

As discussed above, these variables were cited by literature as challenging during the recovery period. Both of these variables were developed as part of the preservation process to facilitate making decisions about the built heritage, but they have come to be essential to its significance. In their study of heritage values in site management, La Torre et al. (2005) clarify that a site will have several values for different stakeholders, but its significance is the total importance of the site with respect to some of these values or all of them, sometimes in relation to comparable sites. However, current practices have come to relate the significance of place to the integrity of its fabric (c.f The Secretary of Interior Standards for the Rehabilitation of Historic Buildings). This is a result for an approach that focuses mainly on the historic or archaeological values of sites (de la Torre, 2005). For the historic preservation community, these variables are perceived to encompass the value and significance of the site, but for other stakeholders, the value of the site may be functional, developmental, or other. This difference of valuation becomes more important after disasters, because of the need to repair and restore functionality to buildings. Since the fabric of the building could be damaged, the perception of its significance might change.

Lowenthal (2000) points out that stakeholders are variable: the individual, the family, the local community, an ethnic or religious group, a region, a state, or other. And influences on heritage preservation come through: ownership, power, participation, continuity and change. He contends that cultural heritage objects are not important for themselves but for the meanings that they have for the people, the values they represent, and the functions that they provide. Thus, the meaning, values, and use of the built heritage are significant decisions in the sustainability of that heritage for future generations. These decisions are by the government, elite groups, community population, academics, and/or business people. The value of heritage is different between different stakeholders, and is the reason behind why certain decisions are made. Decisions should be based on negotiations between stakeholders so that all viewpoints are incorporated. This is not only for maintaining a democratic process, but also for

maintaining the relationship between the community with that heritage. When one groups claims ownership of heritage, it severs the relationship of other groups with it, which is against the principles of sustainability. In its essence, historic preservation is a social activity, not merely a technical endeavor.

Rhyne (June15, 1995) points out that we attempt mainly to preserve the physical. He states that at the heart of every preservation project is the question: “what are we trying to preserve?” then, immediately comes another question: “who will decide?” He points out that there are other values of importance, such as use, symbolic meaning, ritual purity, the process of production, and the process of change and rebirth itself.

This leads to considerations of the many values that a building many have. The case study buildings had aesthetic, historic, functional, developmental, economic, civic, and many other values. These were values that are identifiable because of the documentation of the limited participation that took place. A section 106 consultation provide the chance for the owner, specific groups and historic preservationists to exchange ideas, and opens that consultation for the public by request (See Appendix A). And the public hearings for the EIR and the LPAB provided more chances for people to voice their concern. Based on the two breakings into the 170 Fell St. building, we can also deduce that other groups had other values. Still, the end product of the Section 106 process in this context focused on one set of value- the historic values, as a result of the existing Standards. The process did not identify other values as worthy of representation in the PA. The Section 106 process has come to acknowledge values of indigenous peoples and that has become part of the consultation. The Programmatic Agreement (PA) focused only on protecting the historic/cultural values represented by the buildings. As such, the interests of the parents and students were not of concern to the process.

However, the process has yet failed to see that buildings develop meanings over times, which are no less important than their historic meanings and uses. The point here is that we have no idea if these buildings have any special associations for the local community now, other than the historic meaning. And should new associations exist, the Standards would not acknowledge them unless they are related to the historic fabric.

Sustainable management of the built heritage requires maintaining the values of that heritage for future generations. Our perspective of heritage is shaped by our understanding of our present (Graham, Ashworth & Tunbridge, 2000). The choice of what to preserve and what is significant changes with time. Thus, any interpretation of heritage should take in to account that it is dynamic, and that the process of heritage identification should not only incorporate all stakeholders, but also the changes that may take place over time. This aspect indicates the importance of managing the built environment in a sensitive way. It may be that a building that is not significant now would be so for future generations. The existing process addresses this in regard to historic significance only. This is evident in the Fell St. Building case, in which the original National Register nomination form did not identify that building as significant, but later studies did. It is positive that the existing process for management of cultural heritage does not take previous evaluations of heritage as is; whenever a decision is needed, a new evaluation is done. This positive aspect existed in the new evaluation for 170 Fell St. However, the changing meanings of historic buildings are not addressed. It is only the historic value that is relevant, and only in the presence of historic materials and fabrics. The argument presented here is that there is a focus on the "historic" only. The existing standards should embrace the preservation of the built heritage, as heritage. This means that the process should acknowledge that new meanings and associations are important and become part of what is being preserved. This also means that such associations should be sought, documented, and taken into consideration in acts of preservation.

The sustainability of the built heritage depends on maintaining a relationship between that heritage and the people. The meaning assigned to heritage is intrinsically related to its use. Both of them shape each other. Thus, it is important that the function of heritage be something that all stakeholders are apart of. Graham et al. (2000) contend that it can be viewed as a representation, where meaning is given by how it is used, talked about, felt, and represented. What is the meaning of the Williams Building, 170 Fell St., or other historic buildings to the inhabitants of the city of San Francisco? Are

these building preserved by the people, or by the cultural elite of the city? Does the process of their preservation help in educating the public of their value? These questions are important if the sustainability of that heritage is to be maintained. They are significant as disaster recovery is part of the history of the historic building and adds new meanings to it, which should also be preserved for future generations.

Another important aspect of the recovery and preservation processes is how they function in the construction of meaning for places. The meaning of a building for a community is closely related to its use. The meaning of a place usually regulates and organizes the way it is used, but also its use will assign meaning to it. (Lowenthal, 1985; Graham et al., 2000; Giddings, 2000). This raises the question: What is the meaning that the current standards and processes are giving to the built heritage? For example, what is the meaning of the complex on 170 Fell St. to the people of the city; especially after the SOTA project delay, and the many deliberations and arguments? The public hearing presentations constructed a new image for the building. It would be interesting to investigate how that had affected the meaning of that part of the built heritage for the community. One of the parents attending a public hearing in August, 2002 explained: "*People talk about 170 Fell as being historic. I don't know what the history is. How many people in this room know the history of 170 Fell? Three… ...But if we just keep delaying, delaying, delaying just because one building was built back in what, 1910 or something like that, we're going to have a problem. And we're not being fair to the kids*" (SFUSD, 2000). This indicates the importance of education during the process of preservation. The consultations and public hearings could be better used to educate as well as to elicit meanings for a place. It is a two-way relationship that educates all parties of the values associated with the place, as well as being a negotiation process on the best way for its repair and reuse.

The recovery process of historic buildings becomes part of the history of the building. This raises many questions: in what way is the existing process preserving heritage? Is it preserving the community's relationship with it, is it isolating the people from it? What is being preserved, its meaning, its fabric, both? What will future

generations receive? An old building that did not mean much to the majority of the people, or a part of their built heritage that represents meanings to the majority of the people? The existing process have helped in saving many significant buildings, but it has also been functioning in a way that have negative impacts on historic buildings on the long term. The buildings become relevant to a small group, a cultural elite, and only the meanings and association identified by that group are significant. The preservation process, especially in post disaster situations, need to be more critical in its definition of significance and value.

Lowenthal (2000) points out that the concept of integrity has become more valuable than other values. No matter how important the heritage is for art historians, scholars, or even the market force, its relationship to the public need to be preserved. He points out that damage and destruction should be seen as integral to heritage, as there is no physical mortality, destruction is part of the human life. Heritage management entails taking in to account change as part of heritage itself, as the heritage we have includes the changes made by our predecessors.

Taking a closer look at the cultural value of the built heritage, and from an architectural point of view, it can be grouped into three main categories:

1. Value of object: which comes from the significance of the design itself, the construction methods and approach that represent a technology of a certain time period. This is based on treating the building as a museum object and the preservationist is a curator. The object itself is the center of attention. This translates to a significance of the fabric itself and the original architectural systems.

2. Value of experience: this comes from the character of the place, its spaces, their proportions, the facades, their detailing and design. The experience can be within the building, or around the building. The significant experience can be in the urban space it creates, or the special interior spaces it provides. This translates to the significance of the historic character inside and outside the building. The inside character comes not only from the paintings, relief, detailing, or other special treatments, but also from the spaces and their relationship to each other wish provide

a specific experience in using the place. The experience may be valuable from the outside, as walking down some of San Francisco streets with their bay windows. It is the urban space created by the buildings that is significant.

3. Value of meaning and associations (symbolic meaning). This comes from the association of the place with certain events or people. This has nothing to do with the object itself. It makes the building more of a symbol of an event or a notion and thus its value transcends the fabric itself. The fabric's value is part of the object, but it is not all of it.

The existing standards acknowledge all these values, but only in relation to historic fabric. There is emphasis on maintaining the historic building in fabric. The original fabric is what gives it value and thus loss of fabric leads to loss of value. This way of valuation of historic building has serious ramifications especially in post disaster situations. Earthquake damages parts of historic buildings leading to loss of significant fabric. Many building suffered that in Santa Cruz and Watsonville, CA after the Loma Prieta earthquake, thus it was decided that the building lost its value and many buildings were demolished (Wilson, 1991; Eadie, 1998).

The challenge of disaster is in the fact that there may be major damages to the historic fabric. Does that mean that the damaged building has no cultural value anymore? Historic buildings are part of the heritage of the community and their value and meaning grow and change through time. Taking an example of the Harada House in Riverside, CA. the building is highly significant for its association with the Japanese American experience during World War II. The place has a high value due to its meaning and association. Should an earthquake damage that building and cause a significant loss of fabric, does that mean that it lost its value?

The argument presented here is that existing preservation standards need to develop beyond the historic significance, with special consideration for post disaster situations. The damage caused by the earthquake is part of the life of the built heritage, and it would have its mark on the building's fabric, and the building could continue to exist with repairs and new materials that can be documented for future generations

benefit. The value of the built heritage transcends the object (i.e. fabric and architectural systems), and is related to meanings and associations, and/or to the quality of the experience they provide through their interior spaces and the urban space they create.

Unfortunately, we tend to preserve the built heritage by reducing its development. That built heritage would have had a normal life of changes before our determination of its significance. Such changes in the past we consider historic and part of the past development of the place. It is inconsistent to determine that past changes are part of the history of the building and only limited changes are allowed in the future, and then claim that building as part of community heritage. For a building to be part of heritage, it needs to continue to have meaning for the people, and continue to be used. Thus, mothballing is not a viable solution especially after disaster damage; it is a statement that the building can no longer serve the community. The use of the building will require changes and accommodations that are part of the continued development of the building through time. Such changes would happen through disaster damages, or through preparedness for disasters as in the case of retrofit.

A point to be made here about the result of the 170 Fell St. mothballing was not helpful, but that result did not come because that building could not be used, it came as result of the owner not wanting to accept the usability of the building. That is more related to accountability than historic preservation. That new state for the building constructs a new meaning for it for the community. This would help the argument for demolishing it. As such, mothballing may not be sustainable in post-disaster recovery.

Williams (2001) points out that economic values usually precede all other values for decision makers on the future of historic centers since economic activities are the base of development. However, preservation can provide economic benefits that can help such communities in their quest for development and revitalization. The challenges of revitalization that are present for all communities become more persistent after disasters.

The exiting Section 106 process acknowledges cultural diversity; it attempts to incorporate viewpoints from Native American tribes and local groups and communities.

That is part of a larger goal. That of acknowledging the right of all community groups to heritage. King (2002) points out that conflict in cultural resources management does not have right/wrong answers, but it's about finding balance between conflicting but legitimate human values. In the case of 170 Fell St., that balance was not found. However, the problem was not of conflicting values. At the surface, the delay of the project appears to be a result of conflict between functional values and historic values. But a closer look indicates that the buildings could have incorporated the function with modifications. The conflict was more human in nature. The legislative processes on federal, state, and local levels need to develop ways for avoiding such outcome, by addressing the variables that have led to it.

Finally, the issues relating to historic character and integrity of fabric are related to the challenges of the disaster recovery period and the valuation of the built heritage. For future disaster recovery effort to be more sustainable the exiting processes need to develop to adopt a more critical approach to its value and significance. More importantly, the current standards need to change to incorporate the diverse values of heritage.

Public Participation

Balducci and Calvaresi (2005) point out that the objective of participation is to help in solving design problems when standard models are not helpful and there is a need for innovation based on knowledge that can generate new ideas and solutions. Thus it aims at "mobilizing all cognitive resources available and stimulating interaction between all stakeholders to solve a complex problem" (Balducci and Calvaresi, 2005). Within the context of disaster recovery, a community is faced with a challenging context and new problems, where their regular models would not necessarily work. As such, participation becomes more critical in disaster recovery if solutions are going to address the needs of all community groups. It is important, though, to stress that participation is a process not an outcome (Al-Nammari, 2003), thus successful management of the process leads to identifying the different perspectives surrounding an issues, the

available resources for handling it, possible sources of conflict, areas of common ground, and ways of finding appropriate solutions. It is a process that "facilitates self-reliance and produces involvement to develop a sense of ownership of the developed plans or policies". Further more, "the communication channels set up between the various actors involved will probably remain in place as permanent (social) capital for future initiative" (Balducci and Calvaresi, 2005, 244). For historic buildings, participation is significant as a tool for identifying different values related to them and thus helps incorporate all community groups.

There is a strong participatory element in Section 106, especially after its modification in 2001. The section encourages public input, but within the framework of predefined significance. King (2000) argues that the Section not responsive of problems facing real people. He points out that Section 106 is intended to provide historic preservation a fare share in planning. Programmatic Agreements and Memorandums of Understanding are often developed and signed with people who do not necessarily follow it. The content of the PA would be agreeable to the SHPO and ACHP, but the other side would not really understand the full ramifications. This is mainly due Section 106 being viewed "as a hoop to be jumped though, rather than as a creative exercise in problem solving" (King, 2000,53). This statement embodies the attitude that most owners had of the Section 106 process. It was about getting the consent of the SHPO on predetermined plans for the building, not about finding the best way to achieving their goals while respecting the special value of the historic or cultural resource.

King points out that for the owners of projects awaiting federal funding, the section 106 process only complicates matters and they go through he process "to make the SHPO happy" by doing HABS documentations or sign agreements they don't fully understand. He believes that section 106 has become too much a procedural aspect and less of a tool for maintaining cultural heritage, in its broad definition. He points out that a change is needed. He provides several suggestions in which the process is less controlled by red tape, and the reference point is not the National Register. Nonetheless, his suggestions do not focus on section 106 as a participation tool (King, 2000).

However, participation is a very important part of the process. The section is helpful in protecting heritage, but it needs to be developed to support sustainability of preservation, governance, recovery, and development.

The section 106 process has two main limitations: 1) is selectively participatory and 2) its timing limits its effect. Its objective is to protect cultural heritage by allowing a chance for considering effects of planed actions on cultural heritage. Thus, by design, it comes after plans had been developed. It provides a chance for the SHPO to comment on the effects of a project on cultural property. In this case study, the historic buildings are part of an urban area, and the process took main two paths:

1. Active participation of historic preservationists. As in the case of the 170 Fell St. building, and the Williams Building. The public participated in the form of an NGO interested in the outcome, and many individuals who are interested in the outcome where also allowed the chance to be part of the consultation.
2. No active participation. This was the case of Geary in which only the SHPO was involved.

King (2000) points out that the public is rarely invited to be part of the consultation unless an agreement between the SHPO and the applicant (owner) was not reached. This explains why the public was not as closely involved in the Geary theater project as in the 170 Fell St project. It was only when there was a conflict over the future of the building that the public was actively involved. This means that the main interest is saving the cultural heritage from complete loss.

However, there is another section of the public that was not part of the consultation, which is those who were interested in making the SOTA happen. Not all concerned parties are part of the consultation. The result is that the section work to support historic preservation, not to provide participation. This has two sides:

On the one side, it is positive that historic preservation has a chance for being considered. Usually heritage preservation does not get sufficient consideration after disasters and many cultural resources are lost.

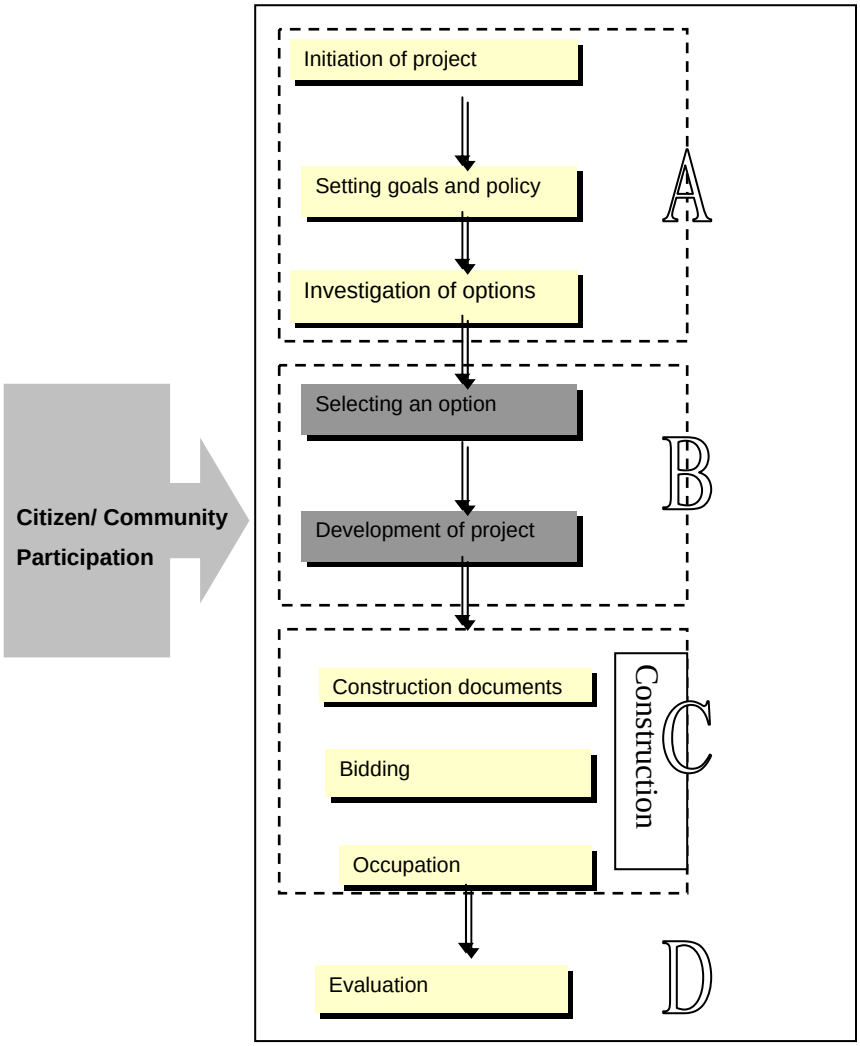
On the other hand, sustainability also requires the participation of the community so that the final arrangement would incorporate the interests of all community groups. This was not the case. The consultation in 170 Fell managed to prevent demolition, but it failed the parents of the children who wanted the school to happen. This should not mean that the demolition should have happened, it means that the PA should have taken into account the needs of such groups as well, not only the needs of heritage preservation. This of course removes the Section 106 from its current position as a tool for protecting heritage only. It means that there should be a way for addressing the needs of all groups within the process.

Haus et al. (2005) point out that public participation ranges in many levels depending on authority, from the right to information and participation in council committees to public referenda in which the public has the final decision. The public has different powers depending on the form of participation. The way Section 106 is set works as a participation tool that is also a dispute resolution tool (King, 2000). Limiting the number of participants is recommended to facilitate consultation effectiveness. This is because the management approach depends on one-stop participation in which consultation take place, agreement is sought, and then the project proceeds. Changes are needed so that Section 106 is part of a broader process that facilitates interaction on several phases of the project development, among different groups, providing different levels of empowerment. This is somewhat addressed in the Section after the changes of 2001, as public hearings are also possibilities.

Figure (12) represents the typical phases of a project. For the case studies, all participation took place in phase B, which is about selecting an option and developing it. However, Phase A, which is more critical as it is the phase when the strategic decisions are made does not have public involvement. Section 106 does not require for consultation at that early stage, but it is up to the owner to take advantage of that. This is something that the SHPO commented on in the response to the SOTA EIR, that the project was fully developed before the owner started consulting with the SHPO. Required participation takes place after the important decisions have been made. One of

the respondents pointed out to the importance of having the public part of the early stages of decision-making, not after the decision is made, as that can help in directing attention to important issues early in the process.

Figure 12 Participation and project stages, adapted from Al-Nammari, 2003.



The figure explains that:

1. Participation needs to take place at all stages of the development of the project. However, the form of participation does not need to be the same. In other words, the level of power given to the public can change according to the phase of project development, so that the negative implications of too much participation could be managed.
2. Stages A and B, can be done through public hearings and consultations. Provided that there is management for the consultation and hearing that would work out with the owner an option that accommodate all parties. They should have a minimal public right to information and input especially in relation to setting goals and investigation of options.
3. Stage C is more technical. Provision for public involvement can be through elected bodies, such as the planning commission and the LPAb. This stage should be based on options developed with public input and should focus on technical aspects.
4. The cultural management process does not have provision for stage D. which is critical for developing the management of cultural heritage. Should allow for input of evaluation and feedback that is taken into consideration.

On the other hand, Haus et al. (2005) point out the paradox in increasing participation. Too much community involvement can jeopardize the interest of groups that are not sufficiently represented, make short-term needs take precedence over long-term strategies, and can result with an elite group having more influence on the outcome. Literature contains many suggestions on how the participation process for the local community can avoid the pitfalls of democratic processes, such as the majority overwhelming the minority (c.f Evans, Joas, Sundback and Theobald, 2005; Hague and Jenkins, 2005). Thus the participation process should gain public input, provide avenue for negotiations, and allow for citizen partnerships, while avoiding the previous pitfalls.

Thus, the community should decide the level of public participation in each phase. The levels would vary from the right of access to information, to public hearings, and consultation and roundtables.

Klok and Denters (2005) discuss several limitations of participation. The selective involvement of some actors, the unequal position of actors as some may have more skills or other resources, lack of transparency in the process as a result to pre-meeting decisions, inconclusive results when consensus is not reached, open conflict, which is a result of interaction that lead to furthering disagreements, and the increased power of public officials who are key players. The processes above illustrate some of these negatives in 170 Fell St. and the Williams Buildings. A suggestion to overcome such limitations can be through developing leadership. Leadership and participation are complimentary and can work together for public benefit (cf. Haus, et al. 2005).

Success of "consensus building" strategies is cited in literature. Such strategies are face-to-face groups of key stakeholders of public agencies, local government and interest groups (Balducci and Calvaresi, 2005). It was shown that such process is effective in developing better plans and building long-term effects on social, intellectual, and political capital. That process can lead to developing trust, networks of communications, agreed upon facts about the situation, mutual understandings, in addition to alliances between the groups.

Geipel points out that citizen participation in disaster recovery may be 'a troublesome, time-consuming, and an expensive game" (Geiple, 1991). Yet not doing it leads to complication with the reconstruction effort, he points out public aversion to new housing and failure to address their needs. Successful implementation of policies and strategies requires public input.

Since the process of recovery for historic buildings is an overlay of all related regulations and laws on different levels of government, it is important to investigate where these regulations are leading. The regulatory context that works well in normative conditions may be creating hindrances in recovery effort. Should a project that is recovering from a disaster be handled similarly? Or should there be regulations to

encourage betterment? This is something that the local governments should consider. During the data collection for this paper several contacts in the Planning Department were asked about an earthquake recovery plan for the City, which they said does not exist. The lack of a plan means that the city is reactive in its approach to recovery.

More importantly, there should be a recovery plan for historic buildings. The process of recovery for such buildings, the players involved, and the buildings themselves can all be addressed in pre-disaster planning. As pointed in the analysis above, many of the variables can be changed or improved, if addressed in a pre-prepared recovery plan. Efforts for earthquake preparedness need to go beyond the structural strengthening of buildings and address the other variables if future earthquake recovery is to be improved.

Literature indicates that the maintenance of historic centers after earthquakes and disasters is highly dependant on the community's perception of their value (Geipel, 1991; Geva and Al-Nammari, 2002). Nonetheless, the recovery period is challenging for cultural property and the sustainability of the built heritage can be compromised when many demolitions take place. This happens for many reasons based on the economic challenges facing the community at the time and the perception of economic validity of preservation, among other reasons (Blair-Tyler and Kristiansson, 1999). Yet, demolition is not the only threat affecting the built heritage. The San Francisco cases demonstrate that pre-disaster laws have limitations when addressing a post disaster situation, which can lead to delays in the process. In many cases, certain compromises are necessary. The community members might need to hasten recovery and repair of their buildings, but that would not be critical if the issues were addressed in advance.

CHAPTER VI

DISCUSSION

1) **Did the recovery of historic buildings require more time than non-historic buildings? If so, what were the historic buildings that required more time?**
    a. **Time required for recovery of historic buildings is longer than time required for recovery of non-historic buildings.**

        The study has shown that historic buildings do take longer time to finish their funding process and attain reimbursements. Since this is a major process for public buildings (figure 2) it is an important indicator for finishing the recovery process.

    b. **Time of recovery for buildings, both historic and non-historic, will vary according to the importance of their functions to restoring normal life back in the city.**
        1. **Emergency Functions, such as fire stations and health care, will be the first to recover.**
        2. **Art facilities such as museums and theaters will be among the last.**

        The results have shown that these hypotheses were partly correct. Emergency buildings recovered early, but health care facilities were among the buildings that faced delays. Museums and art facilities were delayed**.**

        In response for the first question, the research has shown that public historic buildings face delays, but their recovery is not equivalent to the recovery of non-historic buildings. The recovery of historic buildings is different as they are cultural resources. Still, the functions that face delays are critical (like health care and residential), so identifying the sources of delays is important.

2) **For buildings that faced delays, what are the variables that affected the recovery? What were the dynamics of the process?**

    a. **The variables affecting the process will be mainly related to the historic status of the building.**

        The investigation has shown that the building is one of several variables affecting recovery. There are more variables affecting the recovery that are related to the context, the process, and the players involved. So the status of the building is not the sole reason for the delays.

The results of investigating the first two questions show that the recovery of public historic buildings is affected by their function in addition to the level of damage and cost. This has been shown by both the statistical and qualitative analysis. The context of recovery, the process as identified by the existing regulations, the players involved, and the building itself are all important variables in either increasing or decreasing time needs. Such variables will be in effect in different ways over the long-term and their effects change through the phases of the project.

The recovery of historic buildings requires a long term vision. Such vision should be developed ahead of a disaster. Plans for the long-term use of public buildings can be developed by facilities managers and such plans can help in making post-disaster decisions easier. For the most part, the absence of such vision was what had delayed the recovery of the chosen case studies. Such delays should not be necessarily a negative indicator and should not be compared to delays in regular repairs. A delay in a project that results in extending the useful life of the building and maintains its value for the community is a positive.

This brings to mind what King (2004) called “preservation by disaster”. The civic center was completely renovated after the earthquake: This is a long-term benefit that is better than doing immediate repairs that retain a negative status quo. The approach was to optimize the benefit from the funding, and the option of Improved Project is positive in that regard.

Thus, not all delays are negative. There is positive delay, such as delays that lead to betterment of the quality of life and optimization of the built heritage's role in the community's life. These goals are beyond the regular functions of the recovery stage and cannot be compared to regular repairs of damages.

Nevertheless, the extent of delay is important too. A question that is posed would be, could such delays be reduced in ways that would not prevent the positive outcomes? The correlation table above (table 4) has shown that delay will increase cost, thus reducing delays is a needed goal. This reduction, however, should be based on targeting the variables that increased the time needs without compromising the stewardship of the built heritage.

For all buildings, the study indicates that certain building functions need to be addressed before the disaster event so that their recovery time is reduced, such as residential buildings, offices, and cultural facilities. Also, owners should take into account that certain buildings have a complex recovery process, such as health care facilities and places of public gatherings, mainly due to special code requirements. So pre-incident planning should address such buildings, assess their current status, address code needs, and anticipate sources of complications. Also, plans should address existing FEMA processes, eligibility, and reimbursement requirements, so that owners do not take a long time after the earthquake trying to understand issues that are standard FEMA procedure. This can be done by facilities managers in public organizations and NGOs. As contended by Perry and Lindell (2003), it is the process of planning that makes a difference. So actions done during pre-incident planning for recovery would reduce the confusion that takes place after the incident and help prepare the decision makers for the process. Also, as shown by the Geary theater example, pre-incident studies of the needs of the building help in clarifying what should be done after the incident. In both delayed cases, the owner was unsure of the use of the building and that added to the delays.

There are several sources of delays for buildings. Most of the variables are due to the context, recovery process, and players. Thus, significant change can happen if such variables are addressed.

3) **How did the key issues of sustainable recovery for historic buildings play in the recovery period, specifically in regard to historic character and community participation? And how can the recovery of historic buildings be more sustainable?**
    a. **Maintaining historic character and public participation are two principles that are built in the existing laws and process and need improvement.**

Both historic character and community participation are built into the existing procedures that regulate the management of public-owned heritage, but there are several factors that still need improvements. Such policies have come to use historic character and integrity of fabric as the basis of valuation for heritage. Historic character and the integrity of fabric are both factors that help in making decisions about the built heritage, but must also encompass the value of heritage.

Values of historic buildings are challenged strongly during recovery. The period of recovery is stressed, as there is a strong push in the direction of economic and functional values, mainly due to the circumstance itself. As such, decisions about historic buildings should not be reactive in nature, and should try to maintain the significance of the place for all groups. As cultural resources, this requires special arrangement for the recovery phase that allows for valuation of historic buildings that is not based on the physical integrity of the building or the severity of damage.

Regulations and laws establish the environment within which the recovery takes place. Such regulations and laws are essential in the process and need to be developed to support sustainable recovery, heritage management, and governance, in order to develop sustainable cities. Governments, through legislation, law, regulations, and procedures, create an environment that can support sustainability. The context establishes how the relationship between groups will proceed and is essential in determining the process and out come. The legislative, economic, social, political, and cultural environment

surrounding the building and the players define many of the variables that will affect the recovery.

Thus, the existing policies need improvements in order to preserve the value of the built heritage for future generations. This is essential during disaster recovery as the value of the built heritage may be contested. Using only the integrity of fabric and historic character to assess whether the damaged historic building is worth keeping will lead to the loss of important heritage resources. Also, the process is focused on one set of values: historic. The process needs to be developed so that it encompasses the values that other groups in the society have in a critical way, so that historic buildings are still preserved without isolating the community from them. As Lowenthal points out: “a heritage disjoined from ongoing life cannot enlist popular support” (Lowenthal, 2000, 22).

Change after disaster is inevitable. Disasters can elicit improvements but can also generate negative reactions, such as demolitions or changes that significantly affect the value of historic buildings. There will be a strong tide of repairs and changes, and owners will take advantage of the repair phase to make changes that otherwise would not have happened, this includes positive and negative changes. Regulations help regulate such changes. Careful management of options can lead to improvements in the urban context.

In the recovery period, there is a hidden conflict potential due to the different values and priorities that each group have. Such differences can develop into conflict if not addressed early in the process (Al-Nammari, 2005). Participatory processes that encourage face-to-face deliberations would be a good way for addressing such issues if accompanied by conflict resolution approaches, but the choice of method depends on the scope of work and level of empowerment (Bass et al., 1995).

The few case studies above have negative outcomes on trust between parties and social solidarity between community groups. The local government and public agencies need to revaluate the process of recovery for their own buildings and attempt to identify better management approaches. The two homeless breakings into 170 Fell St., for

example, do not seem to be important for the public agencies involved in the deliberations. But they are important as indicators of social capital in the city and are symbolic in terms of the statement they make.

The sustainability of the recovery cannot be judged based on a limited number of cases. Generalizing from case studies should be done carefully, as case studies are "generalizable to theoretical propositions and not to populations or universes" (Yin, 2003, 10). Also, since there have not been similar investigations, the ability to cross-compare is limited. However, learning from the dynamics of the process is important, and mainly, from the principles and processes that are presented. Unfortunately, the lack of data has created that limitation. The results of the analysis should be interpreted within that limitation. The selected cases are all cases that faced delays. Thus they do not necessarily represent the usual recovery process. However, they do represent a situation that did happen and could happen again. More research is needed to identify ways for limiting such complications from happening, which will save time and money for the public, and would improve the sustainability of the process of recovery. The cases indicate shortcomings in the existing process, which need to be addressed.

CHAPTER VII

SUMMARY AND CONCLUSION

This study provides the following main conclusions:

1. The need for pre-incident planning

Owners of public buildings should address historic buildings under their stewardship ahead of disaster by developing pre-incident plans for their buildings. This could help in reducing the initial confusion over eligibility and process. Also, it can help the owner anticipate what upgrades may be needed if the building was significantly damaged, help in developing alternatives ahead of time, and avoid the delays resulting from confusion over the required code, requirements of the city, or CEQA and Section 106. Such plans could be done on periodic basis, as plans that assess the current status, regardless of whether a disaster is eminent. Such plans can help in general facility management for historic buildings even if no disaster took place, as it provides vision for the management and incorporates stakeholders in the evaluation of the status of the building.

Long-term recovery requires pre-disaster cooperation between involved groups to build communication lines, common strategy, and trust. Important issues relating to the future of the historic building and the anticipated process of recovery could be discussed. This should be done as a part of a pre-disaster preparedness.

Some variables may not be easy to address, such as the attitude of the players. These variables require leadership training and conflict resolution approach.

2. Addressing certain functions through preparedness

Certain functions need to be addressed to reduce disaster time and cost. Residential and cultural buildings should be addressed in particular, for both historic and non-historic buildings. Owners of such buildings should develop

recovery plans that identify the problems that such buildings have, their level of maintenance, needed action for code upgrades, areas of needed improvements, future plans for the buildings, and any special treatments needed. Plans should include the Historic Structure Report and identification of significance of the building. Such plans should be developed in coordination with the stakeholders who will be participating in the recovery phase, and so, should be able to identify the different values that different groups have for the buildings. This dose not mean that similar studies will not be needed after a disaster; as such studies should always be updated. It should help the participating groups identify areas of agreement and disagreement and thus reduce future conflict. Such plans are not only helpful for disaster recovery but also helpful to the up-keep of historic buildings and their continued maintenance.

Different acts of structural and non-structural mitigation are needed. Buildings of large area would have high levels of damage, even if built with reinforced concrete. Specific care needs to be given to public buildings that have special equipment, furniture, or instruments. Such contents should be braced or fixed in ways that reduce their damage and hazard. The analysis showed that damage levels increase based on the content of the building, especially for hospitals, office buildings, and infrastructure facilities. Since the recovery time is affected by damage level, historic status, and building function, city managers can address these buildings ahead of time to reduce the time needed to recovery.

3. Developing regulations

The process of recovery for public buildings is an overlay of regulations on state, local, and federal levels. The overlay may result in complication, overlap, conflict of requirements (especially in codes), or lack of sufficient participation. The existing laws and regulations need to be developed to take into account such complications. The local government is responsible, in its disaster preparedness efforts, to identify such complications or gaps and develop within their own regulations and ordinances elements or processes that address them in

a way that best suits the conditions of the community. A goal in such plans should be maintaining a participatory approach that goes beyond being a formality of operation.

4. FEMA

As the funding source, needs to address the complexity of the process and the clarity of the requirements. Since the Loma Prieta earthquake, the process has been changed and simplified in some aspects. However, the recovery process for historic buildings takes longer time; issues facing historic buildings need to be addressed specifically. This requires further research on recovery of historic buildings.

FEMA policies regarding the management of recovery funding for the built heritage does not take any consideration to the special character of such buildings, other than Section 106 requirements. The importance of historic buildings for the sustainable recovery of disaster affected areas is great, especially in places where heritage tourism can help the local community in recovery. Special programs for the preparedness and recovery of historic buildings should be developed, not only to encourage a better way for managing them, but also to facilitate the preservation of such heritage. Such policies should work on reducing the vulnerability of the built heritage, and reducing the time and cost associated with its recovery.

5. Professional preparation and education

Professionals can become part of the problem when they lack sufficient knowledge of relevant laws, standards, or the value of historic buildings. Professionals provide owners with their perceptions of feasibility and thus, affect the owner’s position. Architects, engineers, and other consultants need education on historic preservation, disaster management and recovery, and Section 106 process and related laws. These issues can be addressed in continued education credits and in architectural and professional preparation in schools in general.

6. Heritage management

The Secretary of Interior Standards and Section 106 need further development so that they support the sustainable management of the built heritage. This means adopting a comprehensive approach in understanding the value of historic buildings. An approach that extends beyond the physical integrity. It also requires a process that not only addresses values of history, but also the values of all stakeholders. An essential goal should be avoiding the alienation of the general public. This requires a more critical approach to preservation, in which it is seen as a management of the community's heritage, not just buildings of historic importance. This change of paradigm should probably start by approaching historic buildings as built heritage.

It is important that the preservation process is perceived as part of the continued history of heritage. The outcome of that process and the process itself are important too. There is a need for a change of perspective, not to approach the built heritage as if it had stopped in time, or as if its only significant history has passed. Acts on the building are part of its continued history. Thus, its meaning as heritage is shaped by how decisions are made, who is making them, and what relationship the community has to them.

Assessing significance should take into account that damage is part of the life of the built heritage. Thus, the process should avoid the current focus only on the historic and artistic values of buildings and provide for other valuation systems. This requires advancing preservation as a community-led activity, not as an sphere for architects, historians and the cultural elite. For that to happen, concerns of the community should be taken into consideration and not brushed aside.

The importance of historic buildings is not understood by all owners or the general public. This leads to creating tension about decisions to preserve it. The existing process has not been educational; decisions have been taken

separate from public involvement. Current preservation processes should have an educational element and should not be considered only regulatory steps.

Owners and stewards of public historic buildings should be required to plan for disaster recovery by addressing:

a. The status of the building and its needs.

b. If the owner has multiple buildings (like a city or a university), they should address them as a group as well, to develop a comprehensive approach.

c. The needs of the buildings so that they remain functional after disaster.

d. Any code upgrades that could be required or needed.

e. Any improvements that the owner may need.

f. Any existing faults in the building that may lead to increasing damage.

g. Up keeping maintenance level.

h. Addressing the possibility of mitigation on any level, structural or other. Furniture and other contents need to be addressed as well.

i. Identify the significance of the building, and any special treatments that it may need to maintain its integrity after a disaster.

j. Develop a Historic Structure Report.

k. Identify possible stakeholders, and invite their participation in developing the report and recovery plans.

l. Identify the different values the building may have for different groups.

m. Identify sources for emergency funds.

n. Investigate the existing application process for FEMA, and the requirements of the application process and reimbursement.

7. Developing the effectiveness of participation

Each of the different stages of a project should allow for some type of public input (consultation, public hearing, roundtables, presentations, or else), as described in figure (12). The process should incorporate different types of

participation at different stages so that the public is awarded different powers of affecting the outcome throughout the progress of the project.

Stakeholders and the general public should be part of the initial stages of the development of the project and be encouraged to provide their opinion on the outcome, which should address the interests of all groups. Consensus about the outcome of the project should be sought.

8. Section 106

The Section is important in post disaster situations and makes a difference in saving the built heritage, however, it needs to be broader. It was initially developed to facilitate taking into consideration effects of planning decisions on historic properties. It has gradually developed to be more effective as a participation tool, especially after the modifications of 1999. However, there is a need for more changes in the process.

The SHPO should not have two roles (i.e. as mediator and as stakeholder). It may be better to have the SHPO as a mediator only. This is to improve the consultation process as a conflict resolution process.

The process should acknowledge the validity of other values that community groups have for historic buildings and address concerns of all community groups in developing the MOA or PA.

Enhance the participatory opportunities that exist so far by allowing input in the early stages of project development.

There is a need to add a step in the section 106 process. Evaluation after the project is done is needed and should be done with stakeholder involvement.

9. Recovery management

FEMA’s relationship with the owners, especially local jurisdictions, needs development. That may be done through pre-earthquake cooperation in planning for disaster response and recovery. Many respondents from public agencies lacked trust in FEMA.

Moving FEMA into the Department of Homeland Security had negative outcomes on the relation to cities and local jurisdictions. Some of the respondents complained of the hardships of obtaining papers in and out from FEMA after that merger, since bureaucratic processes became more complex due to security. This leads in the opposite direction if better relationships with local jurisdiction are to be built.

The tagging system needs development so that the meaning of the red tag is changed. As suggested above, once a building is to be demolished, a new tag should be given to it. This avoids the many misunderstandings of the red tag, which would happen again in future disasters.

Cities need to invest time in preparation for recovery plans. None of the respondents in the City of San Francisco heard of a recovery plan before. This is understandable as recovery plans are more complex and require cooperation between many agencies and departments, however, such preparation would help all agencies involved during the recovery phase.

The recovery of historic and heritage buildings in a city like San Francisco is important for tourism. Yet, none of the processes indicated awareness of the effects of decisions on tourism in the city. Tourism is considered, indirectly, through the repair of certain important landmarks and tourism destinations like the Embarcadero, many of the historic piers, the waterfront, the Civic Center, and many of the park structures. Yet, such repairs were not part of a plan, and no tourism studies were done on the city level. Buildings that are not monumental or visible, like historic residences, hotels, or other facilities, may not be directly important as tourism attraction per se, but they are important as contributors to the creation of the character of the city. Future recovery should take into consideration effects of decision on tourism, especially in cities hat are tourism destinations, like San Francisco or New Orleans.

10. Future research recommendations

- There are several variables that affect the recovery of historic buildings. Improving the sustainability of the recovery requires further investigation into each of the variables, especially for facilities such as historic health care buildings, residential buildings and infrastructures.
- More investigation is needed on other variables that may affect the recovery time of historic buildings, which were not investigated in this inquiry. Variables like ownership, geographic location, design, shape, and height have not yet been explored systematically. Also, the relationship of time to cost, and the elements that increase cost require investigation especially since disaster costs keep escalating.
- Facilitating disaster recovery should take into account economic ramifications of disasters. An important role that historic buildings play is the creation of environments that are attractive to tourists. The implications of damage of historic buildings on tourism has not been investigated in this research and future research should address effects of disaster on heritage tourism, and how current policies address that.
- General issues of sustainability need further investigation. The social sustainability of the process, its effect on the quality of life of the inhabitants of the buildings and the neighborhoods, its effect on the economic development of the community, the environmental issues of recovery, the relationship between governmental departments, the coordination between different departments on the same level and on the three different levels (federal, state, local), and the sustainability of governance are in need of further research.
- The study indicates that the current preservation laws and regulations have limitations in terms of sustainable heritage management. More research is needed to identify ways of making the process more sustainable for cultural heritage. Research on the value of historic

buildings after disasters and the significance of damaged buildings is needed.

- Mitigation is a challenge for managers of historic buildings. For public buildings, the challenge is not that of incentives, but of cost. The solution sought so far has been that of trying to develop the code requirements and technologies involved. Cost need to be reduced through ways of indirect incentives through encouraging a supportive market. There is a need to study the elements of retrofit cost and ways of reducing it.
- Further research needs to develop the findings in a broader perspective. Developing comparative studies on the long-term recovery of historic buildings in other contexts need to be done. However, taking in to account the changes that are taking place in FEMA, the fact that it has come to be part of the Department of Homeland Security, and that its is no longer subject to the Freedom of Information Act, such studies my not be easy. The best approach would be for the local governments and agencies to develop better file storage systems in which old files can be retrieved. The study of long-term recovery requires better ways for data storage and retrieval, which is not existent.
- Public participation is a critical aspect of both recovery and preservation. As mentioned above, too much or too little of public participation can have negative effects. More research is needed to investigate ways of effectively engaging public groups in the process, the limitations and opportunities of public participation during disaster recovery.
- Inquiry in historic preservation rarely uses statistical approaches. This study has used a rigorous approach to find out trends in the recovery of historic buildings. A benefit of this approach is that it allows for the investigation of a large number of cases and thus develops understanding on a larger scale. This encourages utilizing such methods in future studies of historic buildings, towards identifying general trends that can help

develop policies related to the management of the built heritage. It is recommended that more researcher investigate methods of applying statistical methods in historic preservation discourse and academic research.

11. Implications of this research

- Practical

  This research has implications on different public policy areas that relate to disaster management, historic preservation, and sustainability. It calls for improvements of policies towards addressing historic buildings separately by specific participatory requirements, planning for recovery of historic buildings specifically, on city level, addressing certain functions that would otherwise require more time or cost. Also, this research has implications in reevaluating current policies toward participation in disaster management and in heritage management.

  In addition to that, this research calls for a change of current policies towards historic buildings, so that they are managed as heritage. Also, the recovery of historic buildings would have effects on tourism; such an aspect was not addressed explicitly in local recovery effort. This requires development of recovery plans, which is lacking.

- Historic preservation process

  This research would encourage the development of the current approach towards the evaluation of significance and identifying more to cultural value than the historic fabric and character.

  Also, changes on the role of SHPO in the process, as a mediator only, and identification of bias within the process as it exists now thus developing Section 106 towards becoming a tool for heritage management by incorporating the different values it has.

Disaster preparedness is lacking for the built heritage. This research points out to the significance of developing plans for reducing the cost and time needed for recovery.

- Recovery

  The findings of this research should help in other disasters by alerting public agencies and local governments to the areas of potential conflict and the buildings that would expect delays. Thus, this research could be helpful in many disaster situations, as the variables identified are mostly not disaster specific. Taking into account recent disasters, like Katrina, the recovery of the historic resources in New Orleans can be improved if the variables identified by this research were taken into account.

  The sustainable recoveries of cities require taking into account the role historic buildings play in attracting tourism. The importance of the regular non-landmark buildings is often neglected and interviews with some respondents revealed that ramifications of damage to historic buildings is not always understood by decision-makers, especially when the historic building is not monumental. The importance of the regular building in creating a tourism destination, and the effects a disaster could have upon that are not fully understood. This research direct attention to the importance of the built heritage not only for cultural continuity but also for sustainable development through tourism.

  FEMA role should be developed beyond being a source of funding and the policies that govern relationship between players need to be developed so that communication and cooperation are improved, specifically between public agencies, local governments, and FEMA.

  Participation is essential for successful recovery. Current local policies need to develop better ways for public participation in which such participation is effective. This is of significance for public agencies that usually function independently from local government.

- Education

  This study used statistical methods in historic building studies, which is relatively new in the approach to historic preservation. This should provide a beginning towards more investigation of ways to utilize quantitative approaches in historical studies and in the management of the built heritage as well.

  This dissertation incorporated two fields that are usually investigated separately. The findings of the research create an avenue for both sides for investigations, thus addressing historic preservation by disaster management and vise versa.

  Importance of education for architects and planner about recovery, and historic preservation is emphasized, and the findings of this research should help bridge part of the knowledge gap that exists between the two fields.

- Theoretical

  This research helps to link historic preservation, sustainability, and disaster management, thus encouraging future research in that area.

  This investigation encourages the development of historic preservation theory towards heritage management and sustainability.

  An important implication of this research is that develops the theory of sustainability as link between disasters and historic buildings.

  Finally, improving the sustainability of the recovery requires changes in the existing policies, which would affect the context of the recovery and its process. It also requires better preparedness, which can be facilitated through prior planning. Such planning can take into account the variables identified above and investigate them on a building-by-building basis, thus it should be done by stewards and owners. Certain functions will

expect further challenges and they need to be targeted for pre-disaster planning.

In conclusion, this study has investigated issues that affect the sustainability of the built heritage after disaster. The findings can be transformed to other contexts, as many of the issues are not based on the disaster type. The filed of disaster management of historic buildings need to be investigated as more of the built heritage is affected by disaster every year. The improvement of the sustainability of recovery and of heritage management requires more investigation.

ENDNOTES

[1] Since this paper is multi-disciplinary in nature, many terms are common in both Disaster Management and Historic Preservation literature. The choice of this word came as it has less confusion than other words used in preservation literature, such as reconstruction or restoration. All references to Historic Preservation terms (i.e. restoration, rehabilitation) are done in their general meaning, as that is the meaning they had in the correspondences.

[2] ICOMOS uses the term "Conservation" not "Preservation", but for maintaining consistency the term of Preservation will be used as it is the term used in the USA.

[3] Integrity of fabric is a state in which the original historic building materials, location, feelings, and systems remain intact. Any act that changes them, adds to them, or damages them is considered damage to the integrity of the historic fabric. The original materials and systems of the building are important as historic documents that should not be falsified (Fielden, 1987; Look, Wong and Augustus, 1997; ICOMOS, 1999;).

[4] Applied Technology Council (ATC) developed standards for post-earthquake evaluation of buildings (ATC-20), which provides guidelines and step by step procedures for professionals involved in post-earthquake inspections. The guidelines contain instructions on where to look for damage and how to rate the safety significance of damage. The ATC 20 guidelines identify three phases of safety evaluation procedures: 1) Rapid evaluation done to define safe and unsafe buildings, it is done within 10-20 minutes and is aimed at providing preliminary assessment it labels the buildings as Inspected (apparently OK), Limited Entry (Questionable), and Unsafe (obviously unsafe). 2) the second level of evaluation, the Detailed Evaluation, needs 1-4 hours, consisting of a thorough visual examination of the structure inside and outside. It identified three types of buildings: safe for use but may need repairs, Limited Entry (Questionable), or unsafe (must be repaired or removed). The final evaluation is done by a structural engineering consultant retained by the owner. This inspection will result

in one of two designations for the building: 1) Inspected, but will need repairs. 2) Unsafe, needs repairs or removal. This evaluation is the most thorough and is done without time limits. Each of the three evaluations will post placards on the buildings: green, yellow, or red. The placards are intended to identify if further evaluation is needed and if the buildings is safe enough for regular use or if it may require structural repairs before use (ATC-20-1, 1989).

[5] The term project and worksite are used interchangeably.

[6] Alternate Project: "is any permanent restoration project where the applicant chooses to abandon the facility and its function rather than make disaster repairs The applicant may use any federal share funds, limited to the approved federal estimates to complete the eligible scope of work, at another facility" (FEMA 323 :33)

[7] The comments section usually contained information that project approval is pending Section 106 completion, requires historic review, needs Historic Structure Report, or has reference about the SHPO. There was no direct identification of historic projects per se.

[8] All Univariate analysis models were developed with the help of Adrash Joshi, Graduate student in the Statistics Department.

[9] Most of the analysis was presented in Al-Nammari, 2005.

[10] The Robert T. Stafford Disaster Relief and Emergency Assistance Act, amended in 2000, require the federal government to assist local and state government when a federal disaster is declared. This assistance is provided through the Federal Emergency Management Agency (FEMA 2005)

[11] Alternate Project: A status for a project in which the applicant uses FEMA funds for another project (s), thus abandoning the damaged facility. The funding would be based on the repair cost estimates for the damaged facility. These funds can be used for another facility upon FEMA approval. However, there is a 10% reduction of coverage in this project status, and the new project would still go through environmental reviews (FEMA 323).

[12] FEMA regulations require that if the repair cost for a building is 50% of the cost of replacing it, then replacing cost is what FEMA would provide.

[13] Improved Project: FEMA funds usually covers only repair costs, but the applicant may chose to make additional improvements to the facility. In this case the costs would be hard to track as improvements and repairs are done at the same time. Funding would be limited to the approved scope of repairs only, based on cost estimates. The project still goes through the historic and environmental reviews (FEMA323, 1999).

[14] The National Environmental Quality Act (NEPA) also requires an environmental review once a specific proposal was submitted to FEMA for funding.

[15] SOTA program was developed for 1200 students of painting, dance, sculpture, and other visual and performing arts. Among the critique of the program was that it requires all visual arts classrooms to be of 16 ft. height, it provides for a library for students that is 420 sq. ft while the faculty of 70 have a lounge of 1320 ft. sq., that the visual arts halls can accommodate 510 students at the same time, and that it required a studio with a loft inside it for perspective studies (D. Bahlman, letter to SHPO, February 3, 1998).

[16] Mothballing has specific procedures that would close the building but keep it for future use through regular basic maintenance (cf. Park, 1993).

[17] Section 1010 of the San Francisco Planning Code indicates that the Planning Commission has no authority over certain public agencies, SFUSD is one of them. SFUSD is a state agency that has powers to tax, to issue bonds, to condemn property and to manage its own property. The board of the SFUSD are elected by voters and not appointed. Public School Districts are considered separate State agencies and operate as separate jurisdictions from the cities in which they are located (SFUSD, 2000: 7-5, 7-6).

[18] The SHPO used consultant representatives on some project to follow up the work. The SHPO representative was available on site to follow up the developments on site. This strategy works for reducing the work load on the main office and allowing for more follow up on site thus solving issues as they appear.

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APPENDIX A

SECTION 106

Section 106 (16 U.S.C. 470f) National Historic Preservation Act of 1966 as amended through 1992 (Public Law 102-575)

"The head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. The head of any such Federal agency shall afford the Advisory Council on Historic Preservation established under Title II of this Act a reasonable opportunity to comment with regard to such undertaking."

The section identifies that:

1. If an action is a federal undertaking (i.e.any project that is owned by the federal government, funded by federally assisted loans or grants, or requiring federal permit or license).
2. Then the federal agency of jurisdiction is responsible.
3. Before approval of the expenditure of any funds.
4. To take into account the effects of the undertaking on any district, site, building, structure, or object that is eligible for the National Register.
5. To afford the Advisory Council on Historic Preservation a reasonable opportunity to comment.

This means that FEMA would be responsible to make sure that any project receiving FEMA assistance would not have adverse effects on any historic district, site, building, structure, or object. The historic properties included in this section are properties included in the National Register of Historic Places or that meet the criteria for the National Register

The regulations explaining the Section 106 (36 CFR Part 800) were updated in 2001, and required more public involvement. The older regulations were similar in the main structure of the process (FEMA, 2001; King 2000).

Section 106 main steps:

1. The federal agency determines
   a. Whether it has an undertaking that could adversely affect historic properties.

   b. Identify the appropriate State Historic Preservation Officer/Tribal Historic Preservation Officer (SHPO/THPO).
   c. Plan to involve the public, and identify specific potential consulting parties.
2. The federal agency, in consultation with SHPO/THPO, identifies historic properties in the area of potential effects. If the agency finds that no historic properties are present or affected, then it would provide documentation of that to the SHPO/THPO and proceeds with its undertaking, unless there was an objection within 30 days. If there was an adverse effect, then the agency should assess possible adverse effects.
3. The federal agency, in consultation with the SHPO/THPO, makes an assessment of the adverse effects on the identified historic properties. This is based on criteria found in the regulations explaining the Section 106 (36 CFR Part 800). If it was found that there will be no adverse effect, the agency proceeds with the undertaking and any agreed-upon conditions, or else the agency would have to initiate the consultation process. The consultation process is intended to seek ways to avoid, minimize, or mitigate the adverse effects.
4. The consultation is done in participation of SHPO/THPO and any other interested parties. The regulations provide a list of groups that must be included: ACHP, SHPO/THPO, Indian tribes when the undertaking occurs or affects historic properties, on their tribal lands, Indian tribes and Native Hawaiian organizations, Representatives of local governments, Applicants for Federal assistance, permits, licenses and other approvals, Additional consulting parties, The general public. The consultation is described as" is a dynamic, good-faith process of seeking, discussing, and considering the views of other participants and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process" (ACHP, 2002).
5. Consultation usually results in a Memorandum of Agreement (MOA), which outlines agreed-upon measures that the agency will take to avoid, minimize, or mitigate the adverse effects. If agreement was not found, the ACHP would be invited in the process. "If consultation proves unproductive, the agency or the SHPO/THPO, or ACHP itself, may terminate consultation. If a SHPO terminates consultation, the agency and ACHP may conclude an MOA without SHPO involvement. However, if a THPO terminates consultation and the undertaking is on or affecting historic properties on tribal lands, ACHP must provide its comments. The agency must submit appropriate documentation to ACHP and request ACHP's written comments. The agency head must take into account ACHP's written comments in deciding how to proceed." (ACHP, 2002).

The ACHP provide specific notes on how the public would be involved:

"***Public involvement is a critical aspect*** *of the Section 106 process. Section 800.2(d) contains a standard that Federal agencies must adhere to as they go through the Section 106 process.*

The ***type*** *of public involvement will depend upon various factors, including but not limited to, the nature and complexity of the undertaking, the potential impact, the historic property, and the likely interest of the public in historic preservation issues.*

Confidentiality *concerns include those specified in Section 304 of the Act and legitimate concerns about proprietary information, business plans, and privacy of property owners.*

Section 800.2(d)(2) sets a ***notice and public information standard****. The public must be notified, with sufficient information to allow meaningful comments, so that they can express their views during the various stages and decision-making points of the Section 106 process.*

It is intended that Federal agencies have flexibility in how they involve the public, including the use of the National Environmental Policy Act (NEPA) and other agency planning processes, as long as opportunities for such public involvement are adequate and consistent with subpart A of the regulations. Section 800.2(d)(3) provides reminders of this flexibility" (ACHP, 2002).

APPENDIX B

SAMPLE PAGE FROM THE CHRONOLOGICAL MATRIX

	Date	From	To	About	Comments
Letter	August 13, 1993	ACT	SHPO	Asking for SHPO concurrence, as per their recordation according to MOA agreement	
Letter	August 13, 1993	ACT	SHPO	Letter signed between SHPO and ACT regarding agreement on documentation.	
Letter	September 9, 1993	ACT	SHPO	Asking for SHPO concurrence, as they want to start demolitions with a few weeks. There was a Letter on August 13,1993 asking for concurrence.	
Letter	September 29, 1993	SHPO	FEMA	Comments on the 90% drawing identifying the auditorium, paneling, annex, and other issues as important.	
Letter	February 8, 1994	FEMA	OES	Asking for ACT reply to comments on the 90% construction documents, presented in October.	Important: FEMA contacting act through OES. Reminding them to reply.
Plans submitted for review	February 16, 1994			Comments, includes request fir sight line study, missing 1st floor plans	
Letter	February 16, 1994	ACT	OES	Enclosed letter from Gensler as reply to Roy Kite's letter of Nov. 12, 1993. Concerns from FEMA.	
Letter	March 8, 1994	SHPO	FEMA	Letter indicating that plans for first floor not received plans. Also, issues with glass, balustrades, panels, canopy, sightline studies,...	
memo	March 8, 1994	Steade	Hans	Re. Letter of Feb 15, 1994 to ACT from Gensler, which includes replies to FEMA letter of Aug. 5, 1993. this is not a restoration project, more rehabilitation. Regrettably the first floor plans were not submitted.	
Letter	April 6, 1994	ACT	OES	Reply to March 8th , 1994 letter from SHPO to FEMA, responding to SHPO letter with letter from architect.	

meeting	May 2, 1994	ACT, SHPO, OES, FEMA, Gensler		Requested that they have story poles be constructed to represent the roof top addition to the annex of the Geary theater.	Meeting to resolve outstanding questions
meeting	May 2, 1994	FEMA	All	Meeting re: resolution of issues under MOA, mason street façade and auditorium finishes.	
Letter	May 31, 1994	Gensler	ACT	Story poles erected	
Letter	May 31, 1994	ACT	SHPO	we did the story poles and photographed them. Enclosing letter from Gensler (architect), and photograph.	
Meeting	June 14, 1994	SHPO, ACT, Cahill, Gensler, OES,		Misunderstanding on need for letter for façade	
memo	June 15, 1994	Steade	Hans	About ACT meeting. Lobby plaster identified as problem. SHPO had approved plans not knowing that the façade will be saved. Problem how.	
Letter	June 27, 1994	ACT	FEMA	ACT awaiting response from SHPO on two issues the rooftop and façade still not heard from SHPO	Seems that construction work is in progress and they want quick resolution.
memo	July 5, 1994	Peterson	Steade	Issues raised in the June 14th meeting, plaster, façade treatment	
memo	July 7, 1994	Steade	Hans	Peterson report of July 5th on June 14 meeting. Plaster issue, mason street façade, roof top visually and architectural objectable? Comments work on the lobby was never approved by SHPO, and work is commencing. Problem that new and old not distinguished.	When did Peterson become SHPO rep?
Letter	July 7, 1994	Cahill (contractor)	act	Façade options. FEMA will not fund anything to do with this façade b/c it was not damaged by the quake. FEMA had approved a lump sum to seismic retrofit to code for the annex, which will be completely demolished and replaced with a new structure-concrete-. Architect design retain the facade and restores it. no details on how that will be done. Facade of poor quality-umb and conc.	FEMA had approved seismic retrofit, when?
Letter	July 8, 1994	ACT	SHPO	Façade options: to demolish and reconstruct, to keep in place and shore, or to reconstruct after removal. ACT prefers to reconstruct after removal (option 3). Also, SOHA decided that the conc. Slab above ground floor lobby ceiling will not have to be removed- so the majority of the historic ceiling will be preserved. July 7th letter	Contrary to previous understanding of needing a letter about it

APPENDIX C

SAMPLE FROM THE SINGLE-PROJECT-ANALYSIS MATRIX

Date	Kind	From	To	Time	Historic Character	Participation	People	Building	Process	Context	Notes
6/6/1990	Letter	Foster Eng.	SHPO		Exterior facade will be restored to pre earthquake conditions and historically significant interiors finish maintained. Removal of chimney and parapet and emergency stabilization will not prevent (preclude) reconstruction of the facade to pre-earthquake appearance. (maintaining of historic character not a problem)		Professional initiating contact with SHPO early in the process.	Significance understood: one of the oldest high school buildings in the city and its movement to its current locations " is certainly an engineering achieving of the highest order". Stabilization action needed immediately as building is badly damage. The SFUSD intends to do that. Need to remove chimney and parapets. Hollow clay tiles, and stabilize the corners.	This is first referral to SHPO. Jan 1990. the consultant is initiating contact, un like other consultants, and confirming that they will respect the Standards and SHB Code, and understand the significance of the building.		This is first referral to SHPO. Jan 1990. The consultant is initiating contact, un like other consultants, and confirming that they will respect the Standards and SHB Code, and understand the significance of the building.

6/21/1990	Letter	Foster Engineering	SHPO		They planned to do as much in0situe repair as possible to save historic fabric, but some parts are severely damaged and need to be reconstructed.	Had a presentation for the SF City Planning Department, preliminary review, to the Architectural Review Committee (ARC) reporting to the Landmarks Review Board, they are under the Planning Department and are an advisory committee that has to review all alteration work on Landmarks and architecturally significant buildings within the city.	consultant coordinating with SHPO on their plans	They initially were planning to reconstruct all brick work, but FEMA required full examination for the brickwork and exterior facade (building material testing and field observation) which showed that some sections do not need reconstruction but can be repaired, strengthened, and anchored in-situ.	Application for Planning Department? they did not know they did not need a C of A. They are coordinating with SHPO early.		They are presenting to the planning department as if they have to. They did not know at the time that they did not need any approval from the planning Department. SFUSD decided that they do not need approvals later.

9/1/1995	meeting minutes SOTA	professionals and consultants involved in SOTA		Plans in 1995 to demolish 170 Fell St..	saving the trim in case the building not demolished	Planning for 170 Fell demolition, before section 106 starting. " the inevitable politics associated with the demolition of 170 fell from historic preservationists, etc."			Planning for 170 Fell demolition, before section 106 starting.	170 Fell building currently occupied by the homeless.	

APPENDIX D

COMPARISON MATRIX

			170 Fell St.	***Geary Theater***	***The Williams***	***Notes***
Players						
Owner's internal factors	*Stability of staff*		Delayed progress	No indication	No information	
	Change of leadership		Change of project with change of leadership	~	~	
Perception of Significance			Historic Significance not clear, other values not addressed	Significance clear	Historic Significance not clear initially	
Perception of the consultation			The consultation is a “hoop” to go through.	Consultation is to please the SHPO and approval	Consultation is a procedural requirement- a hoop.	

Attitude	*Attitude*	*Towards the historic building*	No appreciation for the historic building	Fostered the building but did not understand the Standards	Did not appreciate it and it was ignored before the earthquake	
	Cooperation	*Owner cooperating*	No cooperation	Cooperative	Cooperative at the end	
	Compliance	*Owner compliance with deadlines, agreements*	Compliance issues	Compliant	Mostly compliant	
Institutional culture		*Process: "will be approved after the public hearing"*	Made decisions alone	N/A	Made decisions alone	Both agencies are used to doing things their way. They have developed a method of management that supported individual decision-making and they seem to be used to having things their way.

Knowledge		*Of standards*	Informed of standards	Informed	Informed	This should not be an issue. They have consultants and FEMA and SHPO provided advice of possible sources of problems.
		Section 10 6 process	Consultant available	Consultant available	Consultant available	No understanding of the objective.
		FEMA process	Confused over alternatives	Confused over roles and eligibility	Confused over codes	
Authority	*Power and authority of owner*		Had jurisdiction to do what they wanted	No, had to attain approvals from city	Had power and authority to eminent domain as a separate public agency	Both public organizations that had jurisdiction.

Trust	*Between all parties*		No trust	No trust	No trust	Believing that FEMA can should approve funds for strengthening, that the SHPO is complicating the process, or that the owner is not transparent on goals.
Stewardship	*Owner understands their responsibility*		No	Yes	Not clear	
Process						
Initial Position	*Owner Uncertainty of what to do*		Not sure of use	Repair	Demolish	
	FEMA position		Pushed for demolition	Deny strengthening coverage	Repair cracks	
FEMA process	*Complication of applications and approvals "dancing with FEMA"*		Complicated	Complicated	Complicated	Cost more

Participation effectiveness	*Not all stakeholders were part of the decisions*		Values of parents not addressed, may be other groups too.	Not apparent	Values of groups affected by the development project not clear	
Early Consultation	*Early consultation with SHPO*		Delayed consultation	Early consultation	Early consultation	
Clarity of the SHPO's Role			SHPO is a mediator	SHPO overseeing the adoption of the Standards	SHPO overseeing the adoption of the Standards	

Project Management		*Late decisions about what to do*	Delay	Knew what they wanted	Delayed	Both public agencies had delays in making final decision on what to do. For fell, complete change of mind, for Williams, needed temporary work until final decision was made. In a way they knew what they wanted. Final action delayed. Alternate project status in both. Money went somewhere else until final decision is made.
		Change of consultants	Too much change of consultants	Minor change-delay simple	N/A	
		Deferring repairs (mothballing)	Mothballing	No	Delay in preservation work	

		Professionals Involved	Consultant pushing for demolition	Some professionals not understanding standards	Professionals disagreement about what is needed	Professionals have an impact on the development of the project.
Misunderstanding of red tag			Yes	Yes	Yes	To demolish, unusable building.
Building						
Intervention needed	*Earthquake damage level*		Highly damaged	Damaged	Damaged	Damage relative
	Strengthening		Needed	Needed	Needed	All needed strengthening. All faced cost problem due to strengthening.
	Codes		Required	Required	Not required initially, but became required due to strengthening	
	Maintenance		Ignored	Well maintained	Ignored	Building was not well maintained before earthquake

	Rehabilitation	*Major improvements needed*	Needed	Needed	Needed	Needed extensive rehabilitation
	Reconstruction	*Rebuilding parts*	Parts	Parts	No	
Ornament and details			Details	Many details	Little detail	The detailing level was high in Geary only. Fell St. had little details in brick. So did Williams.
Location			Suitable for SOTA	Affected importance of renovation	Economically significant	
Visibility			Visible	Visible	Visible but not as much	The visible buildings were in newspapers and followed up by public
Context						
Political	*Political support*		Yes	Yes	Unclear	Politicians trying to interfere. Mayor always trying to push the project.

Other disasters	*Leads to changes in process and funding*		Northridge	no effect	PA changes/ no Section 106	
Preservation Activism	*Diligence*	*Activists follow-up*	Activists affected outcome	no public involvement	Activism help prevent demolition	
	Proactiveness	*activists suggestions*	Provided helpful solutions	~	no information	
Community needs	*Social*	*Needs of schools*	yes		no	
	cultural	*Theater challenges*	yes	yes	no	
	economic	*availability of donations/ need revitalization for area*	no	yes	yes	Geary and Williams had economic benefits, thus were important to area and owner. The fell had no direct economic benefit. Maybe that why owner able to just leave it.
regulatory	*Section 106*		Yes	Yes	Yes	
	CEQA		Yes	Yes	Yes	

Technical context	*Methods for strengthening, assessing strength of building, or repairing it*		Yes	Yes	Yes	
Social context			Homeless and education.	Patron needs	Not apparent	

VITA

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Education: M.A Archaeology (January 1998) University of Jordan.

B.S. Architectural Engineering (July 1992) University of Jordan.

Professional Experience: Graphic Designer, Honors Programs, Texas A&M University.

US ICOMOS International Intern, National Parks Service, Oakland, CA.

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Preservation Architect, Yajouz Protective Preservation Project, Jordan.

Architect, Khirbit Yajouz Archaeological Excavation, Jordan.

Architect, Sigma Consulting Engineers. Amman, Jordan.

Academic Experiences: Teaching Assistant, Department of Architecture, Texas A&M University, Fall 2003.

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Selected Research and Presentations:

Al-Nammari, Fatima M. (2005) Earthquake Recovery and Historic Buildings: Investigating the Conflicts. The International Conference: *Negotiating Urban Conflicts*, Technical University Darmstadt, April 7-9, Germany.

Al-Nammari, Fatima. (2003) The Preservation of Vernacular Settlements in Jordan: Development Chances Lost. The 6th US/ICOMOS International Symposium: *Managing Conflict & Conservation in Historic Cities: Integrating Conservation with Tourism, Development & Politics* (April), Annapolis, Maryland.

Al-Nammari, Fatima M. (2005) Sustainable Disaster Recovery of Historic Buildings: Learning from San Francisco after the Loma Prieta Earthquake. Presentation in AIA San Francisco, February 22nd.