

Hazard Mitigation Plan 2004



CITY OF NAPA



February 13, 2004

To: Officials, Employees, and Citizens of Napa City

RE: Commitment to creating a disaster resistant City

The preservation of life, property and the environment is an inherent responsibility of local, state, and federal government. The City of Napa has prepared this Hazard Mitigation Plan to ensure the most effective and economical allocation of resources for protection of people and property prior to the onset of a natural or technological disaster.

While no plan can completely prevent death and destruction, good plans carried out by knowledgeable and well-trained personnel, can and will minimize losses. This plan establishes the priorities for future mitigation actions to begin the process of making the City of Napa a disaster resistant community.

The objective of this plan is to incorporate and coordinate the best possible approaches to mitigation from our four major threats, flooding, wildfire, earthquakes and technological hazards, so these approaches can be rapidly and effectively applied as resources become available to conduct these mitigation programs and measures. By implementing, over time the process and programs outlined in this plan, it will greatly enhance the survivability of key facilities and the ability of response personnel of the city in responding effectively to any emergency.

This mitigation plan is an extension of the *State Hazard Mitigation Plan*. It will be reviewed and exercised periodically and revised as necessary to meet changing conditions.

The Napa City Council gives its full support to this plan and urges all officials, employees, and the citizens, individually and collectively, to do their share in the total disaster mitigation effort of the City of Napa.

This letter promulgates the *City of Napa Hazard Mitigation Plan*, constitutes the adoption of the plan as a standing annex to the City of Napa Emergency Plan that repetitive and avoidable disaster loss must be prevented to make all communities disaster resistant. This mitigation plan becomes effective on approval by the Napa City Council.

Sincerely,

Ed Henderson
Mayor

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RESOLUTION R2004 _____

**RESOLUTION OF THE CITY COUNCIL OF THE CITY
OF NAPA, STATE OF CALIFORNIA ADOPTING THE
CITY OF NAPA HAZARD MITIGATION PLAN**

WHEREAS, the City of Napa was selected to receive the Hazard Mitigation Grant through the Office of Emergency Services (OES) for the development of a Hazard Mitigation Plan; and

WHEREAS, the Grant is for \$25,000, and the City's share of the cost is \$8,333, which is staff time allocated for the development of this plan; and

WHEREAS, the City of Napa will be required to have such a plan to receive future project funding from the federal hazard mitigation grant program; and

WHEREAS, the City of Napa Hazard Mitigation Plan has been developed, submitted to the OES and is ready for adoption; and

WHEREAS, the City Council has read and agrees to abide by the Disaster Mitigation Act 2000 guidance and grant guidelines and this plan represents the compliance with the same; and

WHEREAS, the Napa City Fire Department will review and update the plan annually as necessary.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Napa, State of California that the City of Napa Hazard Mitigation Plan is formally adopted as our plan and road map to a more disaster resistant community.

I HEREBY CERTIFY that the foregoing Resolution was duly and regularly adopted by the City Council of the City of Napa at a regular meeting of said city Council held on the 7th day of September, 2004 by the following roll call vote:

AYES:

NOES:

ABSENT

ATTEST: _____
CITY CLERK OF THE CITY OF NAPA

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TABLE OF CONTENTS

<u><i>Content</i></u>	<u><i>Page Number</i></u>
SECTION 1: Legal Requirements	
Letter of Promulgation	i
Resolutions	iii
SECTION 2: Hazard Mitigation Planning Process	
City of Napa Disaster Mitigation Committee	1
Napa County Operational Area Disaster Committee Contact List	2
Planning Process	3
Major Threat: Flooding	4
Establishing Goals: Blending Engineering and Ecology	5
Examining Potential Strategies	5
Evaluating Alternative Strategies	6
Citizens For Napa River Flood Management Committee	8
Major Threat: Earthquake	9
Napa Disaster Education Task Force	10
Major Threat: Wildland Interface Fires	11
Firewise Conference	11
Firewise Conference Participants	11
Major Threat: Terrorism and Technological Hazards	14
Napa Terrorism Working Group	14
Terrorism Working Group List	15
Public Meetings on Draft Plan	16
Plan Intent and Vision	16

<u>Content</u>	<u>Page Number</u>
Community Profile	18
Napa History	18
Napa Community Profile	19
Community Facilities	23
Economic Outlook	24
Napa General Information	25
Tourism Information	30
Napa Land Use	31
City of Napa History	32
Existing Land Use	33
City Land Use and Development Trends and Hazard Areas	35
SECTION 3: Risk Assessment	
Hazard Identification	38
Explaining the Threat Analysis. Where does the rating come from?	38
Napa Hazard Analysis Data	39
Napa Hazard Analysis Graph	40
Flood Hazard	41
Regional Setting	41
Napa River Watershed	41
Tidal Influence	41
Stream Flows	41
History of Flooding	42
Floodplain and Floodway	43
Flood Damage Statistics	44
Flood Hazard Area	45
Flood Losses and Methodology used to Determine Amounts	45
Record of Historic Floods	46
Flood Zone map	47
Napa River Flood Management Project	49
Flood Hazard Inventory	50
Methodology used to Determine Inventory	50
Flood Hazard Inventory Lists	51
Seismic Hazard	57
Ground Shaking	57
Liquefaction	57
Dam Failure	57
Regional and Local Fault Zones	58
West Napa Fault Shaking Intensity Map	59
Concord-Green Valley Fault Shaking Intensity Map	61
Rodgers Creek Fault Shaking Intensity Map	61
Special Studies Zones	63
GIS Maps	63
Soil Slopes and Fault Lines Map	65

<u>Content</u>	<u>Page Number</u>
Government Buildings and Fault Lines Map	67
Public Safety and Fault Lines Map	69
Medical Facilities and Fault Lines Map	71
Schools and Fault Lines Map	73
Childcare Facilities and Alluvial Soils	75
Earthquake Hazus Information	
West Napa Fault	77
Concord-Green Valley Fault	81
Rodgers Creek Fault	85
Summary of Expected Damage	89
Unreinforced Masonry Buildings	91
Background and URM Laws	91
Earthquake Damage Statistics	93
URM List	96
Wildland Interface Fire Hazard	
Wildland Urban Interface	98
Wildland Urban Interface Map	100
Fire hazard Area Inventory	101
Potential Wildland Fire Losses	102
Wildfire Hazard Rating Forms	104
Technological Hazards	109
Hazardous Materials	109
Hazardous Materials Facilities List	110
Dam Failure	111
Terrorism	113
SECTION 4: Mitigation Strategies	
Local Hazard Mitigation Goals	115
Mitigation Objectives and Actions	115
Mitigation Objectives and Actions List	117
Goal: To Promote a Flood Safe Community	120
Goal: To Promote an Earthquake Safe Community	123
Goal: To Promote a Fire Safe Community	125
Goal: To Promote a Technology/Terror Safe Community	128
Goal: To Create a Disaster Resistant Community	135

<u>Content</u>	<u>Page Number</u>
SECTION 5: Plan Maintenance Procedures	
Plan Maintenance	140
Monitoring, Evaluating and Updating the Plan	140
Implementation Through Existing Planning Mechanisms	141
Continued Public Involvement	142
Annual Review Checklist	143
SECTION 6: Federal, State & Local Regulations & Policies	
Federal and State Regulations and Policies	146
Napa Regulations and Policies	147
SECTION 7: Appendices	
Appendix A: Capability to Respond and Critical Facilities List	148
Capability to Respond to Hazards	150
Napa Government Buildings	152
Napa Medical Facilities	153
Napa Public Safety Facilities	154
Napa Schools	155
Appendix B: Flood Mitigation Assistance Program Candidate Projects	156
Ongoing Studies	158
Structural Flood Control Measures	159
Non-Structural Flood Control Measures	159
Flood Problems and Mitigation Projects	160
Mitigation Project List	163

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SECTION 2: THE PLANNING PROCESS

Hazard mitigation planning in the City and County of Napa has been an ongoing process that the Disaster Mitigation Act 2000 has enhanced by requiring a written hazard mitigation plan. The City of Napa has, and will continue to have, public, private and governmental input into the City's threat assessment and mitigation strategies. This section describes this input and planning process.

Incorporating existing plans: The City of Napa has a safety component within the General Plan and this section already identified our most likely hazards and listed mitigation strategies that were incorporated into this plan. In addition, the City had completed other reports such as the Seismic Vulnerability Study on URM buildings, the Storm Drain Improvement Plan, a Water Department Vulnerability Study and a Terrorism Vulnerability Report. These and other studies or plans have been incorporated into this document. The City of Napa has a FEMA approved Flood Mitigation Plan at a cost of \$136,000,000. While the specifics are not included in here since that plan is a stand alone mitigation document, it is a companion to this document and is available for public review. The City has an Emergency Plan that addresses a response to emergencies and disasters. The information in this document compliments the emergency plan but concentrates on mitigation strategies as compared to response or recovery. It is the intent that the LHMP and the Emergency Plan will be companion documents.

The Process - Flood: The planning process for this document began in the 90's after Napa suffered a significant flood in 1986. The community and civic leaders began the process of developing the Flood Mitigation Plan which was approved by FEMA in 1996. The process is described at length in the section below titled *Major Threat: Flood*. It includes who was involved, how the public participated, the involvement of other agencies and the specific strategies used to obtain a FEMA approved plan.

The Process – Earthquake: After Napa experienced a 5.1 earthquake on September 3, 2000, the community began the process of mitigating potential damage from future quakes. The Mayor convened a public workshop to address Napa's risk to future earthquakes and also invited experts to explore mitigation and planning activities designed to reduce these estimated future earthquake losses. This process is described at length in the section below titled *Major Threat: Earthquake*.

The Process – Terrorism: The Napa Terrorism Working Group (TWG) was formed in 2001 in response to the events of 9/11 and the subsequent anthrax mailings. All emergency response agencies collaborated on a countywide protocol for response to terrorist incidents and began the process of exploring strategies to mitigate future terror attacks locally. This process is described in the section below titled *Major Threat: Terrorism*.

The Process – Fire: The Napa County Firewise Conference that was held on June 4-6, 2003 generated ideas how to complete our hazard assessment and develop mitigation strategies. There were 81 participants in the process from a mix of disciplines. In breakout session, groups were tasked with developing strategies to become Firewise Communities. The results of the breakout groups brainstorming can be found on page 11 – 12 under the title *Major Threat: Fire*.

Putting it all together - In July 2003, the City of Napa received a \$25,000 grant from OES to assist in completing our LHMP. The Fire Department became the lead agency;

however a City Mitigation Team was formed to work on this project. The team met in August, developed goals and objectives, delegated tasks and responsibilities and agreed on a timetable. The members of this Team are listed on page 1. Each team member contributed in areas of their expertise. For example Cassandra Walker is the Cities Redevelopment Director and she assisted in collecting and interpreting data regarding the Cities seismically vulnerable buildings and together with Bruce Gunn, the Cities Chief Building Inspector, they recommended mitigation actions.

It was determined early on that the City and County would collaborate, wherever we could, however, we would each produce our own stand-alone plans. The contact from the County was Neal O'Hare the OES Coordinator. Two consultants were contracted to assist. The first was Frank Lucier from North American Emergency Management who assisted us in interpreting, compiling and presenting the information. The second was Robert Pendoley from RJ Planning. Mr. Pendoley assisted us in completing our hazard assessment. Both participated in our Public Workshop.

Each City Department Head reviewed the plan as it progressed, utilized the talents within their department and recommended changes. In addition, after the hazard assessment was completed, they recommended mitigation action items. Each of these action items were evaluated, prioritized and collectively they decided which ones were appropriate to recommend the Team review for final acceptance. After the Team made final changes, the City Manager approved the document and it was sent to City Council for Adoption. The Plan was formally adopted on September 10, 2004.

Major Threat: Flooding

Flood events in Napa have been recorded since 1892. Historically, the most significant flood events occurred in 1940, 1942, 1955, 1960, 1963, 1965, 1973, 1979, 1982, 1983, 1986, 1995, 1997, and most recently in 1998. Major floods have resulted in damage to commercial, industrial, residential, and agricultural areas. Utilities, roads, bridges, and streets also are subject to damage and require repair and clean up after a flood event. Flooding causes business slow down or stoppage, wage loss, and interruptions to traffic and the flow of goods. Flooding also has significant effects on human life and health (both physical and mental). The 1986 flood, which was the result of a 50-year storm, inundated most of the land adjacent to the Napa River and caused \$100 million in property damage, killed 3 people, injured 27 people, destroyed 250 homes, and damaged 2,500 residences county-wide.

Since the 1930's, Napa City and County residents have made several concerted efforts to address flooding. The most recent effort began in 1965, when Congress authorized the development of a detailed project proposal for flood protection. In 1975, the U.S. Army Corps of Engineers submitted the first project proposal under the 1965 Authorization. Napa County voters rejected the proposal in referendum elections in both 1976 and 1977, and it was subsequently shelved. When the floods of 1986 hit the Napa valley, the City of Napa requested that the project be reactivated. The Corps responded with a revised proposal in 1995. Again, it was deemed unacceptable.

As frustrating as the rejections were, not just for the Corps, but for all those who desperately wanted a solution, a new approach emerged which looked at flood control from a broader, more comprehensive perspective. Citizens for Napa River Flood Management was formed, bringing together a diverse group of local engineers, architects, aquatic ecologists, business and agricultural leaders, environmentalists, government officials, homeowners and renters, and numerous community organizations.

Through a series of public meetings and intensive debates over every aspect of Napa's flooding problems, the Citizens for Napa River Flood Management crafted a flood management plan offering a range of benefits for the entire Napa region. The U.S. Army Corps of Engineers served as a resource for the group, helping to evaluate their approach to flood management. The final plan produced by the Citizens for Napa River Flood Management was successfully evaluated through the research, experience, and state-of-the-art simulation tools developed by both the Army Corps of Engineers and numerous international experts in the field of hydrology and other related disciplines. The success of this collaboration serves as a model, not just for Napa, but also for the nation.

Establishing Goals: Blending Engineering and Ecology

Citizens for Napa River Flood Management established the following agreed-upon set of goals, initially for the City of Napa, but quickly expanded to include all of Napa County:

- 100-year flood protection;
- An environmentally-restored, "living" Napa River;
- Enhanced opportunities for economic development;
- A local financing plan that the community could support; and
- A plan that addresses the entire watershed countywide.

Examining Potential Strategies

Building on members' expertise, Citizens for Napa River Flood Management members examined the range of potential strategies that could achieve these goals. Some of the broad categories considered were:

- Existing Reservoir Strategies
 - Increasing the use of existing reservoirs for flood control purposes as well as water supply.
- Up-Valley Strategies
 - Holding more water upriver during potential flood events, reducing the flow through the City of Napa, then releasing the stored water as conditions permit.
- Down-River Strategies
 - Improving "drainage" at the mouth of the Napa River, thereby increasing the rate of flow through the City of Napa and preventing the accumulation of floodwaters.
- Watershed Protection Strategies

- Improving the capacity of the entire watershed to control and direct flood flows by altering land-use practices.
- Risk Reduction Strategies
 - Elevating and/or relocating homes and businesses in the floodplain.

Evaluating Alternative Strategies

As each of these strategies were examined, both individually and in combinations, some conclusions emerged:

- Configuration of new or expanded-capacity dams and reservoirs upriver by itself could not adequately reduce flood flows into Napa;
- Increasing the rate of flow through the City of Napa by improving “drainage” at the mouth of the Napa River would create erosion and would not significantly reduce flood levels;
- Improving the capacity of the entire watershed to control and direct flood flows is a desirable goal, but by itself cannot prevent major flood events, which occur naturally; and
- Elevating and/or relocating homes and businesses in the floodplain would be extremely costly and, in many cases, infeasible.

The current design evolved from a series of analyses and informed discussions about which strategies, or combination of strategies, best met the Project’s objectives.

The U.S. Army Corps of Engineers, lead federal agency for the Project, was required to submit a detailed proposal describing the project and the rationale behind the proposed design. In addition, the Corps prepared a Supplemental Environmental Impact Statement/Environmental Impact Report (SEIS/EIR) detailing the environmental analyses and mitigation measures contained in the Project. These environmental documents are available in their entirety for public review at various locations throughout the County (see back cover for additional information).

The approach of Citizens for Napa River Flood Management is based on the natural processes and characteristics of the Napa River itself, incorporating the following principles of geomorphology:

- Maintaining the natural slope of the river—the slope should not be altered significantly by dredging or straightening;
- Maintaining the natural width of the river;
- Maintaining the natural width/depth ratio of the river;
- Maintaining or restoring the connection of the river to the floodplain;
- Allowing the river to meander as much as possible;
- Maintaining channel features such as mud flats, shallows, sandbars, and a naturally uneven bottom; and
- Maintaining a continuous fish and riparian corridor along the river.

The goal is to once again make the Napa River a living river by:

- Conveying variable flows and restoring habitat in the floodplain;
- Balancing sediment input with sediment transport;
- Providing natural fish and wildlife habitat;
- Maintaining high water quality and supply;
- Offering improved recreation opportunities;
- Maintaining its aesthetic qualities; and
- Generally enhancing the human environment.

Citizens For Napa River Flood Management Committee

- Friends of the Napa River
- Napa Valley Economic Development Corporation
- Napa County Resource Conservation District
- California Dept. of Fish & Game
- Napa Chamber of Commerce
- United Napa Valley Associates
- American Center for Wine, Food & Arts
- National Resource Conservation Service (NRCS)
- Homeowners: GSMOL & 1st St. Neighbors
- Napa County Landmarks
- Napa Valley Vintners Association
- Sierra Club
- Flood Plain Business Coalition
- Up Valley Chambers of Commerce
- Napa County Land Trust
- Napa-Solano Building Trades Council
- Napa Valley Fisherman's Associations
- Napa Valley Conference & Visitors Bureau
- Napa Downtown Merchants
- Napa Valley Expo
- Napa County Farm Bureau
- Napa Valley Grape Growers Association
- Suscol Council
- Agricultural Commission
- U.S. Army Corps of Engineers
- Napa County Flood Control & Water Conservation District
- Napa County
- City of American Canyon
- City of Calistoga
- City of Napa
- City of St. Helena
- Town of Yountville

Major Threat: Earthquake

Napa County faces a potential \$1 billion earthquake risk. This is an estimate for modeled losses due to building damages and business losses from a local earthquake caused by the West Napa Fault, running through Napa Valley. Earthquakes of two other nearby earthquake faults – the Rodgers Creek Fault and the Concord-Green Valley Fault – would cause estimated damages to Napa County in the one-half billion-dollar range.

On February 5, 2001, in a first-of-its-kind meeting, scientists and emergency managers from the United States Geological Survey, California Division of Mines and Geology, Federal Emergency Management Agency, and California Governor’s Office of Emergency Services gathered to present modeled building stock and business interruption loss-estimation figures for three potential earthquake threats to the 127,000 residents of Napa County.

This public meeting, requested by Mayor Ed Henderson, City of Napa, used the FEMA’s National Risk Assessment System, called HAZUS. HAZUS is a sophisticated earthquake-loss estimation software tool based on a user-friendly geographic information system platform

The three-earthquake scenario simulations affecting northern San Francisco Bay Area counties were presented to an audience over 75 Napa County public officials. Not only did the meeting address Napa County’s risk to future earthquakes but the invited experts also emphasized mitigation and planning activities designed to reduce these estimated future earthquake losses.

To further its proactive mitigation posture, Napa County has joined FEMA’s Disaster Resistant Communities initiative, which is based on establishing public-private partnerships in order to leverage resources necessary to create a disaster-resistant community. The U. S. Geological Survey, California Division of Mines and Geology, California Governor’s Office of Emergency Services, and the Napa County Office of Emergency Services are all Disaster Resistant Communities program partners with FEMA.

Napa County residents and businesses experienced very strong shaking during the Napa Earthquake near Mt. Veeder, magnitude Richter 5.1, on September 3, 2000, with an epicenter near the Town of Yountville, causing moderate damage throughout the southern Napa Valley. Total losses from this moderate earthquake ranged from \$50 to \$65 million.

The process for the development of Earthquake related projects has used input from public meetings, the Local Assistance Center, individual exit surveys and our public-private partnership started by the Disaster Education Task Force.

Napa County Disaster Education Task Force			
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Major Threat: Wildland Interface Fires

A narrow valley floor surrounded and intermingled with steep, hilly, wooded terrain that contains areas that are very susceptible to wildland fires characterizes areas of the City and the County. Such fires expose residential and other development within the County to an increased risk of conflagration. The hilly/mountainous terrain on the east and west side of Napa Valley strongly influences both wildland fire behavior and the suppression capability of firefighters and their equipment.

Wind is a predominant factor in the spread of fire in that burning embers are carried with the wind to adjacent exposed areas. The Napa Valley has a characteristic southerly wind that originates from the San Francisco Bay and becomes a factor in fire suppression. Also, during the dry season the Valley experiences an occasional north wind of significant velocity that is recognized by fire fighters to be a significant factor in the spread of wildland fires.

Firewise Conference

The public participation for the wildland fire interface portions of this Plan was developed from the input of participants at the Napa County Firewise Conference that was held on June 4-6, 2003. There were 81 participants in the process from a mix of disciplines. In breakout session, groups were tasked with developing strategies to become Firewise Communities. The results of the breakout groups brainstorming are as follows:

Firewise Conference Participants

- Homeowner education
- Chipping programs
- Fuel reduction
- Grant applications
- Counties – Title 3 funding
- City/County participation
- GIS mapping
- Co-generation
- Homeowner involvement
- Fire Department consultation
- Fire Department training with community
- Public outreach
- Media involvement
- Fire Safe Council interaction – Share ideas and learn from each other
- Elected officials education
- More Firewise seminars
- Goat farmers
- Mutual support groups

Group - Insurance, Fire, Landowners

- Continue vegetation management fire safe homes by owners
- Work with new residents on defensible space
- Educate insured and Insurance Company employees on information learned here
- Inform insurance agents with newsletters
- Continue education with programs like Firewise
- Blend this information with current legislation
- Landowners continue to work with California Department of Forestry and Fire Protection (CDF) and local fire agencies

Group – Planners, Fire

- Inform others within Agency department and in other departments
- Review proposed ordinances
- Incorporate new knowledge from others into current discipline
- Include in General Plan revision
- Continue to support existing Fire Safe Councils, foster new ones, & look for grants
- Increase public awareness through door-to-door and other outreach measures
- More intensive inspection and enforcement of defensible space
- Get governing bodies onboard
- Increase use and coordination of GIS
- Interlocal governmental partnerships and shared efforts

Group - Developers, Contractors, Builders, Architects, Landscapers, Fire

- Community contact and education
- Local cooperation/neighborhood mitigation
- DMA 2000 (fire portion) Develop near/mid/long term strategies
- Training staff for new fire regulations
- Public education/ school programs
- Become a volunteer firefighter
- Influence culture of Napa Land Trust
- Pilot program for Firewise training

From these Firewise group strategies, the mitigation action items were developed for this Plan. This public process was facilitated by California Division of Forestry and the United States Forest Service and gave us a firm foundation for our fire hazard mitigation planning efforts.

Firewise Conference Participants

Area of Expertise	Number	Percentage
Insurance	11	13%
Fire	12	12%
Fire Safe Councils	5	5%
California Department of Forestry	16	17%
Homeowner Associations	1	1%
Code Enforcement	2	2%
County Planning	11	12%
Business/Industry	5	5%
Landscaping	3	3%
Local Government	10	11%
BIA – SCA	2	2%
Utilities	3	3%
Sierra Club	1	1%
Architecture	2	2%
Volunteer Associations	1	1%
USFS	1	1%
Emergency Services	5	5%
Volunteer Fire Departments	3	3%
Fish & Game	1	1%

Major Threat: Terrorism and Technological Hazards

Napa Terrorism Working Group

The Napa Terrorism Working Group (TWG) was formed in 2001 in response to the events of 9/11 and the subsequent anthrax mailings. All emergency response agencies collaborated on a countywide protocol for response to terrorist incidents

When Homeland Defense grants became available, the same agencies decided that the TWG was best positioned to do needs assessments related to terrorism and determine allocations of any monies received for homeland defense issues. It was agreed by the members that such monies would be pooled and used based on needs assessments conducted by the group. The group was instrumental in completing two countywide threat and vulnerability assessments that maintained our eligibility for these grant programs. The TWG group agreed that the money is to be shared as equitably as possible. The main concept of the TWG was to form a cooperative, interagency group to deal with a host of issues related to terrorism and funding. Pooling the monies received and dispensing them according to the agreed upon needs of the group was one of the goals.

At the beginning of F/Y 03-04, in order to meet the state requirements for the Homeland Defense grants, an executive committee was formed within the group. This executive committee consisted of the County Sheriff, the County Fire Chief (or their representatives), a representative from the city's Fire Chiefs, from the city's Police Chiefs, and the County Public Health Officer.

Members of the Napa County Terrorism Working Group	
Andrew Lewis	Napa Police Department
Mark Barclay	CDF/Napa County Fire
Mark Caro	County Safety Officer
Cheri Kluever	Veterans Home
Chris Piper	Piners Napa Ambulance
Ty Cook	Napa County EMS Agency
John Cooledge	Department of Agriculture
Patti Deweese	Napa County Office of Administration
Jan Donovan	Napa County Sheriffs Office
Doug Uhlik	California Highway Patrol
Joyce Adams	Red Cross
John Kara	Napa County Environmental Health
Kathy Brady	City of Calistoga OES
Keith Caldwell	American Canyon Fire Department
Ken Arnold	Napa Valley Community College

Members of the Napa County Terrorism Working Group (continued)	
Kevin Plett	City of Yountville City Manager
Kim Suenram	Napa Fire Department
Eugene Lyerla*	Napa County Sheriffs Office
Bonny Martigoni*	Napa County EMS Agency
Mary-Jean McLaughlin	Napa County Public Information Office
Michelle Monroe	Queen of the Valley Hospital
Noel Ojeda	City of Angwin
Neal O'Haire*	Napa County OES
Jill Pahl	Napa County Environmental Health
Theresa Richmond	Napa County Health and Human Services
Robert Wedell*	St. Helena Police Department
John Robertson	Napa County Sheriffs Office
Steve Stuart	Napa Fire Department
Tim Streblov*	CDF/Napa County Fire Department
Tim Borman*	Napa Fire Department
Tom Bishop	St. Helena Fire Department
Vern Simas	American Canyon Fire Department
Veronica Simpson	Queen of the Valley Hospital
* --- Voting Member	

PUBLIC WORKSHOPS ON THE DRAFT PLAN

The public provided input by participating in several forums. There were multiple public workshops during the period of building the FEMA approved Flood Mitigation Plan as described in a previous section titled; *Major Threat: Flooding*. As noted on page 7, over 32 different agencies, businesses groups, nonprofits, community leaders and government agencies attended the Flood Mitigation Workshops.

There was a public workshop on February 5, 2001 that addressed Napa County's risk to future earthquakes and emphasized mitigation and planning activities designed to reduce future earthquake losses.

The public participation for the wildland fire interface portions of this Plan was developed from the input of participants at the Napa County Firewise Conference that was held on June 4-6, 2003. As noted on page 12, there were 81 participants from a mix of 19 disciplines who attended the Fire Wise Conference. The agencies ranged from the Sierra Club to architects and homeowners groups in addition to the many government agencies.

As the plan developed, the Napa County Disaster Education Task Force, a public - private partnership, met monthly and reviewed the progress. Bringing all of the mitigation public outreach efforts together was a public workshop held on March 17, 2004. This workshop was conducted to inform the public on this mitigation planning effort and to solicit additional input for this Plan. The Plan was also posted on the City Internet Web site for public review and comment. The public was given thirty days to comment and make suggestions, and these comments and input are reflected in this Plan.

Plan Intent and Vision

This Plan is intended to be a roadmap towards a more disaster resistant community. It will not be a regulatory document like the City General Plan, but a living document that provides a background on the threats that are faced in Napa, identifies the critical paths to mitigate these threats and provides a list of action items that, when funding becomes available, will move the City of Napa closer to becoming a disaster resistant community.

The list of action items is categorized by major threat, by time horizon from funding of the requirement to completion, and by the complexity of coordination (especially in regards to environmental coordination under the California Environmental Quality Act {CEQA} and the need for a detailed environmental impact report under federal statutes).

By building this modular approach to hazard mitigation, public policy officials can focus future limited mitigation dollars on where they can have the most impact in light of the threats that are faced. As mitigation funding increases there will be a list of action items from which to rapidly develop public policy.

The action item lists will be revised annually, and as technology and approaches to mitigation change or improve, so will the lists. This Plan is intended to be an evolving

mitigation document. As hazards are largely mitigated (i.e. the 2007 completion of the living river project that will substantially reduce the flood threat), secondary hazards will increase in importance and require revision in the Plan and action item lists to address them.

The Plan's vision therefore is process and project oriented. Practical result-oriented action items with clear cost/risk benefit analysis are the building blocks of this Plan, laying the foundation for rapid action in the advent that mitigation resource funding becomes available from whatever source. This Plan therefore is a mitigation toolkit that identifies hazards and risks, finds and defines prescriptive mitigation actions, and develops a framework for their implementation as public policy. This Plan is a call to action for hazard mitigation and the moving the City of Napa towards being a more disaster resistant community.

COMMUNITY PROFILE

Napa's History

The word *Napa* was probably derived from the name given to a southern Wappo Indian Village whose people shared the area with elk, deer, grizzlies and panthers for many centuries. At the time of the first recorded exploration into Napa Valley in 1823, the population consisted of hundreds of Indians. Padre Jose Altimira, founder of the mission at Sonoma, led the expedition. Spanish and Mexican control remained until the Bear Flag Revolution, and the valley became one of the first in California to be settled by American farmers, who started arriving in the 1830s.

When California was granted statehood, Napa Valley was in the Territory of California, District of Sonoma. In 1850 when counties were first organized, Napa became one of the original counties of California, and in 1851 the first courthouse was erected. By 1870 most of the Indians who had inhabited the valley were wiped out by smallpox and other diseases brought by the white man. The few that remained finally were taken into Alexander Valley, where a few descendants now reside on government reservations.

The City of Napa was laid out in 1848 by Nathan Coombs on property he had received from Nicolas Higuerra, holder of the original Spanish Grant. The first business establishment was opened in the new city in 1849.

It was the gold rush of the late 1850s that really built Napa City. After the first severe winter in the gold fields, miners sought refuge in the young city from snow, cold, floods and disease. A tent city was erected along Main Street. There was plenty of work in the valley for disillusioned miners. Many cattle ranches were maintained, and the lumber industry had mushroomed. Sawmills in the valley were in operation cutting up timber that was hauled by team to Napa City, then shipped out on the river to Benicia and San Francisco.

In the mid 1850s, Napa Main Street rivaled that of many larger cities, with as many as 100 saddle horses tied to the fences on an average afternoon. Hotels were crowded, cash slugs and California coinage were plentiful. Saloons and gambling emporiums were numerous, but culture had also made its debut. There was a lyceum and reading room, an opera house, an agricultural society and other evidences of a maturing community.

In 1858 the great silver rush began in Napa Valley, and miners eagerly flocked to the eastern hills. In the sixties, mining was carried on, on a large scale, with quicksilver mines operating in many areas of Napa County. The most noted mine was the Silverado Mine, located on the slope of Mt. St. Helena, which was immortalized by Robert Louis Stevenson in his classic *The Silverado Squatters*.

In the Twentieth Century, the City of Napa became the primary business and economic center for the Napa Valley. As agricultural and wine interests developed north of the City boundary, much of the light industry, banking, commercial and retail activity in the county evolved within the City of Napa and in earlier times along the Napa River through the Historic Downtown. Even today the bulk of the county population lives in the City of

Napa. The active economic development program has continued to support the wine and agricultural activities of the Valley to this day.

Napa Community Profile

Population and Location

The City of Napa, incorporated in 1872, is located at the base of the world-famous Napa Valley wine-producing region, approximately 50 miles northeast of San Francisco. It has a land area of 18.34 square miles and a population of 74,666. A 1975 Citizens Initiative established a Rural Urban Line around the City that limits the City's outward growth.

Economic Trends

	1990	1995	2000	2005	2010
Population	59,523	62,776	74,666	76,824	81,525
Average Income/Household*	\$16,247	\$23,200	\$25,655	\$27,711	\$31,973
<i>* In constant 1995 dollars</i>					

Climate

Strongly influenced by the built-in air conditioning of San Francisco Bay, Napa enjoys a moderate climate. Representative temperatures for the City of Napa in January are 37.4° minimum and 57.7° maximum. For July, they are 52.2° and 82.1°, respectively. Average rainfall is 23.88" per year, with the majority occurring from November to March.

Transportation

Highways

Highway 29 runs north-south through the City.
 Highway 12 (east-west) intersects at the southern part of Napa County and Interstate 80 is six miles east of this point.
 Highway 121 runs through the southern and eastern sides of the City of Napa.

Rail

California Northern and Union Pacific Railroads provide freight service.

Air

The Napa Airport is located south of the city limits. On-call charter service is available 24 hours a day. Major airports (Sacramento, Oakland, San Francisco) are within one hour's drive. Evans Transportation provides shuttle service to and from San Francisco and Oakland airports.

Bus

Napa Valley Transit & the VINE provide service north to Calistoga and south to Vallejo; there is connecting ferry service from Vallejo to San Francisco.

Truck

Several companies serve Napa with overnight service throughout California; a UPS depot is in the Napa Valley Corporate Park.

Water Supply

The City of Napa is committed to providing a safe and reliable supply of quality drinking water. Water is provided by three city-owned and operated, state-of-the-art, treatment plants: Hennessey, Jamieson Canyon terminal of the State Water Project and Milliken.

Sewer Service

The Napa Sanitation District serves the City of Napa and adjacent unincorporated areas. Existing users pay an annual sewer service charge that is based on flow and strength. New connectors pay a connection fee, also based on flow and strength.

Solid Waste Disposal

The Napa-Vallejo Waste Management Authority, a joint powers agency between Napa City, Napa County and Vallejo City, provides garbage pick-up service for all residents and business, economical waste disposal facilities and activities including the Hazardous Waste Collection Facility for households and small quantity business generators.

Storm Drainage

The City of Napa is developing a Storm Drainage Master Plan and a base map for the system. Some parts of the system date back to the early 1900s and are in the process of being updated, using the revenue collected from the storm water system service fee. The service fee has a cap of \$240/year for all commercial and industrial property and \$12/year for residential property.

Electricity and Natural Gas

Pacific Gas and Electric (PG&E) supplies electricity and natural gas to the City of Napa.

Telephone

SBC provides a variety of services to the City of Napa.

Recent Major Projects

Recently completed Downtown Projects include: COPIA, the American Center for Wine, Food and the Arts; Napa Mill Historic Preservation Reuse Project; Napa Valley Opera House Theater Restoration; Oxbow School for the Arts, and Blue Oak School.

Other private projects outside of Downtown completed in the past 4 years or nearing completion include numerous subdivisions, the largest of which is the Von Uhlit Ranch development with 79 attached single family homes and 200 apartments; Hawthorne Village Apartments; three senior apartment projects totaling 310 units; hotels including the River Terrace Inn, the California House Inn and an 80 room expansion of the Hilton Garden Inn; an addition to the Napa Premium Outlets; revitalization of Bel Aire Plaza with a new Target, Trader Joes and Cost Plus; a new Wal Mart; the Kaiser Medical Office Expansion; the Wolfe Teen Center; and subdivision of a new Industrial Park on Enterprise Court.

The \$200 million Napa River Flood Protection Project is reshaping the Napa Riverfront through much of the City. It includes the recent replacement of the Third Street Bridge and construction of the Soscol Avenue/Oxbow Bypass Bridge, as well as ongoing replacement of the Maxwell Bridge and the First Street Bridge. Another significant ongoing public project is the Highway 29/Trancas St. Interchange.”

City Government

Napa operates under the council-manager form of government. Policy-making and legislative authority are vested in the governing council, which consists of a mayor and four council members. Council members are elected to four-year staggered terms with two council members elected every two years, and they also hire the City Manager, City Attorney and City Clerk. The City Manager is responsible for carrying out the policies of the City Council, overseeing the day-to-day operations of the City and for appointing the directors of the City departments.

Police

The Napa Police Department is committed to maintaining a safe and secure community environment and to promote a sense of trust and confidence in the police by members of the public. They provide law enforcement and crime prevention services including criminal investigations, traffic enforcement, police patrol and emergency response, juvenile services and communications services. The department administers a variety of community based policing programs, such as D.A.R.E. (Drug Abuse Resistance Education), G.R.E.A.T. (Gang Resistance Education And Training), Graffiti Control, Neighborhood Watch, and Traffic Patrol.

Fire

The Fire Department serves the community from four fire stations covering 18 square miles within the City limits of Napa. Each station provides an Advanced Life Support (Paramedic) Engine company staffed with a minimum of 3 personnel. In addition, Fire Station One provides a Ladder Truck Company capable of specialized operations and heavy rescue. The department staffing consists of 59 suppression, seven fire prevention and four administration personnel. The department participates in a multi-agency Hazardous Materials Response Team and maintains a Swift Water Rescue Team with two inflatable rescue boats.

Public Works

Public works oversees the following departments; Administrative Services, Bridges and Urban Drainage, Engineering Services, Fleet Management, Property Management, Recycling/Waste Reduction, Street, Electrical and Communications, Transit, Transportation/Engineering and water.

The Bridge and Urban Drainage (BUD) Division is responsible for the design and construction of City maintained bridges, design and construction of storm drainage system improvements, administering the Storm Water System Service Fee Program, reviewing the drainage portion of development projects, administering the Floodplain Management Program, and monitoring ALERT rainfall and stream gages. The Division is responsible for the construction of several bridges that must be replaced for the Napa River/ Napa Creek Flood Protection Project, the implementation of the Storm Drainage

Master Plan, reporting weather information during Emergency Operations, and processing FEMA floodplain documents.

Public Works administers the Hazard Mitigation and Damage Assistance Programs and administers five bridge projects that are part of the Flood Protection Project. During disasters, Public works Operations section provides equipment and Public Works Staff services in the Situation Status Section and Damage Assessment Unit.

Community Development

Community Development Department (CDD) consists of the following divisions: Building Division, Code Enforcement Division, Engineering Development Review, and Planning Division.

The Planning Division provides a comprehensive planning review and evaluation of all current development projects in accordance with State Planning Law, California Environmental Quality Act, the City's General Plan, Zoning Ordinance and other land use standards. Preparation and enforcement of all Permit and Architectural Review conditions of approval is a complementary responsibility. The Division also provides advanced planning services, General Plan administration and Zoning Ordinance studies not directly related to current development review.

The Building Division is responsible for the enforcement of minimum building standards to safeguard life or limb, health, property and public welfare by regulating and controlling the design, construction, quality of materials, use occupancy and location of all buildings and structures within the jurisdiction of the City of Napa.

The Community Development Department ensures that development meets City Ordinance and Building Code requirements. During disasters, the Community Development Department provides staff for the Planning Section as well as providing staff and equipment to the Operation Section.

Community Resources

The Napa City Community Resources Department (NCRD) mission is to provide for the protection and enhancement of the City's park lands, open spaces and street trees through planning, education, and direct stewardship of these resources, improve the quality of life in the community by promoting positive social behavior, interaction with others, self discovery, skill development, and positive self esteem through the development, implementation and coordination of a wide variety of recreation and cultural services; and provide support for community development, community services and environmental protection and awareness through utilization of the Department's unique blend of administration and professional resources.

During disasters, the Community Resources Department provides staff for the Logistics Section as well as providing Staff and equipment to the Operation Section.

Community Facilities

Health

The City of Napa has excellent medical facilities: Queen of the Valley Hospital, Kaiser Permanente Clinic and Napa State Hospital. Nearby are also the St. Helena Hospital and Health Care Center and the Veterans Home of California. Paramedic service and the REACH emergency rescue program are in place as well.

Education

Napa Valley Unified School District has 21 elementary schools, three middle schools, and three high schools including the New Technology High School in the city of Napa. Napa is also served by private and parochial schools including Justin Siena High School and the new Blue Oak School, an independent elementary school. Eighty percent of public and ninety percent of private high school students go on to college. Local higher education facilities include: Napa Valley College, 180-acre campus serving 11,000 students and Pacific Union College, 2,000 acre campus serving 1,600 students. University of California Berkeley, University of California Davis and Sonoma State University are all within 40 minutes.

Culture and Recreation

Napa's mild climate encourages year-round outdoor activity. The City of Napa offers numerous neighborhood, community, and regional parks, wetlands and natural open areas, and hiking and river trails. Recreation and leisure facilities include three community swimming pools, a public golf course and public tennis courts. There are weekly Farmers' and Chefs' Markets from April through October. The preservation of historic neighborhoods and buildings is balanced with a dynamic mix of retail, fine dining and professional offices. The new COPIA, American Center for Wine, and the Arts recently opened. The arts further enrich downtown with studios, theaters and galleries.

Housing Availability, Pricing and Rentals

Napa is a city known for its quality lifestyle. There are many neighborhoods, each with its own distinct character. Rentals for apartments and duplexes range from \$850 to \$2,100 per month; rentals for two and three bedroom houses range from \$1,000 to \$2,800 per month. The sales price of homes range from \$190,000 to over \$1,000,000. There are 13 mobile home parks with approximately 1,500 spaces located in the community area.

Industrial Sites

Within the City of Napa and south to American Canyon, there are several business/industrial parks that offer sites for purchase, space in existing buildings for lease, and build-to-suit arrangements. The types of uses allowed cover the spectrum from office to R&D, from light to general manufacturing, and from warehouse to distribution. Examples are the Napa Valley Corporate Park, which comprises 246 acres and is located in the southern part of the City. The Napa Valley Gateway Business Park, a 386-acre master planned development, and the Napa Airport Center, are also within close proximity to the City of Napa.

Economic Outlook

The City of Napa has a strong balanced economy, diversified labor force, and competitive land values, all good reasons to do business in the City of Napa. With access to transportation routes and its convenient location at the base of the Napa Valley, the City of Napa is the economic hub for the region. Private investment is on the rise. The business climate is expanding from its agriculture and tourism base to include a growing high-tech market. Retail and service industries are also experiencing growth.

Napa's Economical Demographics

Napa County is centrally located in the North Bay Area of California. The county remains primarily agricultural, confining most commercial and residential development to the existing cities. Its most prominent graphic feature is the Napa Valley, which is one of the most famous and productive wine regions in the world and a very convenient place to do business. State highways include 29, 121, 12 and 128 allow the residents to travel to other cities. The Interstate 80 connection is six miles east of Napa. Highway 101 is 18 miles west of Napa. Napa also has rail, truck and barge service from the Port of San Francisco and the Port of Oakland.

Service is the largest industry in the county, accounting for 27.8% of total employment. Another significant industry, retail trade, accounts for 17% of employment, with numerous jobs available in the eating and drinking sectors. Manufacturing makes up 16.3% of the total followed by government at 15.6%.

Demographic trends, shifts in demands for products or services, technological innovations and the way business is conducted are some of the variables that drive employment in an occupation up or down. Also, occupations which have large employment and have high turnover rates, generally provide the most job openings. Napa County is projected to have many employment opportunities in the high turnover occupations.

The projected growth for Manufacturing during the years of 1995 thru 2002 was 36.6%. The projected growth for Retail Trade during the years of 1995 thru 2002 was 36.3%. The projected growth for Services during the years of 1995 thru 2002 was 23.7%.

The June 2001 Sacramento report was that California has replaced France to become the fifth largest economy in the world, this was caused by the European weak currency and this state's financial clout. California's economy grew 13.6% to \$1.33 Trillion in 2000 while France suffered from the deteriorating Euro, according to the Los Angeles Economic Development Corporation. If the Euro recovers this year, the Number five ranking may change back to the Number six for California. The only economies larger than California at the end of 2000 were the United States (\$9.96 trillion), Japan (\$4.61 trillion), Germany (\$1.89 trillion) and the United Kingdom (\$1.42 trillion).

Napa General Information 2004	
County Seat	Napa County
Napa County Incorporated	February 18,1850
Napa Town Site Founded	1847
Incorporated as City of Napa	1872
Napa City Size	18.34Sq.Mi.
Napa County Size	35 Mi. Long
City of Napa Population	71,412
City Projected Population Cap	85,000
County Population	128,021
Number of Households	27,251
Median Household Income	\$45,935
Average Income per Household	\$66,339
Per Capita Income per Household	\$36,211
Owner Occupied	58
Renter Occupied	42
Average Persons per Household	2.59
Mobile Home Parks	13
Median Home Cost	\$270,000
Home Cost Range	\$190,000-\$1,000,000
Avg. Travel Time to Work	20.51 min.
City Departments	12
City Employees	428
Government	Manager/Council
Official Sister Cities (2001)	(1) Casablanca Valley, Chile (2) Iwanuma, Japan (3)Launceston, Australia
Official Friendship Cities (2001)	(1) Jerez, Mexico (2) Nakaizu City, Japan
Residential Land	67%
Commercial Land	8%
Industrial Land	4%
Public Parks and Quasi	12%
Undeveloped/Agricultural	9%
2003 Taxable Sales Transactions	504,077,00
Sales Tax for State and Local	7.75%

2003 Average Rental Prices in Napa	
TYPE	PER MONTH COST
Rental Units Median Rent	\$819/month
Apartments/Duplexes	\$921 - \$2,100/month
One Bedroom & One Bathroom	\$921/month
Two bedroom & One Bathroom	\$1,116/month
Three Bedroom	\$1,417 - \$2,800/month

2000 City of Napa Marital Status		
STATUS	AMOUNT	PERCENT
Single never married	13,736	24%
Married, excluding separated	31,364	55%
Widowed	4,408	8%
Divorced	6,399	11%

Source: 2000 Census

2000 City of Napa Population by Age	
AGE CATEGORY	AGE IN YEARS
Median Age	36.1 years
Average Age	37.47

Source: 2000 Census

200 Napa County Population by Cities/Towns vs. Unincorporated		
AREA TYPE	POPULATION	PERCENT
Cities/Towns	97,796	78%
Unincorporated	27,483	22%

Source: 2000 Census

2000 City of Napa Population by Household		
HOUSEHOLD TYPE	POPULATION	PERCENT
Family Households	47,192	65%
Non-Family Households	22,953	33%
Group Quarters	1,459	2%

Source: 2000 Census

What the City of Napa Provides	
Neighborhood Recreational Parks	35
Community Parks	4
City Wide Open Space Parks	4
Total Acres of Park Land	748 acres
Softball and Baseball Fields	13
18-Hole Municipal Golf Courses	1
Tennis Courts	48
Swimming Pools	4
State Parks	1
Community Centers	1
Senior Centers	1

The Infrastructure of Napa City	
Miles of Streets	220
City Street Lights	4,405
Signaled Intersections	66
Miles of Water Mains	352
Water Treatment Plants	3
Miles of Storm Drainage	90
Average Water Consumption	14.2 Million Gallons/Day
Water Tanks	11
Parking Garages	3

Available Education and Day Care	
Elementary Schools	21
Middle Schools	2
High Schools	3
Charter Schools	3
Student/Teacher Ratio	14/1
Expenditures Per Pupil	\$4,743
Accredited Day Care Facilities	5
Licensed Day Care Facilities	39
Percentage of Public School Students Continuing to College	80%
Percentage of Private School Students Continuing to College	90%
Colleges in Napa	3
Colleges Within 45 minutes of Napa	3

2003 Area Crime Rate (Annualized Per 100,000)		
CRIME	ANNUALIZED	REAL
Robberies	67.6	48.274512
Rapes	25.35	18.102942
Homicides	1.4	0.999768
Aggravated Assaults	256.33	183.05038
Motor Vehicle Thefts	201.4	143.82377

Source: Napa Chamber of Commerce

2003 Unemployment	
Unemployment	3.8%

Source: Napa Chamber of Commerce

Health Care	
Number of Hospitals	2
Number of Physicians	317
County's Citizens/Physician Ratio	399.3/1

Elder Care	
Skilled Nursing Facilities	8
Total Number of Beds	562

Napa Media	
NAME	TYPE OF MEDIA
Napa Valley Register	Newspaper
The Sentinel	Newspaper
St. Helena Star	Newspaper
KVON/KVYN	Local AM/FM Radio Stations

Tourism Information

Tourism has declined 9.6% from 2001 to 2002. This has affected government revenues, employment and special categories in retail sales. The decline is due to the economic slowdown, the dot com bust and 9-11. Tourism is expected to show a slow increase over the next year.

SURVEY OF TOURISTS VISITING NAPA COUNTY

HOUSEHOLDS	PERCENT
Couples	80%
No Children at Home	60%

AGE	PERCENT
25-44	54%
45-54	17%
55-64	14%
Over 65	8%

PLACE	AMOUNT IN DOLLARS
National Average	\$24,000
Mean Household	\$53,000

WHAT AMOUNT	PERCENT
Some College	Over 8%
College Graduates	43%
Masters Degree	21%

REGION	PERCENT
Northern California	31%
Southern California	5%
East Coast	17.5%
Midwest	17.5%
Southern States	17.5%
Canada, Germany, United Kingdom, Japan, Australia	11.5%

NAPA LAND USE

Regional Setting

The City of Napa is located along the Napa River in the southern portion of the Napa Valley, 52 miles northeast of San Francisco and 61 miles west of Sacramento. Most of the City is on relatively level ground, except the eastern and western edges which extend into brush and oak-covered foothills. The City's northern edge abuts agricultural lands, primarily vineyards. To the south lie agricultural and marsh lands and the Napa County Airport. Regional access to Napa is primarily via State highways 12, 29, 121, 128, and 221.

The City of Napa straddles the Napa River and occupies the level valley floor between the Howell Mountains to the east and the Mayacamas to the west. Napa is the largest city in Napa County, with approximately 75,000 residents in 2004. The city is primarily residential in character with general commercial and tourist commercial areas located downtown and along major roadways. There is a corporate business park at the southeastern end of the City and two other light industrial areas. Community and neighborhood parks are located throughout the city, and larger city-wide recreational areas are found at city boundaries to the west and south.

Geographic Areas

City Limits

As of 2004, Napa's city limits encompass about 18.1 square miles of incorporated territory. Within the boundaries of the city limits, there are several unincorporated islands which remain under County jurisdiction including.

Rural Urban Limit

The planning boundary for the General Plan is the Rural Urban Limit (RUL) encompassing approximately 18.2 square miles. The RUL represents the city's planned ultimate boundary for urban development, based on a 1975 advisory measure since included in the City's General Plan. A 1999 Charter Amendment requires a vote of the people to change the RUL.

Planning Areas

The RUL is divided into 12 planning areas of generally related neighborhoods and commercial and industrial areas, for purposes of more localized planning. They include:

- | | |
|------------------|----------------------|
| 1. Linda Vista | 7. Westwood |
| 2. Vintage | 8. Central Napa |
| 3. Browns Valley | 9. Soscol |
| 4. Pueblo | 10. Terrace/Shurleff |
| 5. Beard | 11. River East |
| 6. Alta Heights | 12. Stanly Ranch |

City of Napa History

The original townsite was laid out at the headwaters of the Napa River in 1848. River trade soon helped Napa City become a center of valley commerce. The city's population swelled from 159 in 1850 to nearly 3,500 in its first 30 years. Consumer goods from San Francisco were unloaded from river barges at the wharf located at the foot of Third Street. Agricultural products, timber from the valley's hills, and fine tanned leather were loaded for transport downriver.

By the turn of the century, Napa boasted several fine hotels and a beautiful opera house in its bustling downtown. Vineyards and orchards had been planted during the mid-nineteenth century and the area was well known for its fine wines and brandies.

Some of the original wineries are still in operation and have been joined by over 200 more. Today, Napa Valley's agricultural industry is more than simply a source of local employment. The wine industry has virtually become a local *raison d'etre*; wine production and its most important spin-off industry, tourism, extend south to the City.

Following a long period of slow growth, the city grew rapidly between 1940 and 1950. Much of the growth was a result of war-industry-related operations in nearby Solano County and created the first signs that Napa was becoming a bedroom community within the San Francisco Bay Area.

Early plans envisioned a future in which the city of Napa would become a full-scale urban center. The City's 1969 General Plan forecast a population of 150,000 by 1990 with an extensive urbanized area and major transportation improvements. However, the 1969 General Plan was never realized. Portions of the plan, and the rapid growth it seemed to be promoting, alarmed many residents. Citizens mobilized and began calling for a new plan that would slow the city's growth rate. In 1973, the City Council placed questions on population growth on the ballot. The option with the least population increase (75,000) was selected by voters. The City Council adopted a new general plan in 1975. Consistent with the ballot measure, the plan projected a Year 2000 population of up to 75,000 and contained urban development within an urban growth boundary dubbed the Residential Urban Limit Line (RUL).

The 1975 General Plan expanded the RUL concept into a growth control mechanism. Urban uses were planned within the RUL. Napa County cooperated by requiring annexation of lands within the RUL before urbanization. During the 1970s, Napa County was also engaged in growth policy discussions. As a result of passage of voter-initiated Measure A, which went into effect in 1980, county lands outside the RUL were planned for resource use, agriculture, or very low density residential development.

In 1980 the city was developed at a typical suburban density of about four units per acre. The 1982 General Plan reasserted the importance of the downtown as the county's primary retail and government center. The Napa Town Center project was designed and three downtown parking garages were constructed on cleared land. The building demolitions associated with redevelopment galvanized a local historic preservation movement, which has led to preservation of most "Old Town" buildings.

The Napa River became a focus for planning efforts after a disastrous flood in 1986. Public interest in flood control provided the impetus for the Army Corps of Engineers' Napa River Flood Control Project. Extensive community participation in the development of the Flood Project led to approval of an innovative "Living River" concept. A local sales tax measure to support this Project was approved in 1999, and construction of the Project is currently ongoing.

Existing Land Use

In 2003, the city can be characterized as a low rise (one to two story building heights) community dominated by low density, detached single family housing in relatively distinct neighborhoods, with low intensity commercial uses along major arterials and generally one story industrial buildings. The following table provides generalized breakdowns of the land use categories by acreage in the early 1990's.

Existing Land Area in RUL –1992		
General Land Use Categories	Acres	% of RUL
Residential	7,856	67%
Commercial	963	8%
Industrial	454	4%
Parks and Public Quasi-Public	1,343	12%
Undeveloped/Agricultural	1,037	9%
Total	11,653	100%

Source: City of Napa Planning Department based on 1986 General Plan

Residential Development

Napa includes a diverse housing stock. Of the City's 26,577 homes in 2003, 62 percent were single family detached homes, 25 percent were multiple family rentals, 7 percent attached single family homes and another 5 percent mobile homes (California Department of Finance, January 1, 2003). The city's housing stock ranges from the merchant mansions built in the late 1800's in the "Old Town" area near downtown, to the working class cottages of the early 1900's, to the traditional ranch style subdivisions of the 1950's and 60's to the large custom homes and subdivisions of the 1990's. Subdivisions are typically developed at between 3-6 units per acre. Multi-family housing (occurring at about 9-40 units per acre) is found throughout the City, ranging from duplexes and triplexes, older homes which have been converted to multi family use, small apartment complexes often in the City's historic neighborhoods, and larger apartments and condominiums which tend to be concentrated along major streets. Mobile home

parks and a variety of residential care facilities are also located throughout the City.

Commercial Development

While downtown functions as the city's commercial center, other general commercial and tourist commercial areas are located along major arterials, including Trancas Street, Soscol Avenue, Lincoln Avenue, Imola Avenue West and parts of Jefferson Street. These areas include several community shopping centers as well as older "strip commercial" buildings, and an auto row on Soscol Avenue. Most development is one story, but parts of Downtown have 2-3 story buildings.

Industrial Development

Most industrial development in Napa is in the southern part of the city, in or near the Napa Valley Corporate Park. Other concentrations of light industrial uses are found along California Blvd. and Industrial Way; in the vicinity of Jackson, Iriquois and Tannen Streets; in the Tannery Bend Area east of Coombs Street. An undeveloped area designated "Corporate Park" is located in the southwestern entrance to the city.

Park Lands

City parks and recreation facilities are located throughout the city, with the larger citywide recreational areas found at the city boundaries to the west and south. Existing regional parks in the city include Alston, Kennedy, and Westwood Hills and Timber Hill, totaling approximately 630 total acres. Four community parks include Century Oaks, Fuller, Garfield, and Las Flores, totaling approximately 46 acres. Neighborhood parks comprise the balance of parkland within the city. The park system is augmented by the developing Napa River Trail which will provide a major north-south bicycle pedestrian "spine" along the River.

Vacant and Underused Lands

Vacant land comprised nine percent of the city's RUL, according to a 1994 survey of vacant parcels, about half of which was considered generally developable. Usable acreage did not include environmentally sensitive areas or bodies of water since those areas were generally not considered suitable for development. This reduced the amount of vacant, usable land to less than five percent of the total RUL. The City has designated many of the environmentally constrained sites as "Resource Area", including steep hillsides in Browns Valley, Westwood and Alta Heights, and wetland areas on Stanly Ranch.

Overall, the City is largely urbanized, although land used for agricultural production is found to the south in the Stanly Ranch and Westwood Planning Areas. Pockets of intensive agricultural use also remain in the Vintage, Beard, and Terrace Shurtleff Planning Areas.

In 2003, vacant usable low density residential acreage is concentrated in the Vintage Planning Area in north Napa, Westwood, and Terrace Shurtleff. Planning Area. Development in other Planning Areas will primarily be the result of infill and re-use over time. New opportunities for development and redevelopment along the Napa River, particularly in the Soscol Corridor, parts of Downtown and Tannery Bend are anticipated as the Napa River Flood Protection Project is completed.

City Land Use and Development Trends and Hazard Areas

Overview

Over the past 15 years, the city has averaged fewer than 300 residential units per year, and there is political and policy support for continuing this “even rate of growth” through 2020. In terms of types of residential development, the City anticipates more mixed use and infill housing as remaining vacant land tracts are used.

Development interest in the Downtown and in the Soscol Corridor have increased in recent years with the ongoing construction of the Flood Protection Project, and catalysts such as Copia and the renovation and re-opening of the historic Opera House. New restaurants and art galleries are opening. Over the next 10 years the City expects to see substantial reinvestment in these two areas, with residential mixed use projects and more 2-4 story developments. The Tannery Bend Mixed Use area is another area likely to see change: city plans for a mixed residential/light industrial “working village” keys off of an eclectic existing use mix and historic industrial design character. Other nonresidential areas, such as the Napa Corporate Park will continue to build out remaining vacant parcels.

The City and County have formally cooperated since the early 1980's to ensure that urban development occurs within the City's RUL and this commitment is fully expected to continue. In 2002, the City of Napa and Napa County, (and the City of American Canyon and the County) after intensive negotiations signed agreements to “shift” portions of County regional housing needs assignments to the two cities in exchange for revenue sharing and other cooperative arrangements. The City of Napa is largely built out with very limited remaining vacant lands within the City's Rural Urban Limit. This RUL boundary requires a vote of the people to change. Consequently, new development in the future is expected to include greater reuse of existing sites in certain parts of the city. Following is a general description of land use and development trends as they relate to various hazards.

Flooding

The Napa River Flood Protection Project has demolished numerous residential, commercial and industrial buildings along the Napa River and Napa Creek in order to construct flood protection improvements including floodwalls, flood plain and marsh plain terraces, a new bypass channel and new bridges. In the lower reaches of the River, levees have been lowered to permit flooding of agricultural lands during flood events. When completed within the next 5 years, certain lands along the river long affected by flooding will be re-mapped by FEMA and are expected to be removed from

the floodway and/or floodplain. In these areas, which include parts of Downtown, the Tannery Bend and the Soscol Corridor and other riverfront lands to the north, new development of currently vacant or underutilized lands is anticipated. Within the next 15 years, potential development includes:

Downtown: Multi-story mixed residential/office/commercial uses on 8-9 sites, of which 3-4 are currently in the floodplain. Permitted residential densities downtown range from 10-45 units per acre while nonresidential intensities are 1.25 Floor Area Ratio (FAR) by right; up to 4.0 with a Use Permit.

Tannery Bend south of Downtown, west side of the Napa River: Multi story mixed residential/office/commercial/light industrial uses on about 3 sites which are currently in the floodplain. This is expected to include renovation of an existing motel and redevelopment of existing lower intensity light industrial uses. Planned residential densities are 10-40 units/acre while nonresidential intensities are 0.4 FAR.

Soscol Corridor on the East side of the River: The Gasser Master Plan area, about 48 acres of developable vacant land is proposed to include 350-450 homes at about 25 units/acre and offices, several commercial buildings and a theater. In addition to this area, at least 4-5 sites are expected to redevelop with commercial buildings, and at least another 2 sites with multi story residential/commercial/office mixed uses. Planned residential densities are 10-40 units per acre while nonresidential intensities are 0.4 FAR.

River Corridor north of Downtown: Two additional hotels are planned on vacant sites near Downtown, while several small sites south of Lincoln Avenue may redevelop with commercial/office uses and light industrial uses at an FAR of 0.4. North of Lincoln, 4 or 5 multi family sites are expected to be developed at densities of 22-30 units/acre once flooding constraints are removed.

Other: A small amount of infill residential development (fewer than 30 units) at low densities (1-8 units/acre) may occur on other floodplain-designated lands throughout the city.

Seismic Hazards

The City of Napa lies in a seismically active region, consequently any development in the City is subject to a certain level of seismic risk and development regulations and practices reflect this fact: there are strict building codes, requirements for geotechnical studies, etc. that must be complied within for any development in the City.

Portions of the City with the greatest earthquake shaking intensity (from the West Napa Fault) are found in a north-south band running along the western edge of the City and through Browns Valley where there is very limited residential development potential (an estimated 200 units) in the next 15 years on infill sites at low densities (up to 6 units/acre). Any sites with hillside slopes have even lower densities: generally 0-2 units/acre. A planned corporate park south of the existing city limits on Golden Gate Drive (with an FAR of 0.4) is also in the highest earthquake shaking intensity area. An area of the City with highest shaking risk, the 900 acre Stanly Ranch in the very southernmost part of the city, was redesignated in 2003 from "Study Area" to a "Resource Area" agricultural land use classification that allows wineries and extremely limited residential uses (up to 18 homes)

Wildland Interface Fire Hazards

The wildland urban interface fire hazard areas shown on p. 85 of this Plan are found primarily on the City's hilly edges (Areas 19, 18, 17, 16, 5, 6, 4, 3, 2) where added

residential development at very low densities (0-2 units/acre) is extremely limited (estimated fewer than 100 units).

The Wildland Interface Area on the City's General Plan Map also includes some flat lands at the northern and southern parts of the City. Part of this General Plan rating was due not to hazards of highly flammable vegetation, steep slopes, or water pressure, but to longer response times or poor area circulation. It is noted that fire response times to southern parts of the City was recently improved (2003) with the opening of a 4th fire station, adjacent to Area 7 which is the Napa Valley College, that is developing a long range master plan for expansion. Area 8 is a part of a city park, areas 9 and 10 are part of a partly developed corporate park; which include a couple of vacant business/industrial sites at a 0.4 FAR. Area 11 is Stanly Ranch, which was planted in vineyards in 2002-03. Area 12 is a future development area comprised of flat to gently rolling grassland planned in the next 15 years to include low density residential uses (3-8 units/acre), multi family residential uses (15-20 units/acre) and corporate park uses at 0.4 FAR. A Specific Plan or Master Plan will be required prior to any development to assure appropriate infrastructure.

Area 1, the Big Ranch Road Area, is a flat area that had a Specific Plan completed and adopted in 1996, including fire requirements and area circulation, and the southern half has been developed. Remaining low density residential potential in this area is about 150 units. The rural edge along Big Ranch Road is planted in vineyards and rural residential homes, many with vineyards, to the north.

Hazardous Materials

Sources of hazardous materials in the City include 21 businesses ranging from major medical facilities, and paint companies to PG&E. Hazardous materials are also found in agricultural facilities around the city. Major new sources of hazardous materials are not anticipated.

Dam Failure

The dam failure map on p. 95 shows potential inundation areas from various dams. Anticipated land use changes in areas affected by potential dam failure would be similar to that described in the flooding section.

Terrorism

No planned land use changes are expected to increase vulnerability to terrorism hazards.

SECTION 3: RISK ASSESSMENT

Hazard Identification

Explaining the Threat Analysis. Where does the rating come from?

The planning process used the FEMA Hazus and other tools such as historical, predicted, and probable occurrences, statistical compilations, expert opinion and past documentation to evaluate all the possible threats faced. In some cases historical data was difficult to find. While the City has kept records for disasters that have occurred since the 1960's, detailed information prior to that has been sketchy. Information was researched from the local newspaper, searching the Internet and interviewing employees and citizens with knowledge of our City. An attempt was made to collect data for the past 100 years. This information was compiled and a graph created that depicts possible hazards our community faces and how often (frequency) and the impact of each of those hazards (severity). Through the threat analysis process the most probable threats, the most devastating threats and the most significant threats to the City of Napa were identified. The four most significant hazards faced are: floods, earthquakes, wildland interface fires, and terrorism and technological hazards. The values in the graph shown with the subsequent rating were obtained using the following variables.

Determining Frequency of Occurrence

Historic Ratings

- 0 = No occurrence in the last 100 years
- 1 = 1 occurrence in the last 100 years
- 2 = 2 occurrences in the last 100 years
- 3 = 3-10 occurrences in the last 100 years
- 4 = 11-25 occurrences in the last 100 years

Probability Ratings (in chances per year)

- 0 = less than 1 in 10,000
- 1 = 1 in 10,000
- 2 = 1 in 1,000
- 3 = 1 in 100
- 4 = 1 in 10
- 5 = greater than 1 in 10

Determining Severity Potential – a vulnerability rating in % of affected people and property including a worst-case scenario.

Vulnerability List Ratings

- 0 = 0%
- 1 = 1%
- 2 = 1 – 5%
- 3 = 6 – 10%
- 4 = 10 – 20%
- 5 = greater than 20%

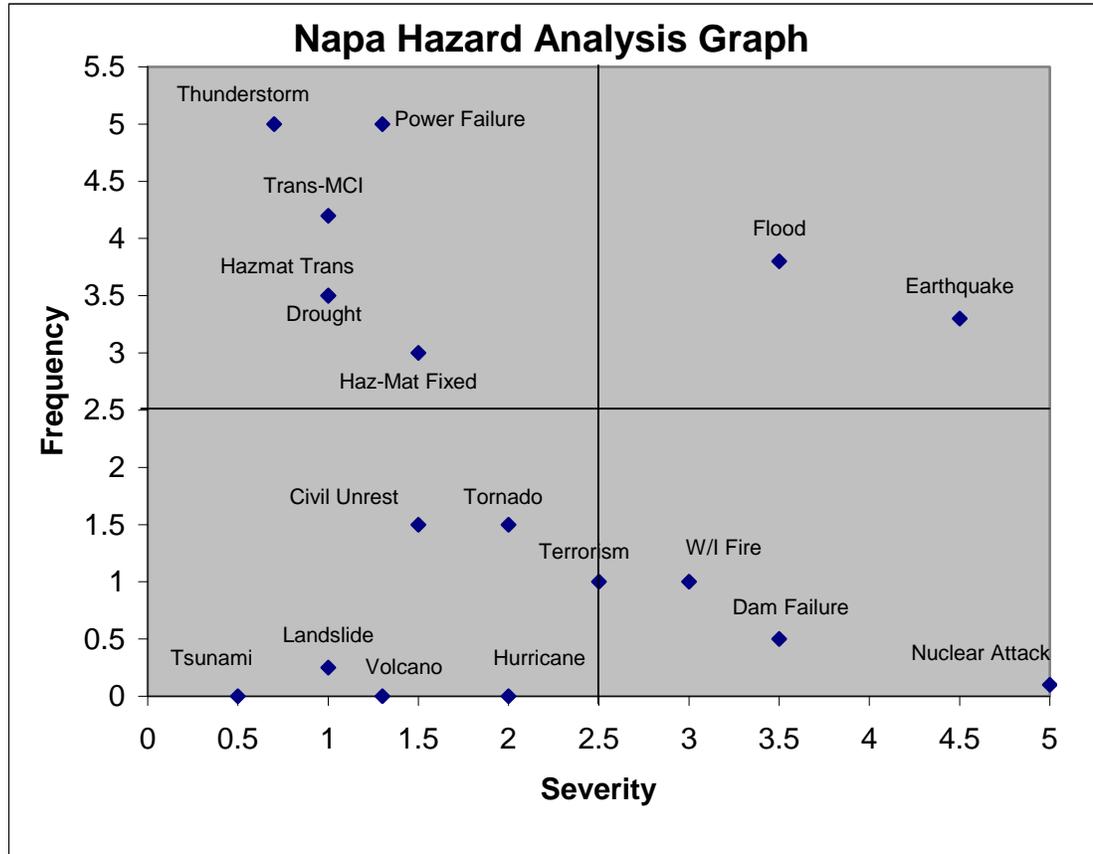
Worst-Case Scenario Ratings

- 0 = 0%
- 1 = 1 - 5%
- 2 = 6 - 10%
- 3 = 11 - 20%
- 4 = 21 - 40%
- 5 = greater than 40%

The graph depicts the end result of a process that identified and analyzed specific anticipated hazards and the chances of future occurrences. In addition it shows the potential vulnerability to people and property. The hazards depicted in the lower right hand quadrant rarely if at all will occur, however if it did, it could affect many with high severity. An example is a hurricane or nuclear war. The bottom hazards should not be given much consideration. In contrast, the hazards listed in the right upper box reflect those that are our highest frequency and most severe causing the most damage to people and property. It is these hazards that we must address.

NAPA HAZARD ANALYSIS DATA						
Hazard	Frequency			Severity		
	History	Probability	Rating	Vulnerability	Worst Case	Rating
Civil Unrest	1	2	1.5	1	2	1.5
Dam Failure	0	1	0.5	3	4	3.5
Drought	3	4	3.5	1	1	1
Earthquake	3	3.5	3.3	4	5	4.5
Fire-W/I Interface	0	2	1	2.5	3.5	3
Flood	4	3.5	3.8	4	3	3.5
Hazmat-Fixed Facility	3	3	3	1	2	1.5
Hazmat-Transportation	4	3	3.5	1	1	1
Hurricane	0	0	0	2	2	2
Landslide	0	0.5	0.25	1	1	1
Nuclear Attack	0	0.1	0.1	5	5	5
Power Failure	5	5	5	0.5	2	1.3
Terrorism	0	2	1	2	3	2.5
Tornado	2	1	1.5	2	2	2
Transportation-MCI	4	4.3	4.2	1	1	1
Tsunami	0	0	0	0	1	0.5
Thunderstorm	5	5	5	1	0.5	0.7
Volcano	0	0	0	0.5	2	1.3

Plotting the threats on a Cartesian plane gives a graphical view of the true magnitude, potential, probability and significance of the threats. The following graph demonstrates this analysis.



Mitigation of these significant hazards has the side benefit of appreciably enhancing the overall disaster resistance in the community from related threats. For example, the clearing of roads of intrusive vegetation eliminating a wildfire hazard will also speed the restoration of the road after an earthquake. The effect of mitigation actions carried out is recognized as a synergistic effect.

In the raw data as displayed, nuclear attack is, as it has been historically, the greatest potential threat. However planning for this threat is a matter of national security. It involves every level of government, and any planning that is being conducted will not appear in public documents due to its sensitive nature.

The following Section will explore the major hazards that the City of Napa currently faces.

Flood Hazard

Flooding in the Napa Valley results from heavy rainfall and drainage into the Napa River, mainly from December through March, and can result in major damage to urban areas and farmlands. Historically, more than ten damaging valley floods have occurred since 1940, with damage to commercial, industrial, residential, and agricultural areas. Utilities, roads, bridges, and streets also are subject to damage and require repair and clean up. Since the early 1960's Napa County residents and businesses have suffered over \$500 million in property damages.

Regional Setting

Napa County is located in the Central Coast Range of northern California. The major surface hydrologic feature of this area is the Napa River, which flows from Mount St. Helena to San Pablo Bay. The river runs approximately 40 miles in length through mountains, vineyards, pastures, urban and industrial development, and marshlands. All but the southern 3.4 miles of the river lie in Napa County.

In 1950, the U.S. Army Corps of Engineers (COE) completed a navigation channel, making the river navigable from San Pablo Bay to Third Street in downtown Napa. The natural siltation process necessitates periodic dredging of the lower reaches of the river in the navigation channel. Since completion of the channel in 1950, the COE has dredged the river a total of four times.

Napa River Watershed

The Napa River drains a watershed encompassing approximately 426 square miles. Eight tributaries feed the Napa River, with four of these tributaries (Napa Creek, Redwood Creek, Browns Valley Creek, Camille Creek, and Toluca Creek) lying in the City of Napa. The most significant of these tributaries is Napa Creek, which drains approximately 15 square miles of watershed before merging with the Napa River at the First Street Bridge.

Tidal Influence

Within the City of Napa, the Napa River can be characterized as a tidal influenced estuarine system. Upstream of Trancas Street, the Napa River is largely freshwater. As the river proceeds through the city, the water quality transitions to a brackish marsh. Tidal influences on the river affect both discharges to San Pablo Bay and water surface elevations extending upstream approximately 0.5 mile north of the City.

Stream Flows

Stream flows within the Napa River vary significantly from season to season and from year to year depending upon total rainfall. The average annual rainfall in the City of Napa is 24 inches (based on data recorded from 1877 to 1980), with total rainfall varying between 10 and 48 inches per year. Snowfall is rare within Napa County, and

snowmelt does not contribute significantly to total runoff or streamflows. The “normal” Napa River channel capacity through the City of Napa is 12,000 cubic feet per second, although this varies throughout the length of the river depending on vegetation and debris, tidal conditions, and sediment deposits. The highest streamflows occur from December to March, while the lowest flows occur in the summer and early fall. During dry years, the river recharges the groundwater in the upper reaches of the river, resulting in intermittent streamflow in the upper and middle reaches. The groundwater discharges to the river farther downstream, maintaining streamflows in the lower reaches of the Napa River throughout the year.

Flooding of the Napa River usually occurs from December to March during periods of heavy rainfall. Flood events resulting in major damage to urban areas and farmlands typically result from rainfall events, which persist over the entire Napa River basin for a period of 12 hours or more. Maximum river stages and discharges occur approximately 13 to 14 hours following the most intense rainfall periods.

History of Flooding in the Napa River Basin

Flooding occurs in the Napa Valley due to heavy rainfall, which occurs predominantly from December through February. Streamflow of flood-producing magnitude is the result of precipitation over the entire river basin for a period in excess of 12 hours. After the periods of most intense rainfall, maximum river stages and discharges in the City can be expected from 13 to 14 hours later. Streamflow in the southern part of the Napa River is also affected by tide conditions, which can affect the River as far upstream as Trancas Street.

Flood events in Napa have been recorded since 1892. Historically, the most significant flood events occurred in 1940, 1942, 1955, 1960, 1963, 1965, 1967, 1973, 1979, 1982, 1983, 1986, 1995, 1997 and most recently in 1998. Major floods have resulted in damage to commercial, industrial, residential, and agricultural areas. Utilities, roads, bridges, and streets also are subject to damage and require repair and clean up after a flood event. Flooding causes business slow down or stoppage, wage loss, and interruptions to traffic and the flow of goods. Flooding also has significant effects on human life and health (both physical and mental). The 1986 flood, which was the result of a 50-year storm, inundated most of the land adjacent to the Napa River and caused \$100 million in property damage, killed 3 people, injured 27 people, destroyed 250 homes, and damaged 2,500 residences county-wide.

Flooding in the City occurs when the Napa River’s flow at Oak Knoll Avenue (just north of the city limits) exceeds about 15,000 cubic feet per second. Some areas (typically agricultural land) remain flooded for several weeks due to inadequate drainage, but one to three days under water is more typical. Flood hazard conditions can exist along the entire length of the Napa River as it flows through the City as well as along the course of several tributary creeks.

In particular, Napa Creek floodwaters have had a major impact on the City’s core. For example, during the 1986 flood, Napa Creek overflowed on the south side of its banks, flooding areas along Coombs Street and the parkway Plaza Mall as the floodwaters

coursed through the downtown, a replay of the February 1942 flood. Two other main tributaries, Milliken and Tulocay Creeks, add to the Napa River’s flood flows within the City, but do not themselves cause significant flooding in the heavily developed parts of the City.

Floodplain and Floodway

The 100-year floodplain boundary defines the geographic area having a 1 percent chance of being in a flood in any given year. The boundary of the 100-year floodplain is typically used as the basic planning criterion to demarcate areas of unacceptable public safety hazards. Outside the floodplain boundary, the degree of flooding risk is not considered sufficient to justify the imposition of floodplain management regulations, while inside the 100-year floodplain, some level of regulation is desired to protect public health, safety, and welfare.

The 100-year floodplain is divided into a floodway and floodway fringe. The floodway is defined as the channel of a stream, plus any adjacent floodplain areas that must be kept free of development so that a 100-year flood can be carried away without substantial increases in flood heights. (FEMA defines “substantial increase” as 1.0 foot above the normal 100-year flood elevation.) The area between the floodway and the boundary of the 100-year floodplain is known as the floodway fringe. This portion of the floodplain could be used for development, as fill within this area will not increase the surface elevation of the 100-year flood more than 1.0 foot at any point.

Relationship of Flood Water Depth to Property Damage		
Depth (feet)	Percent of Damage to Structure	Percent of Damage to Contents
1	8	0
2	26	35
3	45	60
4	60	70
5	70	75
6	80	80
7	85	90
8	100	100
9	100	100

Source: U.S. Army Corps of Engineers 1989

Flood Damage Statistics

The City of Napa is the fifth most flood prone community in California in terms of flood damage payments from the Federal Emergency Management Agency. There are 2,500 properties in the flood plain and over 60 have made more than one flood damage claim to FEMA.

In 1986, flooding along the Napa River reached the 50-year frequency level, or a 2% chance of occurrence per year. Twenty (20) inches of rain fell on Atlas Peak in two days. Thirty (30) inches of rain fell over ten days in Calistoga. Throughout Napa County there were three deaths, 27 injuries, 250 destroyed homes, 2,500 damaged residences and over \$100 million in damage. There was also an unknown amount of un-reimbursed damaged such as reduced tourism, personal hardships, and delayed public projects.

Between 1961 and 1997, flooding has caused \$540 million of property damage in Napa County. Since 1862, twenty-seven major floods have struck the Napa Valley. Major flood events occurred in 1940, 1942, 1955, 1960, 1963, 1965, 1967, 1973, 1979, 1982, 1983, 1986, 1993, 1995 and 1997, 1998, 2002.

In January and March of 1995, the City of Napa was flooded by two 10-year frequency floods, which have a 10% chance of occurrence every year and a 65% chance of occurrence every decade. The City of Napa requested \$8 million to pay for damage to City property. FEMA also paid individual property owners separately.

If someone lives in Napa for thirty years, they have a 26% chance of seeing a 100-year flood which would probably last several days and flood the City from Silverado Trail to Soscol Avenue in the north half of the City and from Silverado Trail to Coombs Street in the south half of the City.

During a 100-year flood, more than 325,000 gallons of floodwater per second would flow through the City of Napa, or five times the volume of Lake Hennessey, over the span of the flood. More than 3,500 people and 2 million square feet of business and office space would be inundated. Between 1989 and 1994, the President of the United States declared 291 federal disasters and 80% were flood related. Floods cause an average of \$4 billion in property damage a year.

Six inches of fast moving floodwater can knock a person off their feet. Water moving at six feet per second or four miles per hour and only one foot deep has a drag force of 63 pounds on a person. Two feet of fast moving floodwater can float a car down the river. The ground under the floodwaters is usually covered with mud, so it is slippery, which makes it even harder to resist the drag force of the moving water.

To reduce flood damages and insurance rates, the City participates in the National Flood Insurance Program, acquired and elevated homes with FEMA Hazard Mitigation Grant Funds, participated in the design of the Napa River/Napa Creek Flood Reduction Project, created an Emergency Plan, constructed drainage system improvement projects and monitor rainfall and stream level gages to give more flood preparation time. The City has the "Citizen's Guide to Flooding and Flood

Recovery” available and provides free sandbags and sand on the first Saturday of November through March.

Prepared by: Graham Wadsworth, Civil Engineer IV
City of Napa, Public Works Department

Flood Hazard Area

As part of the National Flood Insurance Program, the Federal Emergency Management Agency (FEMA) conducts Federal Insurance Studies (FIS) of areas subject to flooding to determine insurance rates and to assist local communities in developing sound floodplain management policies. In 1979, FEMA completed a flood insurance study to develop flood risk data that could be used in a program that would establish local flood insurance rates and promote sound floodplain and floodway management. A Flood Insurance Rate Map was prepared that showed the flood hazard area (the area inundated by a 100-year flood), the floodway, the floodplain, and other flood-related information. This map was revised in 1988 to include data from the 1986 flood and was made available with a Flood Insurance Study publication explaining the floodway concept. The Flood Insurance Rate Map floodway and flood plain boundaries are shown on the following page.

Flood Losses and Methodology Used to Determine Amounts

The following graph provides a variety of statistics on the documented floods in Napa’s past. They include; severity, water levels, chance of occurrence and dollar losses. Dollar losses are difficult to accurately determine and are usually estimated on the lower scale do to the difficulty in obtaining information. The figures shown are from FEMA and reflect the amounts paid to property owners from individual assistance, public assistance and monies not reimbursed. Not included are the losses sustained by those who did not have insurance and who did not report the damage. FEMA has paid out a total of \$8.5 million in flood damage since 1979. There have been 10 different floods years since 1979 giving an average of \$850,000 per flood. Each flood caused different amounts of damage due to differing water levels, subsequently causing a different dollar amount. There are 2636 residential units and 400 commercial structures in the 100 year flood zone. While the risk of flooding continues to occur the potential damage that will occur continues to decrease each year due to the flood control project. Projects such as home elevations, rebuilding infrastructure such as our bridges, ordinances requiring property owners to remodel or build new structures meeting updated standards all lessen our potential damage.

City of Napa Record of Historic Floods

DATE	FLOOD FREQUENCY IN NAPA (YEAR)	CHANCE OF OCCURRENCE (%/YEAR)	DAYS OF RAIN	TOTAL RAIN AT CONN & MILLIKEN (INCHES)	DAILY RAINFALL AT DAMS (INCHES)	PEAK STAGE AT LINCOLN AVE. (FEET)	PEAK STAGE AT THIRD ST. (FEET)	COST (IN \$ MILLIONS)	PEAK FLOW RATE AT OAK KNOLL (CFS)	PEAK STAGE AT OAK KNOLL (FEET)
12/31/96	1.1 - 1.5	66 - 91	2	3.6 & 4.4	1.7 & 2.1	Local (11.8)	?	0	10,376	20.51
11/21/77	1.1 - 1.5	66 - 91	2	5.0 & 8.0	3.5 & 6.6	Creeks(<18)	?	?	< 4,700	<13.0
3/12/83	1.1 - 1.5	66 - 91	2	3.0 & 4.5	2.6 & 4.5	Creeks(<18)	?	?	17,100	23.4
1/20/93	1.1 - 1.5	66 - 91	3	4.4 & 5.1	1.9 & 2.5	Creeks (16.5)	?	(0.15)	19,300	24.7
1/22/97	1.1 - 1.5	66 - 91	3	4.5 & 4.6	3.2 & 3.8	Creeks (16.9)	?	(0.3)	19,089	24.60
1/5/65	1.5 - 2	50 - 66	4	4.9 & 5.1	2.5 & 2.1	Creeks (18.3)	9	?	18,100	25.1 to 25.9
12/16/02	1.5-2	50 - 66	4	10.2 & 6.5	4.3 & 2.1	Creeks (18.2)	?	1.0	18,400	26.44
1/31/63	1.5 - 2	50 - 66	3	7.9 & ?	3.0 & ?	19.8 to 20.5	13	0.5	25,000	27.6
2/3/98	2 - 5	20 - 50	3	5.9 & 5.7	4.8 & 4.3	20.2	12.5	(0.3)	21,000	26.72
1/9/95	2 - 5	20 - 50	4	11.9 & 8.0	5.5 & 3.7	20.5	?	8(2)	22,000	26.8
12/22/55	2 - 5	20 - 50	5	16 & ?	4.8 & ?	20.6	13.7	1?	25,000?	27.5 to 28.2
1/1/97	5 - 10	10 - 20	3	7.6 & 9.1	4.0 & 4.7	21.4	13.5	3.5 (1.5)	26,722	28.07
2/27/40	10 - 20	5 - 10	3	10 & ?	5.6 & ?	22.3	15.4	0.15	26,400 ?	28 ?
1/21/67	10 - 20	5 - 10	3	6.8 & 5.8	4.0 & 3.3	22.7 to 23.2	13.6	?	21,400	26.5
3/9/95	10 - 20	5 - 10	2	7.6 & 6.1	4.4 & 3.8	22.8	<18	(6)	32,600	30.5
2/17&18/86	50	2	7	14.2 & 16.5	3.6 & 4.9	24.2	17.9	5(1.5)	37,100	30.2
?	100	1	?	?	?	25.0	19	140?	48,500	32.0
?	500	0.2	?	?	?	27.5	21.5	150?	50,300?	33.0 ?

NOTE: The Napa River flooded in Napa to unknown depths in 2/24/02, 3/18/07, 12/31/13, 1/3/16, 2/12/25, 2/6/42, 2/24/58, 2/8/60, 1/16/73, 1/16/78, 1/4/82, and 3/1/83

CFS = Cubic Feet Per Second = 450 gallons per minute. 37,000 CFS = 16.6 million gallons per minute. Lake Hennessey has a volume of 31,000 acre feet or 10 billion gallons of water.

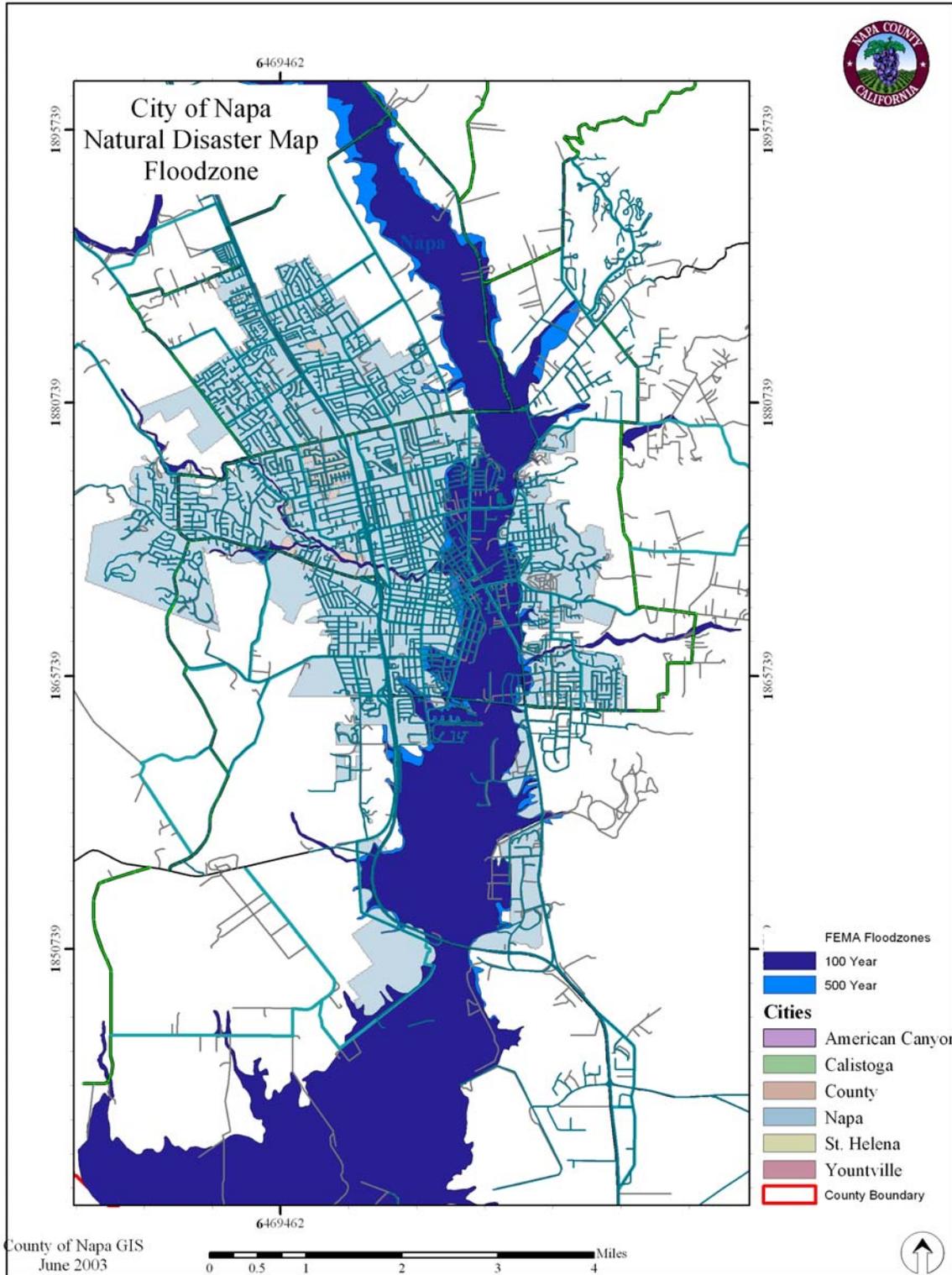
Cost is only what FEMA and OES were asked to pay and does not include intangible costs, such as reduced tourism. Costs in () exclude private property losses in City.

Time from the peak stage at Oak Knoll to Lincoln Avenue is 1 to 3 hours. Time from peak rainfall up-valley to peak flood at Lincoln is 13 to 15 hours.

The maximum recorded 24 hour rainfall for the Napa Valley was 15.3 inches on Atlas Peak on February 17, 1986.

Localized street flooding and Creek flash floods are more dependent on the location, duration and intensity of the storm.

Prepared by: Graham Wadsworth, Department of Public Works



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Napa River Flood Management Project

The Napa River Flood Control Project was authorized as a federal project in 1965 but early studies met with considerable resistance from local citizens. In 1975 a project design was developed incorporating local issues of concern. In 1976 a referendum to determine the acceptability of the flood control project narrowly passed, but a subsequent referendum in 1977 opposing the project passed and placed the project on inactive status.

Following the devastating flood of 1986, the Napa County Flood Control and Water Conservation District petitioned Congress to reactivate the flood control project. In response, the Army Corps of Engineers prepared an action plan and began engineering design studies in 1989. The Corps, as the responsible lead agency, subsequently prepared a set of studies and a Draft Environmental Impact Report (DEIR) that was available for public comments up until May 1995. The selected flood control project described in the Design Memorandum consists of levees, setback floodwalls, sheetpile walls, streambank protection, channel excavation, and a bypass channel at the Oxbow. Maintenance roads, recreation trails, hazardous material review, remediation of project lands, and environmental mitigation are included in the plan.

In response to public concern about the project's design, visual impacts, loss of recreational opportunities, and other environmental impacts, the Corps' flood control project's executive committee agreed to investigate a "Two Track Design Concept." Track 1, the primary track proposed that the Corps revise the construction plans and respond to the concerns raised during public review of the DEIR. Track 2 proposed the establishment of a Technical Design Committee to study alternatives such as watershed management, dams, alternatives to flood walls, and opportunities for river restoration under the guidance of a Community Coalition, which would formulate a community consensus of alternatives to the Corps' flood control project design.

By June 1996, the Community Coalition completed a lengthy set of workshops and public meetings, and proposed a plan for both flood protection and watershed management. Key features included: 1) land acquisition for river widening; 2) business and home relocation assistance; 3) recreational facilities and open space; 4) toxic cleanup; 5) an Oxbow "dry bypass;" 6) utility relocations and pumping plants; 7) levee and floodwall construction; and 8) bridge improvements.

In December 1997, using the Community Coalition's conceptual plan for a "Flood Management Project", the Corps reissued a General Design Memorandum (GDM) and Supplemental Environmental Impact Statement/Report (SEIS/SEIR). In March 1998, a ½-cent sales tax ballot initiative passed by a 68% vote, allowing the District to provide the required 50% local share of funding to implement the project.

The project has been named the "Napa River/Napa Creek Flood Protection Plan". The project design covers a 6-mile stretch of the Napa River, primarily in the City of Napa. It is comprised of four basic components: the widening of the river channel through the creation of both marsh plain and flood plain terraces; the replacement of a series of bridges; the creation of a "dry-bypass" overflow channel in downtown Napa, and the use of a series of floodwalls and levees where necessary. Approximately 300 parcels will be

acquired and 109 buildings will be removed in order to facilitate the project design. Construction began in 2000, and will be complete by 2008.

Flood Hazard Areas Inventory

Every two years the City of Napa submits an inventory to FEMA of structures in flood hazard areas. Inventory provided for the 2003-2004 biennial report was summarized as follows:

FLOOD HAZARD AREAS INVENTORY			
	PERMANENT YEAR-ROUND POPULATION	1-4 FAMILY STRUCTURES	ALL OTHER STRUCTURES INCLUDING COMMERCIAL
ENTIRE COMMUNITY	74,777	20,932	2,501
FLOOD HAZARD AREAS	17,497	2,437	684

Source: Napa Community Development Department estimate 2/04 based on 2000 Census information, land use maps. Area includes land mass for 100 year flood.

There are 2,636 residential structures, 404 commercial structures and an estimated population of 17,497 in the City's Flood Overlay zoning district. The above graph shows the number of buildings in the flood plain compared to the entire community.

Methodology Used to Determine Inventory

The following tables list the inventory of residential structures, and the population residing within the flood zone. Each of the values is categorized by census tracts and depicts potential losses from flooding. It should be noted that the information regarding the residential units was obtained from census data. The information on the commercial structures was obtained by manually counting the commercial structures from an aerial photo of the flood plan. As of this date, there is no easy or quick method for isolating the commercial structures as has been done for residential. Attempts will be made to produce a method.

FLOOD INVENTORY, RESIDENTIAL							
2000 U.S. Census Data			Flood Inventory				
Block/Group/Tract	Pop	HU's	Structures			Demographics	
			1 - 4 Unit	5+ Unit	Total	Tot H U's	Pop
Block 1000, Block Group 1, Census Tract 2002.01	47	27	11	0	11	16	28
Block 1001, Block Group 1, Census Tract 2002.01	117	50					-
Block 1002, Block Group 1, Census Tract 2002.01	219	98					-
Block 1003, Block Group 1, Census Tract 2002.01	147	72	-	15	15	220	449
Block 1004, Block Group 1, Census Tract 2002.01	-	-	-	-	-	-	-
Block 3013, Block Group 3, Census Tract 2002.01	43	22	30	-	30	30	59
Block 1000, Block Group 1, Census Tract 2002.02	-	-					
Block 1001, Block Group 1, Census Tract 2002.02	-	-					
Block 1002, Block Group 1, Census Tract 2002.02	-	-					
Block 1003, Block Group 1, Census Tract 2002.02	73	46					
Block 1004, Block Group 1, Census Tract 2002.02	33	11					
Block 1005, Block Group 1, Census Tract 2002.02	17	8					
Block 1006, Block Group 1, Census Tract 2002.02	11	7					
Block 1007, Block Group 1, Census Tract 2002.02	130	108	49	2	51	170	205
Block 1011, Block Group 1, Census Tract 2002.02	-	-	-	-	-	-	0
Block 1012, Block Group 1, Census Tract 2002.02	-	-	-	-	-	-	0
Block 1014, Block Group 1, Census Tract 2002.02	-	-	-	-	-	-	0
Block 1015, Block Group 1, Census Tract 2002.02	-	-	-	-	-	-	0
Block 1016, Block Group 1, Census Tract 2002.02	-	-	-	-	-	-	0
Block 1017, Block Group 1, Census Tract 2002.02	-	-	-	-	-	-	0
Block 1018, Block Group 1, Census Tract 2002.02	-	-	-	-	-	-	0
Block 2000, Block Group 2, Census Tract 2002.02	-	-	-	-	-	-	0
Block 2001, Block Group 2, Census Tract 2002.02	194	-	-	-	-	-	0
Block 2002, Block Group 2, Census Tract 2002.02	41	-	-	-	-	-	0
Block 2008, Block Group 2, Census Tract 2002.02	38	-	-	-	-	-	0
Block 2009, Block Group 2, Census Tract 2002.02	13	7	5	-	5	7	13
Block 2010, Block Group 2, Census Tract 2002.02	10	5	3	-	3	5	10
Block 2011, Block Group 2, Census Tract 2002.02	-	-	-	-	-	-	0
Block 2012, Block Group 2, Census Tract 2002.02	-	-	-	-	-	-	0
Block 2013, Block Group 2, Census Tract 2002.02	-	-	-	-	-	-	0
Block 2015, Block Group 2, Census Tract 2002.02	219	72	17	5	22	72	219
Block 2016, Block Group 2, Census Tract 2002.02	75	24	11	1	12	24	75
Block 2017, Block Group 2, Census Tract 2002.02	88	55	12	7	19	55	88
Block 2018, Block Group 2, Census Tract 2002.02	38	19	14	-	14	17	34
Block 3001, Block Group 3, Census Tract 2002.02	155	31	4	3	7	31	155
Block 3002, Block Group 3, Census Tract 2002.02	92	38	19	2	21	38	92
Block 3003, Block Group 3, Census Tract 2002.02	68	24	11	1	12	24	68
Block 3004, Block Group 3, Census Tract 2002.02	66	39	16	2	18	39	66
Block 3005, Block Group 3, Census Tract 2002.02	67	35	8	3	11	23	44
Block 3014, Block Group 3, Census Tract 2002.02	79	37	20	2	22	37	79
Block 3015, Block Group 3, Census Tract 2002.02	128	41	23	1	24	41	128
Block 3016, Block Group 3, Census Tract 2002.02	183	45	17	2	19	45	183
Block 3017, Block Group 3, Census Tract 2002.02	23	9	4	-	4	9	23

FLOOD INVENTORY, RESIDENTIAL (continued)							
2000 U.S. Census Data	Flood Inventory						
	Structures					Demographics	
Block/Group/Tract	Pop	HU's	1 – 4 Unit	5+ Unit	Total	Tot H U's	Pop
Block 1007, Block Group 1, Census Tract 2002.03	29	15	5	1	6	10	19
Block 2000, Block Group 2, Census Tract 2002.03	-	-	-	-	-	-	-
Block 2001, Block Group 2, Census Tract 2002.03	421	86	6	6	12	6	29
Block 2002, Block Group 2, Census Tract 2002.03	154	43	14	2	16	2	7
Block 2003, Block Group 2, Census Tract 2002.03	289	104	30	-	30	30	83
Block 3000, Block Group 3, Census Tract 2002.03	109	27	8	1	9	22	89
Block 3001, Block Group 3, Census Tract 2002.03	67	24	15	-	15	17	47
Block 3002, Block Group 3, Census Tract 2002.03	55	28	26	-	26	28	55
Block 3003, Block Group 3, Census Tract 2002.03	38	17	14	-	14	14	31
Block 3004, Block Group 3, Census Tract 2002.03	33	17	9	-	9	9	17
Block 3005, Block Group 3, Census Tract 2002.03	56	22	22	-	22	22	56
Block 3006, Block Group 3, Census Tract 2002.03	348	119	42	-	42	42	123
Block 3007, Block Group 3, Census Tract 2002.03	65	19	21	-	21	21	72
Block 3008, Block Group 3, Census Tract 2002.03	42	13	8	-	8	8	26
Block 3009, Block Group 3, Census Tract 2002.03	72	18	19	-	19	19	76
Block 3010, Block Group 3, Census Tract 2002.03	213	56	36	-	36	36	137
Block 3011, Block Group 3, Census Tract 2002.03	174	45	25	-	25	25	97
Block 2000, Block Group 2, Census Tract 2003	357	137					
Block 2006, Block Group 2, Census Tract 2003	29	11					
Block 2007, Block Group 2, Census Tract 2003	33	21					
Block 2008, Block Group 2, Census Tract 2003	33	11					
Block 2009, Block Group 2, Census Tract 2003	38	17					
Block 2010, Block Group 2, Census Tract 2003	-	-					
Block 2011, Block Group 2, Census Tract 2003	-	-					
Block 2012, Block Group 2, Census Tract 2003	7	3					
Block 2013, Block Group 2, Census Tract 2003	-	-					
Block 2014, Block Group 2, Census Tract 2003	-	-					
Block 2015, Block Group 2, Census Tract 2003	-	-					
Block 2016, Block Group 2, Census Tract 2003	-	-					
Block 2017, Block Group 2, Census Tract 2003	183	99	140	1	141	146	270
Block 2018, Block Group 2, Census Tract 2003	-	-					
Block 2019, Block Group 2, Census Tract 2003	17	12					
Block 2024, Block Group 2, Census Tract 2003	-	-					
Block 2026, Block Group 2, Census Tract 2003	139	32					
Block 2028, Block Group 2, Census Tract 2003	86	44					
Block 3002, Block Group 3, Census Tract 2003	73	28					
Block 3003, Block Group 3, Census Tract 2003	46	18					
Block 3007, Block Group 3, Census Tract 2003	100	34					
Block 3008, Block Group 3, Census Tract 2003	36	10	120	-	120	120	432
Block 2001, Block Group 2, Census Tract 2004	2	1	1	-	1	1	2
Block 2006, Block Group 2, Census Tract 2004	114	48	28	2	30	30	71
Block 2007, Block Group 2, Census Tract 2004	126	48					
Block 2011, Block Group 2, Census Tract 2004	17	14					
Block 2012, Block Group 2, Census Tract 2004	-	-					
Block 2013, Block Group 2, Census Tract 2004	-	-					

FLOOD INVENTORY, RESIDENTIAL (continued)							
2000 U.S. Census Data	Flood Inventory						
	Structures					Demographics	
Block/Group/Tract	Pop	HU's	1 – 4 Unit	5+ Unit	Total	Tot H U's	Pop
Block 2018, Block Group 2, Census Tract 2004	14	6					
Block 2019, Block Group 2, Census Tract 2004	-	-					
Block 2020, Block Group 2, Census Tract 2004	34	17					
Block 2021, Block Group 2, Census Tract 2004	6	2					
Block 2022, Block Group 2, Census Tract 2004	-	-					
Block 2023, Block Group 2, Census Tract 2004	19	7					
Block 2024, Block Group 2, Census Tract 2004	8	4	66	-	66	66	132
Block 3030, Block Group 3, Census Tract 2005.01	170	61	61	-	61	61	170
Block 3034, Block Group 3, Census Tract 2005.01	2	1	1	-	1	1	2
Block 3035, Block Group 3, Census Tract 2005.01	69	37	2	-	2	3	6
Block 3042, Block Group 3, Census Tract 2005.01	76	36	9	-	9	36	76
Block 3044, Block Group 3, Census Tract 2005.01	11	5	5	-	5	5	11
Block 1007, Block Group 1, Census Tract 2005.02	569	232	34	-	34	34	83
Block 1008, Block Group 1, Census Tract 2005.02	9	3	3	-	3	3	9
Block 1009, Block Group 1, Census Tract 2005.02	59	20	20	-	20	20	59
Block 1011, Block Group 1, Census Tract 2005.02	59	20	20	-	20	20	59
Block 1012, Block Group 1, Census Tract 2005.02	41	10	10	-	10	10	41
Block 2000, Block Group 2, Census Tract 2005.02	85	20	2	3	5	20	85
Block 2002, Block Group 2, Census Tract 2005.02	155	98					
Block 2003, Block Group 2, Census Tract 2005.02	14	9					
Block 2004, Block Group 2, Census Tract 2005.02	1,438	474					
Block 2005, Block Group 2, Census Tract 2005.02	4	3					
Block 2006, Block Group 2, Census Tract 2005.02	80	44					
Block 2007, Block Group 2, Census Tract 2005.02	57	21					
Block 2008, Block Group 2, Census Tract 2005.02	31	9					
Block 2009, Block Group 2, Census Tract 2005.02	103	35					
Block 2010, Block Group 2, Census Tract 2005.02	90	30					
Block 2011, Block Group 2, Census Tract 2005.02	157	43					
Block 2012, Block Group 2, Census Tract 2005.02	62	21	229	101	330	787	2,324
Block 2013, Block Group 2, Census Tract 2005.02	70	21	21	-	21	21	70
Block 3000, Block Group 3, Census Tract 2005.02	167	72					
Block 3001, Block Group 3, Census Tract 2005.02	275	97					
Block 3003, Block Group 3, Census Tract 2005.02	135	49	186	1	187	194	534
Block 3004, Block Group 3, Census Tract 2005.02	1,054	340					
Block 3005, Block Group 3, Census Tract 2005.02	53	13					
Block 3006, Block Group 3, Census Tract 2005.02	10	4					
Block 3007, Block Group 3, Census Tract 2005.02	59	25					
Block 3008, Block Group 3, Census Tract 2005.02	57	19	164	9	173	388	1,164
Block 1006, Block Group 1, Census Tract 2005.03	138	67	-	-	-	-	
Block 1009, Block Group 1, Census Tract 2005.03	77	32	1	-	1	4	10
Block 1010, Block Group 1, Census Tract 2005.03	40	13	1	-	1	3	9
Block 1011, Block Group 1, Census Tract 2005.03	13	3	1	-	1	3	13
Block 1012, Block Group 1, Census Tract 2005.03	2	1	1	-	1	1	2
Block 1013, Block Group 1, Census Tract 2005.03	54	23	12	1	13	23	54

FLOOD INVENTORY, RESIDENTIAL (continued)							
2000 U.S. Census Data	Flood Inventory						
Block/Group/Tract	Structures					Demographics	
	Pop	HU's	1 – 4 Unit	5+ Unit	Total	Tot H U's	Pop
Block 1025, Block Group 1, Census Tract 2005.03	4	-	-	-	-	-	-
Block 1026, Block Group 1, Census Tract 2005.03	32	12	7	1	8	12	32
Block 1027, Block Group 1, Census Tract 2005.03	76	44	24	2	26	57	98
Block 1029, Block Group 1, Census Tract 2005.03	28	8	3	-	3	8	28
Block 1030, Block Group 1, Census Tract 2005.03	27	13	10	-	10	13	27
Block 1031, Block Group 1, Census Tract 2005.03	61	25	5	-	5	5	12
Block 1032, Block Group 1, Census Tract 2005.03	-	-	-	-	-	-	-
Block 1033, Block Group 1, Census Tract 2005.03	-	-	-	-	-	-	-
Block 2000, Block Group 2, Census Tract 2005.03	7	3	3	-	3	3	7
Block 2001, Block Group 2, Census Tract 2005.03	-	-	-	-	-	-	-
Block 2002, Block Group 2, Census Tract 2005.03	12	4	1	-	1	4	12
Block 2003, Block Group 2, Census Tract 2005.03	-	-	-	-	-	-	-
Block 2004, Block Group 2, Census Tract 2005.03	26	11	-	-	-	-	-
Block 2005, Block Group 2, Census Tract 2005.03	2	2	-	-	-	-	-
Block 2006, Block Group 2, Census Tract 2005.03	-	-	-	-	-	-	-
Block 2007, Block Group 2, Census Tract 2005.03	12	4	-	-	-	-	-
Block 2008, Block Group 2, Census Tract 2005.03	42	20	11	-	11	17	36
Block 2009, Block Group 2, Census Tract 2005.03	67	23	12	-	12	21	61
Block 2010, Block Group 2, Census Tract 2005.03	7	4	4	-	4	4	7
Block 2011, Block Group 2, Census Tract 2005.03	10	4	-	-	-	-	-
Block 2012, Block Group 2, Census Tract 2005.03	-	1	2	-	2	2	-
Block 2013, Block Group 2, Census Tract 2005.03	17	5	3	-	3	4	14
Block 2014, Block Group 2, Census Tract 2005.03	-	1	1	-	1	1	-
Block 2015, Block Group 2, Census Tract 2005.03	-	-	-	-	-	-	0
Block 2016, Block Group 2, Census Tract 2005.03	-	-	-	-	-	-	0
Block 2017, Block Group 2, Census Tract 2005.03	-	-	-	-	-	-	0
Block 2018, Block Group 2, Census Tract 2005.03	-	-	-	-	-	-	0
Block 2019, Block Group 2, Census Tract 2005.03	-	-	-	-	-	-	0
Block 2020, Block Group 2, Census Tract 2005.03	5	4	3	-	3	5	6
Block 2021, Block Group 2, Census Tract 2005.03	15	7	7	-	7	8	17
Block 2022, Block Group 2, Census Tract 2005.03	2	1	1	-	1	1	2
Block 2023, Block Group 2, Census Tract 2005.03	-	-	-	-	-	-	0
Block 1001, Block Group 1, Census Tract 2007.01	137	42	11	-	11	11	36
Block 1002, Block Group 1, Census Tract 2007.01	30	11	6	-	6	6	16
Block 1006, Block Group 1, Census Tract 2007.01	149	20	5	-	5	5	37
Block 1009, Block Group 1, Census Tract 2007.01	96	33	18	-	18	18	52
Block 4003, Block Group 4, Census Tract 2007.01	215	89	17	-	17	17	41
Block 4010, Block Group 4, Census Tract 2007.01	51	20	17	-	17	17	43
Block 4011, Block Group 4, Census Tract 2007.01	17	10	11	-	11	11	19
Block 4012, Block Group 4, Census Tract 2007.01	121	57	4	-	4	4	8
Block 4018, Block Group 4, Census Tract 2007.01	640	273	4	6	10	244	572
Block 1000, Block Group 1, Census Tract 2007.03	103	39	25	-	25	25	66
Block 1025, Block Group 1, Census Tract 2007.03	15	7	7	-	7	7	15
Block 1026, Block Group 1, Census Tract 2007.03	360	141	27	-	27	27	69
Block 1027, Block Group 1, Census Tract 2007.03	30	14	2	-	2	2	4

FLOOD INVENTORY, RESIDENTIAL (continued)							
2000 U.S. Census Data	Flood Inventory						
	Structures					Demographics	
Block/Group/Tract	Pop	HU's	1 – 4 Unit	5+ Unit	Total	Tot H U's	Pop
Block 1036, Block Group 1, Census Tract 2007.03	-	-	-	-	-	-	
Block 1037, Block Group 1, Census Tract 2007.03	26	12	12	-	12	12	26
Block 3000, Block Group 3, Census Tract 2008.01	109	57	28	-	28	28	54
Block 3001, Block Group 3, Census Tract 2008.01	35	14	10	-	10	10	25
Block 3002, Block Group 3, Census Tract 2008.01	116	32	20	-	20	20	73
Block 3000, Block Group 3, Census Tract 2008.02	49	29					
Block 3001, Block Group 3, Census Tract 2008.02	23	11					
Block 3002, Block Group 3, Census Tract 2008.02	21	10					
Block 3003, Block Group 3, Census Tract 2008.02	69	38					
Block 3004, Block Group 3, Census Tract 2008.02	47	36					
Block 3005, Block Group 3, Census Tract 2008.02	152	83					
Block 3006, Block Group 3, Census Tract 2008.02	-	-					
Block 3007, Block Group 3, Census Tract 2008.02	225	105	104	9	113	207	444
Block 3008, Block Group 3, Census Tract 2008.02	21	8					
Block 3009, Block Group 3, Census Tract 2008.02	560	327					
Block 3011, Block Group 3, Census Tract 2008.02	476	215	30	-	30	30	66
Block 3016, Block Group 3, Census Tract 2008.02	106	50					
Block 3017, Block Group 3, Census Tract 2008.02	83	40					
Block 3018, Block Group 3, Census Tract 2008.02	81	33					
Block 3019, Block Group 3, Census Tract 2008.02	24	11					
Block 3020, Block Group 3, Census Tract 2008.02	34	19	123	-	123	148	265
Block 1014, Block Group 1, Census Tract 2009	-	-	-	-	-	-	
Block 1015, Block Group 1, Census Tract 2009	20	-	-	-	-	-	
Block 1016, Block Group 1, Census Tract 2009	-	-	-	-	-	-	
Block 1017, Block Group 1, Census Tract 2009	-	-	-	-	-	-	
Block 1018, Block Group 1, Census Tract 2009	-	-	-	-	-	-	
Block 1019, Block Group 1, Census Tract 2009	2	1	1	-	1	1	2
Block 1022, Block Group 1, Census Tract 2009	-	-	-	-	-	-	
Block 1001, Block Group 1, Census Tract 2010.01	-	-	-	-	-	-	
Block 1003, Block Group 1, Census Tract 2010.01	-	-	-	-	-	-	
Block 1004, Block Group 1, Census Tract 2010.01	-	-	-	-	-	-	
Block 1009, Block Group 1, Census Tract 2011	14	6	10	-	10	10	23
Block 5004, Block Group 5, Census Tract 2014	-	-	-	-	-	-	
Totals	17,120	6,610	2,437	199	2,636	4,450	11,402

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Seismic Hazards

Earthquakes occur along fault lines. They occur infrequently, but can inflict major damage. Faults within and outside the County could affect the City of Napa in the event of an earthquake. These include two active fault zones in the region outside the county: the San Andreas and Hayward faults. Three active faults within Napa County -- the Rodgers Creek, the Concord/Green Valley and the West Napa faults -- also pose a risk to Napa residents and property. In addition, on September 3, 2000 an earthquake registering 5.1 occurred on a previously unknown and unmapped fault 10 miles northwest of the City of Napa. There are four principle seismic hazards: earthquake-induced ground rupture, ground shaking, liquefaction, or water movement. There are no known active faults running directly through the City of Napa, so that ground rupture is presumably not a hazard at this time and with the available scientific data.

Ground Shaking

The primary seismic concern is ground shaking associated with regional and local faults. A large area south of Napa is subject to very strong to very violent ground shaking.

Earthquake-generated ground shaking can cause both structural and nonstructural hazards, such as falling ceilings and light fixtures, toppling exterior parapets, shattered glass, and the dislodging of furniture and equipment. As with most communities in the San Francisco Bay Area near active earthquake faults, much of Napa would be susceptible to violent ground shaking.

Liquefaction

Another earthquake-induced hazard, liquefaction, occurs when water-saturated, cohesionless soil loses its strength and liquefies during intense and prolonged ground shaking. Areas that have the greatest potential for liquefaction are those areas where the water table is less than 50 feet below the surface and soils are predominantly clean, composed of relatively uniform sands, and are of loose-to-medium density. The poorly consolidated younger alluvium that occupies areas south of the City and along the Napa River are considered to have high to very high potential for liquefaction. The younger soils found on the valley floor in the western part of the City are also subject to moderate to high potential for liquefaction.

Dam Failure

Another hazard associated with major earthquakes is the collapse or failure of dams. Because dams can fail for reasons other than seismic activity, and the resultant hazard is from flooding, dam inundation hazards are described in the Technology Hazards section of this Plan.

Regional and Local Fault Zones in the Napa Vicinity

Regional Faults

The Coast Ranges, which traverses northern California in a northwest to southwest direction, is characterized by numerous active faults. The active regional fault zones that have the potential to affect the Napa area include the San Andreas, the Hayward, the Calaveras, and the Rodgers Creek faults. A fault zone is an area of crustal weakness characterized by a series of faults across which there has been relative displacement of the two sides parallel to the zone. An active fault is one that has shown movement during the last 10,000 years, based on documented, geologic evidence.

- **San Andreas Fault Zone**

This fault zone is located approximately 33 miles southeast of Napa. The maximum credible earthquake (MCE) capable of being generated along this system, which was responsible for the 1989 Loma Prieta earthquake (Richter magnitude 7.1), is 8.3 on the Richter scale. The United States Geological Survey (USGS) has estimated a relatively low probability of 2 percent that an earthquake of Richter magnitude 8.0 would occur along the North Coast segment (USGS 1990).

- **Hayward Fault Zone**

This fault zone is located approximately 21 miles southeast of Napa. According to the Working Group on California Earthquake Probabilities, as cited by the California Division of Mines and Geology (CDMG) (1990), this fault has a 25 percent chance of producing an earthquake of magnitude 7.0 or greater within the next 30 years.

- **Calaveras Fault Zone**

This fault zone is located approximately 18 miles southeast of Napa. The northern segment of this fault from the Calaveras Reservoir to Danville has an estimated 200-year recurrence time. At least 160 years have passed since the last earthquake of Richter magnitude 7.0 (Applied Technology Council 1994). The southern segment of the fault between the Calaveras Reservoir and Hollister was responsible for the 1984 Morgan Hill magnitude 6.2 earthquake.

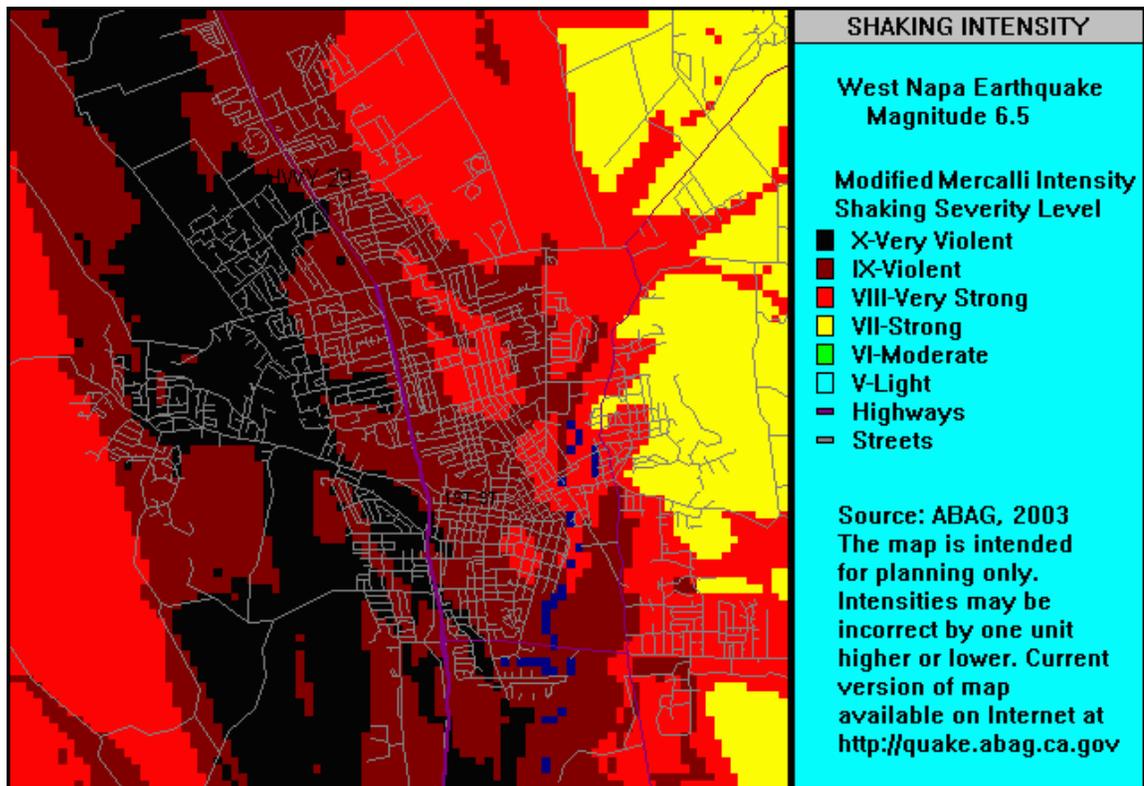
- **Rodgers Creek Fault Zone**

This fault zone lies 12 miles to the west of Napa and is part of the San Andreas Fault system; it may also be the northward continuation of the Hayward fault. Trenching studies across the fault by the USGS have resulted in an estimated 250-year recurrence interval for magnitude 7.0 earthquakes (Budding et al 1989, as cited by CDMG 1991). The last major earthquake along this fault was in 1808, and the USGS considers this fault a prime potential for future large earthquakes (CDMG 1991). ABAG estimates a 22 percent chance of a 7.0 magnitude earthquake on this fault in the next 25 years (ABAG 1992).

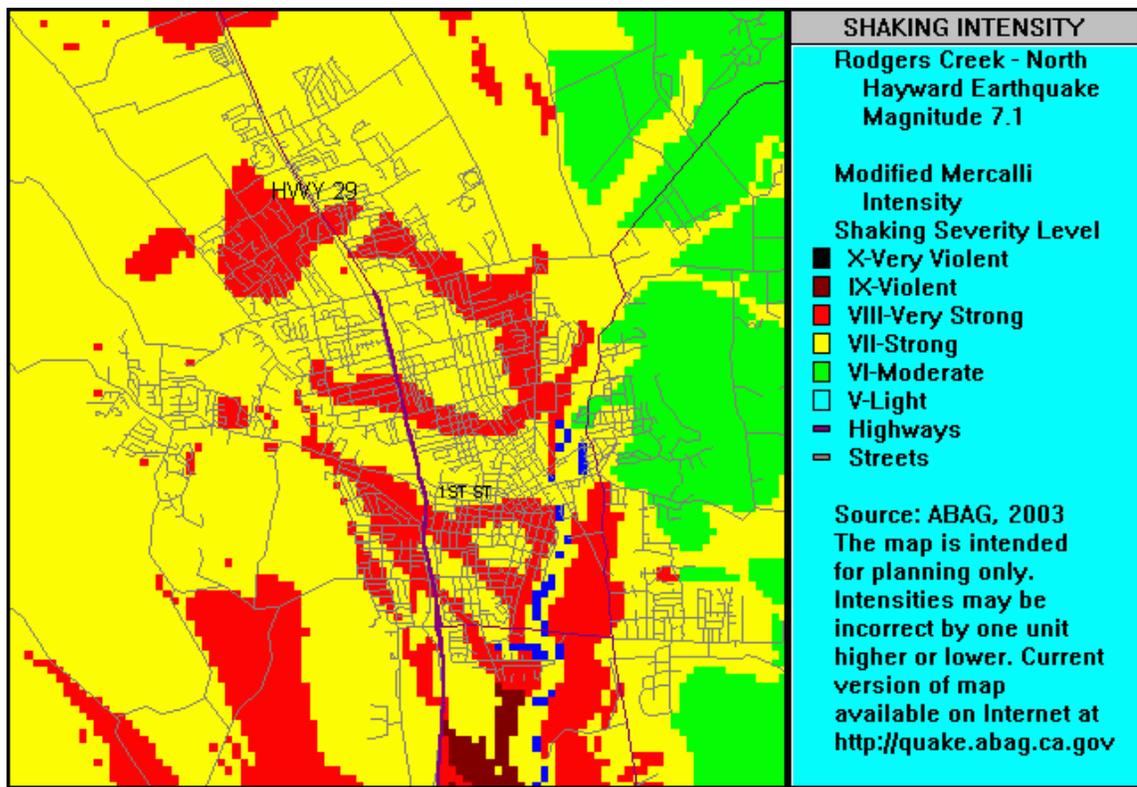
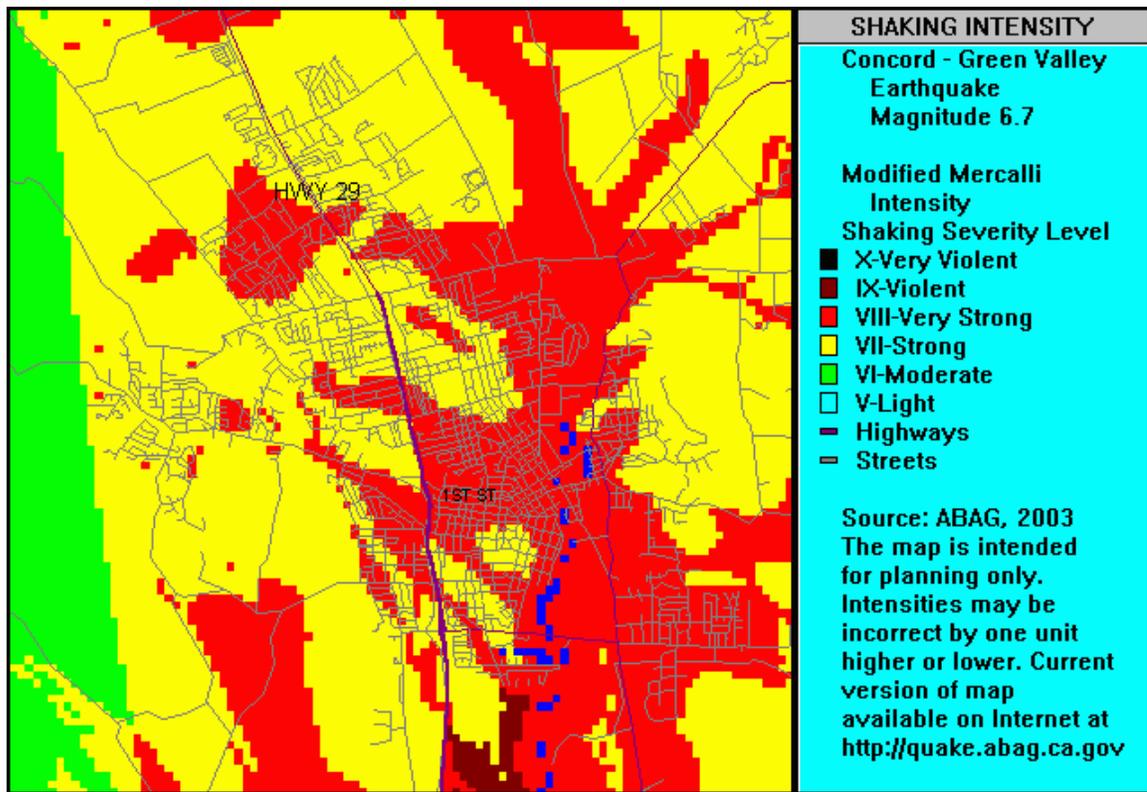
Local Faults

There are three active faults within Napa County that are known at this time. They are the Cordelia, the Green Valley, and the West Napa faults. It is estimated that these faults are capable of producing earthquakes with a Richter magnitude of up to 6.75. A fourth local fault, the Soda Creek fault, lies east of the West Napa fault and is considered potentially active with a predicted maximum Richter magnitude of 6.25 (Wills 1994). This fault displays evidence of displacement during the late Quaternary period (7000,000 to 10,000 years ago) but has not been active during the Holocene period (10,000 years ago to present) (Bryant 1982). Other less significant faults in the Napa area include the Carneros, Mill Valley, and Browns Valley faults.

The following maps show the potential shaking intensity for the West Napa Fault, the Concord-Green Valley Fault and the Rodgers Creek Fault.



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Special Studies Zones

California Division of Mines and Geology (CDMG) classify faults as either active or potentially active according to the Alquist-Priolo Special Studies Zone Act of 1972 (CDMG 1972). A fault that has exhibited surface displacement (movement) within the Holocene Epoch (the last 10,000 years) is defined as active by the CDMG. The CDMG suggests that this definition be used to evaluate faults located within a 60-mile radius of a project site. A fault that has exhibited surface displacement during the Pleistocene Epoch (1.6 million years ago to 10,000 years ago) is defined as potentially active.

The State of California enacted the Alquist-Priolo Special Studies Zone Act in 1972 to assure that homes, offices, hospitals, public buildings, and other structures for human occupancy are not built on active faults, thereby preventing or avoiding potential damage resulting from fault surface rupture. Surface rupture is a break in the ground surface and associated deformation resulting from fault movement. The act requires a geological investigation before a local government can approve most development projects in special studies zones.

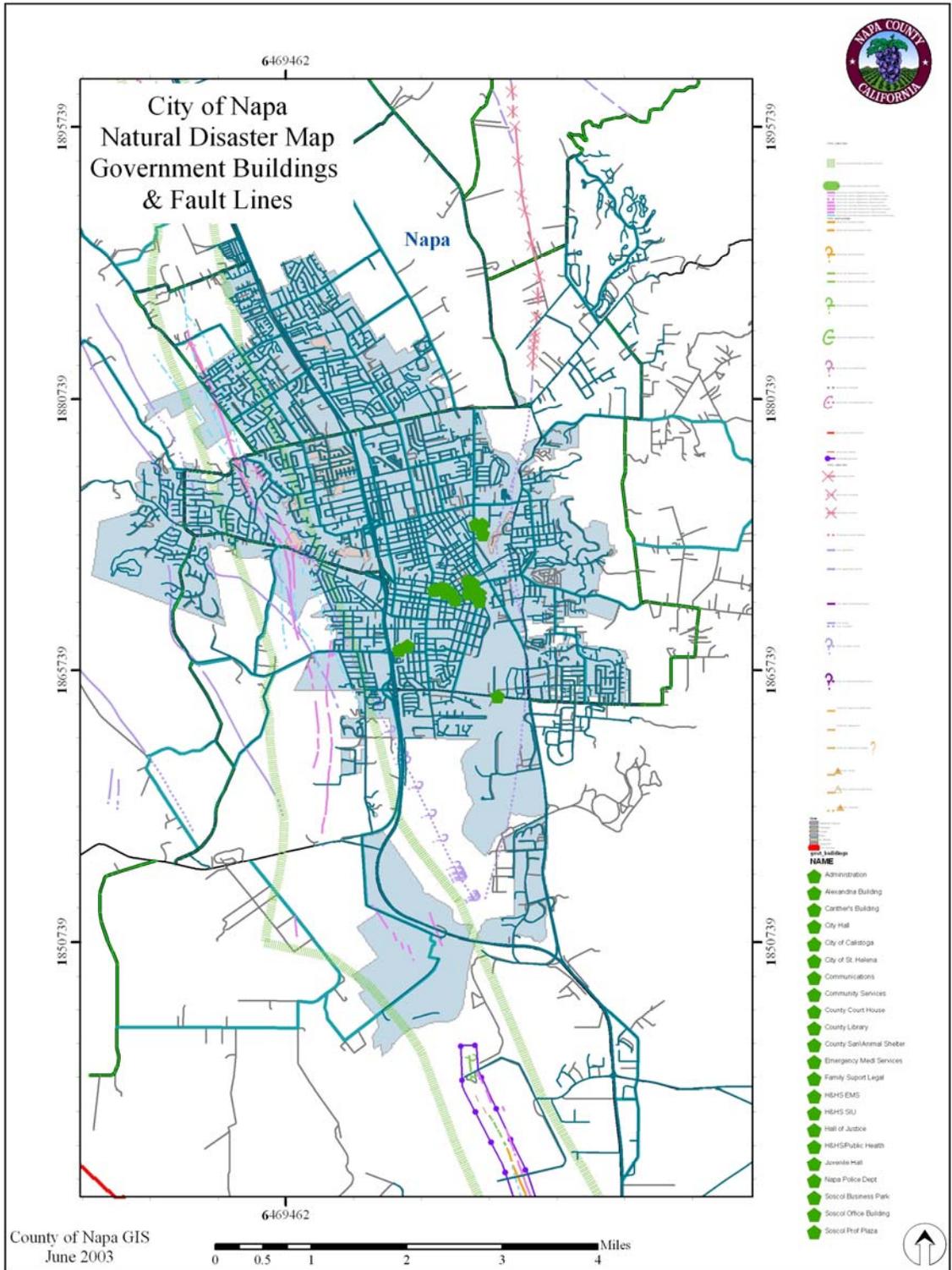
In the Napa County area, Alquist-Priolo Special Studies Zones have been established for the Rodgers Creek, the southern portion of the West Napa and the Green Valley faults. The portion of the West Napa fault that is within the City of Napa is not included in the Alquist-Priolo Special Studies Zone.

Earthquake Maps

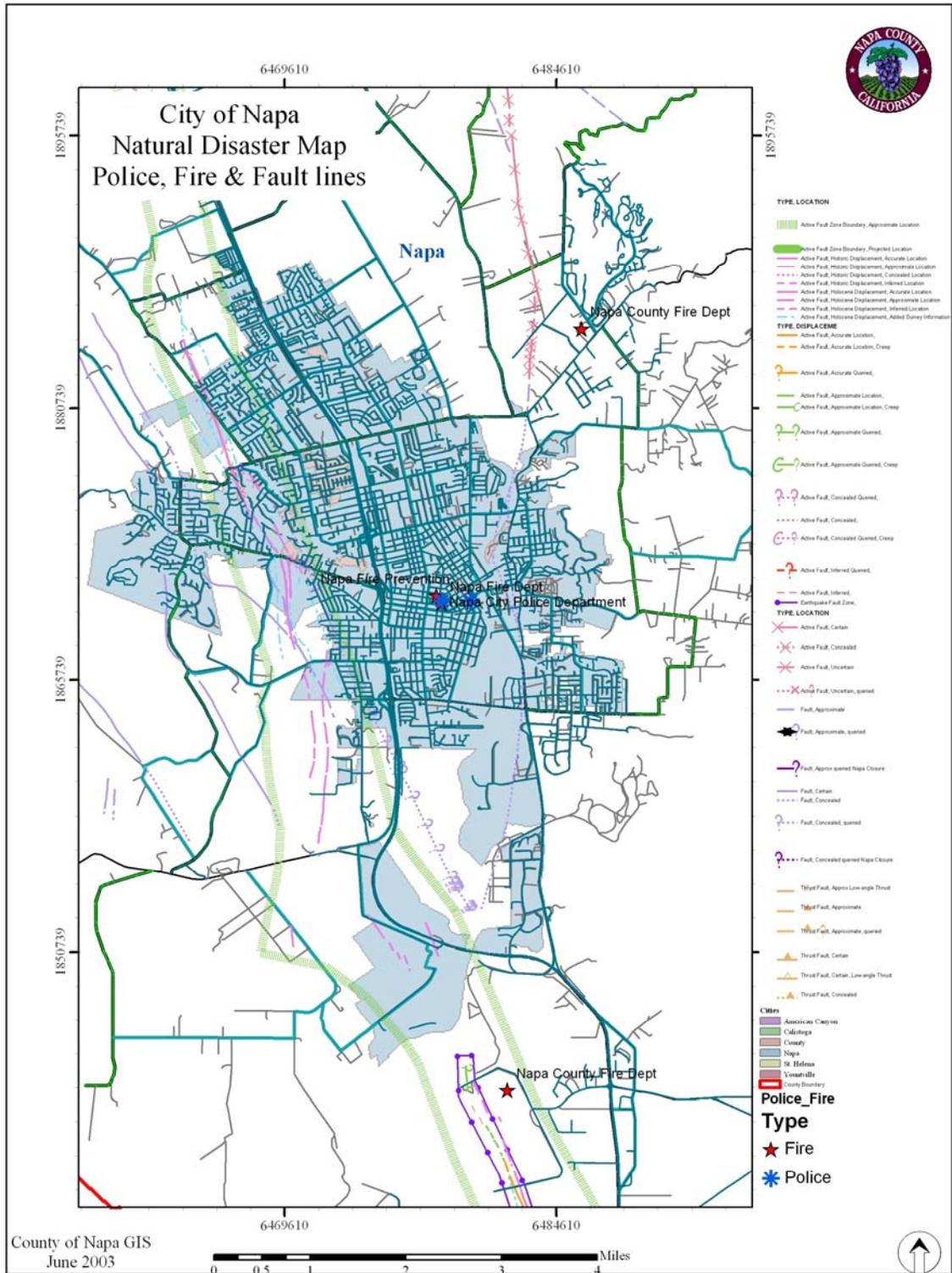
On the following pages are maps showing the faults and soil conditions in relationship to critical facilities in the City of Napa. A complete list of critical facilities can be found in Appendix A.

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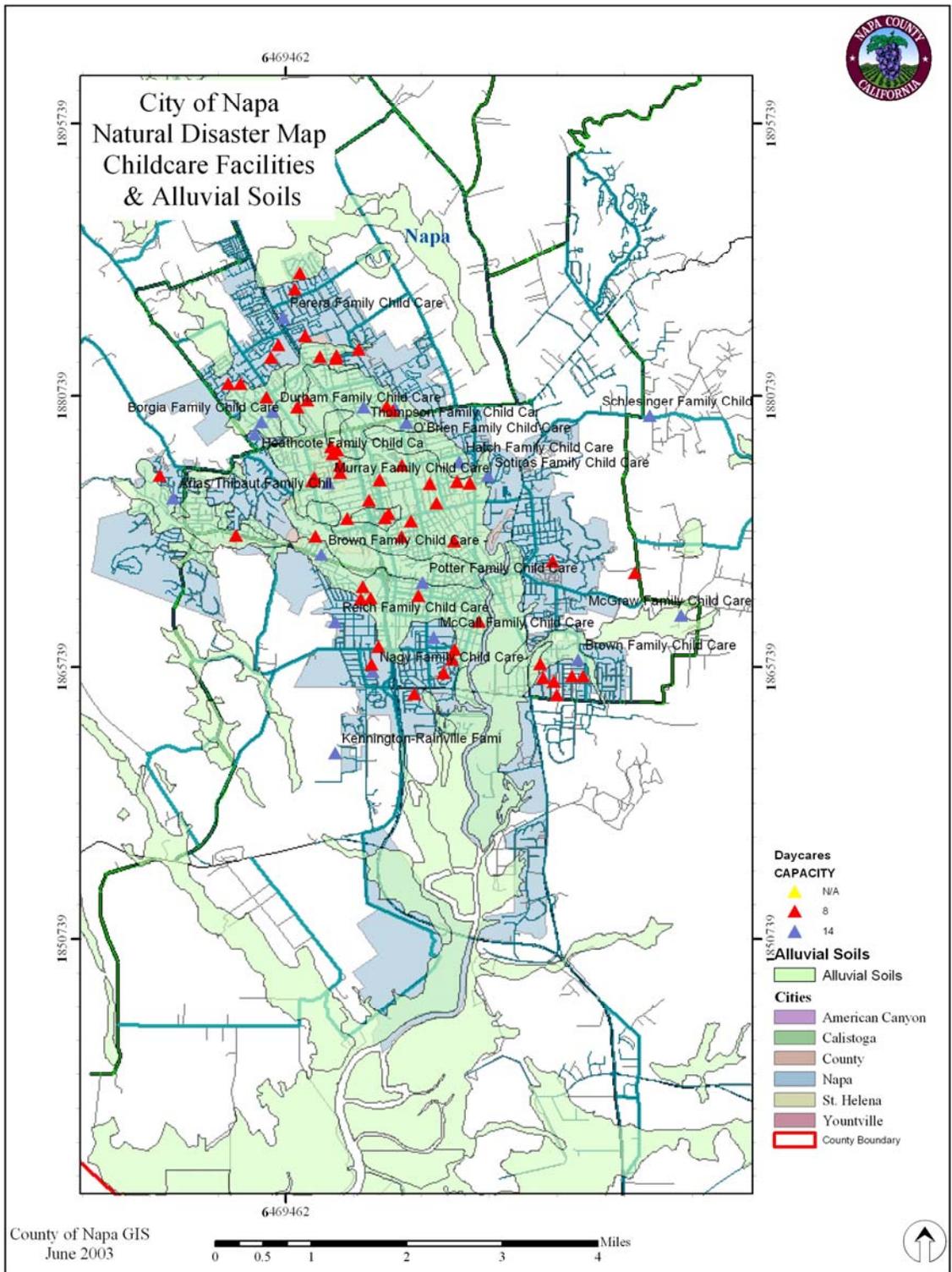
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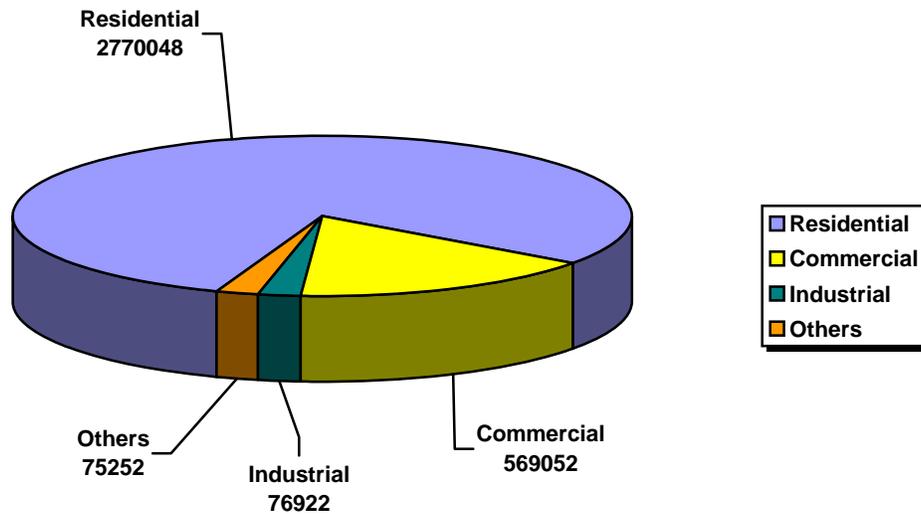


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WEST NAPA FAULT HAZUS DAMAGE ESTIMATES

Scenario Name: West Napa Mid Point
Longitude of Epicenter: -122.312
Latitude of Epicenter: 38.2846
Earthquake Magnitude: 6.5
Depth (Km): 10
Rupture Length (Km): 28.8403

Figure 1: Building Exposure by Occupancy Type
(Thousands of Dollars)



Transportation System Lifeline Inventory

System	Component	# Locations / # Segments	Replacement Value (Millions of Dollars)
Highway	Major Roads	12	561
	Bridges	38	86
	Tunnels	2	20
	Subtotal		667
Railways	Rail Tracks	10	50
		Subtotal	50
		Total	717

Utility System Lifeline Inventory

System	Component	Replacement Value (Millions of Dollars)
Potable Water	Pipelines	0.0
	Distribution Lines	51.8
		51.8
Waste Water	Distribution Lines	31.1
		31.1
Natural Gas	Distribution Lines	20.7
		20.7
Electrical Power	Distribution Lines	15.5
		15.5
Communication	Facilities	8.0
	Distribution Lines	6.9
		14.9
		134.1

Expected Building Damage By Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Residential	4,961	98.24	6,961	98.35	4,812	97.00	1,242	96.89	452	95.36
Commercial	73	1.45	93	1.31	120	2.42	54	4.91	21	4.43
Industrial	8	0.16	13	0.18	17	0.34	11	0.83	1	0.21
Agriculture	1	0.16	1	0.00	1	0.02	1	0.08	0	0.00
Religion	5	0.10	6	0.00	7	0.14	3	0.23	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	2	0.04	4	0.06	4	0.08	1	0.08	0	0.00
Total	5,050		7,078		4,961		1,325		474	

Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	35	0.7	28	0.4	38	0.8	18	1.4	2	0.4
Mobile Homes	51	1.0	121	1.7	291	5.9	249	18.8	82	17.3
Precast Concrete	24	0.5	14	0.2	31	0.6	16	1.2	3	0.6
Reinforced Masonry	412	8.2	319	4.5	426	8.6	262	19.8	87	18.4
Steel	220	4.4	264	3.7	536	10.8	345	26.1	120	25.3
Unreinforced Masonry	9	0.2	23	0.3	54	1.1	60	4.5	68	14.3
Wood	4,299	85.1	6,309	89.1	3,585	72.3	372	28.1	112	23.6

Expected Damage to Essential Facilities

Classification	Total	Number of Facilities		
		Least Moderate Damage > 50%	Complete Damage > 50%	Functionality > 50% at day 1
Hospitals	2	1	0	0
Schools	45	27	0	0
Fire Stations	2	0	0	0

Expected Damage to the Transportation Systems

System	Component	Number of Locations				
		Locations / Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50%	
					After Day 1	After Day 7
Highway	Roads	12			12	12
	Bridges	38	9	3	29	36
	Tunnels	2	0	0	2	2
Railways	Tracks	0			10	10

Expected Utility System Facility Damage

System	Number of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	With Functionality > 50%	
				After Day 1	After Day 7
Communication	4	3	0	0	4
Total	4	3	0	0	4

Expected Potable Water and Electric Power System Performance (Level 1)

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	23,491	11,363	10,224	7,634	0	0
Electric Power	23,491	19,142	14,202	7,118	638	0

Causality Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Residential	214	47	5	10
	Non-Residential	7	2	0	1
	Total	221	49	5	11
2 PM	Residential	59	13	1	3
	Non-Residential	358	99	16	31
	Commute	0	0	1	0
	Total	418	113	18	34
5 PM	Residential	71	15	2	3
	Non-Residential	113	31	5	10
	Commute	1	1	2	0
	Total	184	48	9	13

Building-Related Economic Loss Estimates (Millions of Dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building loss	Structural	51.7	19.7	2.4	2.5	76.3
	Non-Structural	213.6	53.4	6.1	7.1	280.2
	Content	61.0	26.1	4.0	3.2	94.3
	Inventory	N/A	0.4	0.5	0.0	0.9
	Subtotal	326.3	99.6	13.1	12.8	451.7
Business Interruption Loss	Wage	3.0	24.3	0.4	0.7	28.4
	Income	1.3	18.3	0.2	0.2	20.0
	Rental	20.2	8.6	0.2	0.4	29.4
	Relocation	38.0	14.9	0.9	3.3	57.1
	Subtotal	62.4	66.1	1.8	4.5	134.8
Total	388.7	165.7	14.8	17.3	586.5	

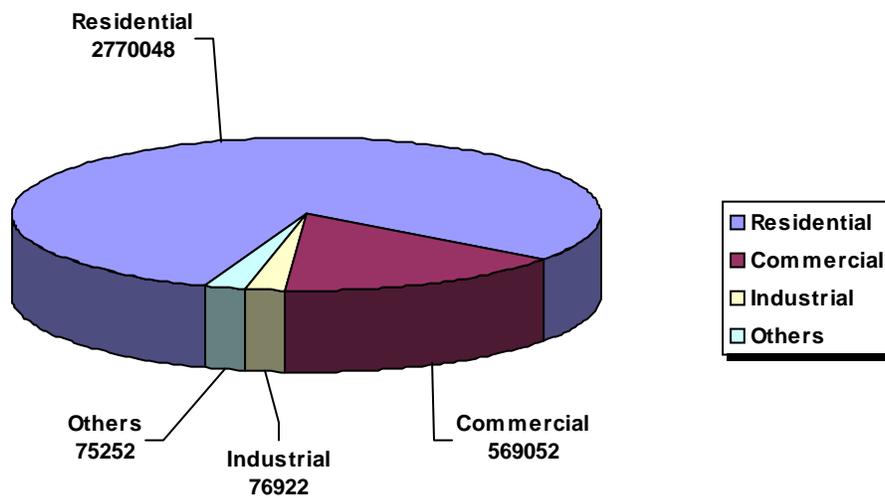
Transportation System Economic Losses (Millions of Dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Roads	561.2	0.0	0.0
	Bridges	86.0	5.2	6.0
	Tunnels	20.0	0.8	4.0
	Subtotal	667.2	6.0	10.0
Railways	Tracks	50.1	0.0	0.0
	Subtotal	50.1	0.0	0.0
		717.3	6.0	0.8

CONCORD-GREEN VALLEY FAULT HAZUS ESTIMATES

Scenario Name: Concord-Green Valley Mid Point
 Longitude of Epicenter: -122.15
 Latitude of Epicenter: 38.2777
 Earthquake Magnitude: 6.8
 Depth (Km): 10
 Rupture Length (Km): 44.26

Figure 1: Building Exposure by Occupancy Type
 (Thousands of Dollars)



Transportation System Lifeline Inventory

System	Component	# Locations / # Segments	Replacement Value (Millions of Dollars)
Highway	Major Roads	12	561
	Bridges	38	86
	Tunnels	2	20
	Subtotal		667
Railways	Rail Tracks	10	50
	Subtotal		50
	Total		717

Utility System Lifeline Inventory

System	Component	Replacement Value (Millions of Dollars)
Potable Water	Pipelines	0.0
	Facilities	0.0
	Distribution Lines	51.8
		51.8
Waste Water	Distribution Lines	31.1
		31.1
Natural Gas	Distribution Lines	20.7
		20.7
Electrical Power	Distribution Lines	15.5
		15.5
Communication	Facilities	8.0
	Distribution Lines	6.9
		14.9
		134.1

Expected Building Damage By Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Residential	10,006	97.96	5,492	97.95	2,255	95.88	556	96.36	85	97.70
Commercial	162	1.59	92	1.64	77	3.27	19	3.29	2	2.30
Industrial	24	0.23	13	0.23	12	0.51	2	0.35	0	0.00
Agriculture	4	0.23	1	0.00	1	0.04	0	0.00	0	0.00
Religion	10	0.10	6	0.00	5	0.21	0	0.00	0	0.00
Government	2	0.02	0	0.00	0	0.00	0	0.00	0	0.00
Education	6	0.06	3	0.05	2	0.09	0	0.00	0	0.00
Total	10,214		6,758		2,352		577		87	

Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Mobile Homes	139	1.4	188	3.4	298	12.7	144	25.0	20	23.0
Precast Concrete	49	0.5	16	0.3	18	0.8	3	0.5	0	0.0
Reinforced Masonry	822	8.0	278	5.0	266	11.3	126	21.9	15	17.2
Steel	514	5.0	341	6.1	416	17.7	185	32.2	27	31.0
Unreinforced Masonry	40	0.4	45	0.8	64	2.7	42	7.3	25	28.7
Wood	8,579	84.0	4,714	84.1	1,267	53.9	72	12.5	0	0.0

Expected Damage to Essential Facilities

Classification	Total	Number of Facilities		
		Least Moderate Damage > 50%	Complete Damage > 50%	Functionality > 50% at day 1
Hospitals	2		0	1
Schools	45	2	0	2
Fire Stations	2	0	0	0

Expected Damage to the Transportation Systems

System	Component	Number of Locations				
		Locations / Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50%	
					After Day 1	After Day 7
Highway	Roads	12			12	12
	Bridges	38	3	0	38	38
	Tunnels	2	0	0	2	2
Railways	Tracks	0			10	10

Expected Utility System Facility Damage

System	Number of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	With Functionality > 50%	
				After Day 1	After Day 7
Communication	4	1	0	4	4
Total	4	1	0	4	4

Expected Potable Water and Electric Power System Performance (Level 1)

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	23,491	1,468	489	0	0	0
Electric Power	23,491	13,632	6,788	1,992	20	0

Causality Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Residential	71	12	1	2
	Non-Residential	2	1	0	0
	Total	73	13	1	3
2 PM	Residential	20	3	0	1
	Non-Residential	121	28	4	8
	Commute	0	0	0	0
	Total	140	31	4	9
5 PM	Residential	23	4	0	1
	Non-Residential	38	9	1	3
	Commute	0	0	0	0
	Total	62	13	2	3

Building-Related Economic Loss Estimates (Millions of Dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building loss	Structural	20.2	8.4	1.1	1.0	30.7
	Non-Structural	84.1	23.1	2.9	2.9	112.9
	Content	28.8	12.9	2.0	1.5	42.2
	Inventory	N/A	0.2	0.2	0.0	0.5
	Subtotal	130.1	44.6	6.1	5.4	186.3
Business Interruption Loss	Wage	1.0	10.9	0.2	0.3	12.4
	Income	0.5	8.3	0.1	0.1	8.9
	Rental	7.6	3.9	0.1	0.2	11.7
	Relocation	14.5	7.0	0.5	1.4	23.4
	Subtotal	23.6	30.1	0.9	1.9	56.5
Total	153.7	74.7	7.0	7.4	242.8	

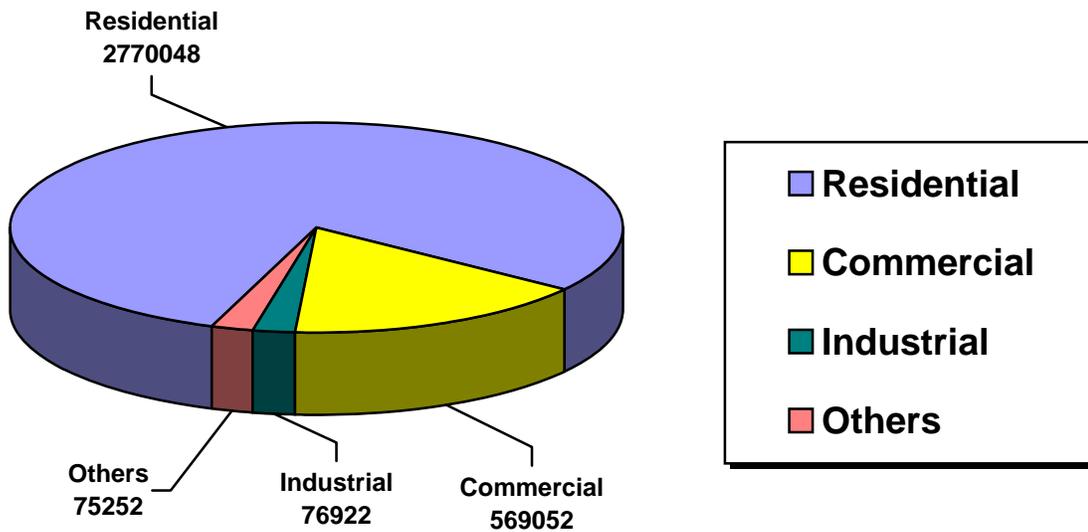
Transportation System Economic Losses (Millions of Dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Roads	561.2	0.0	0.0
	Bridges	86.0	1.3	1.5
	Tunnels	20.0	0.2	1.0
	Subtotal	667.2	1.5	0.2
Railways	Tracks	50.1	0.0	0.0
	Subtotal	50.1	0.0	0.0
		717.3	1.5	0.2

RODGERS CREEK FAULT HAZUS DAMAGE ESTIMATES

Scenario Name: Rodgers Creek Mid Point
Longitude of Epicenter: -122.452
Latitude of Epicenter: 38.1886
Earthquake Magnitude: 7.1
Depth (Km): 12
Rupture Length (Km): 67.9204

Figure 1: Building Exposure by Occupancy Type
(Thousands of Dollars)



Transportation System Lifeline Inventory

System	Component	# Locations / # Segments	Replacement Value (Millions of Dollars)
Highway	Major Roads	12	561
	Bridges	38	86
	Tunnels	2	20
	Subtotal		667
Railways	Rail Tracks	10	50
	Subtotal		50
	Total		717

Utility System Lifeline Inventory

System	Component	Replacement Value (Millions of Dollars)
Potable Water	Pipelines	0.0
	Facilities	0.0
	Distribution Lines	51.8
		51.8
Waste Water	Distribution Lines	31.1
		31.1
Natural Gas	Distribution Lines	20.7
		20.7
Electrical Power	Distribution Lines	15.5
		15.5
Communication	Facilities	8.0
	Distribution Lines	6.9
		14.9
		134.1

Expected Building Damage By Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)								
Residential	1,937	99.13	5,720	98.69	7,034	97.91	2,379	95.50	1,406	94.17
Commercial	17	0.87	61	1.05	121	1.68	90	3.61	69	4.62
Industrial	0	0.00	7	0.12	17	0.24	14	0.56	11	0.74
Agriculture	0	0.00	1	0.00	1	0.01	1	0.04	1	0.07
Religion	0	0.00	5	0.00	7	0.10	5	0.20	4	0.27
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	2	0.00	4	0.06	2	0.08	2	0.13
Total	1,954		5,796		7,184		2,491		1,493	

Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	14	0.7	23	0.4	41	0.6	25	1.0	20	1.3
Mobile Homes	8	0.4	41	0.7	190	2.6	308	12.4	249	16.7
Precast Concrete	8	0.4	5	0.1	32	0.4	21	0.8	22	1.5
Reinforced Masonry	174	8.9	24	4.2	455	6.3	349	14.0	288	19.3
Steel	70	3.6	121	2.1	158	6.4	498	20.0	332	22.2
Unreinforced Masonry	0	0.0	7	0.1	26	0.4	48	1.9	133	8.9
Wood	1,680	86.0	5,357	92.4	5,982	83.3	1,242	49.9	449	30.1

Expected Damage to Essential Facilities

Classification	Total	Number of Facilities		
		Least Moderate Damage > 50%	Complete Damage > 50%	Functionality > 50% at day 1
Hospitals	2	2	0	0
Schools	45	44	0	0
Fire Stations	2	2	0	0

Expected Damage to the Transportation Systems

System	Component	Number of Locations				
		Locations / Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50%	
After Day 1	After Day 7					
Highway	Roads	12			12	12
	Bridges	38	20	9	21	23
	Tunnels	2	0	0	2	2
Railways	Tracks	0			10	10

Expected Utility System Facility Damage

System	Number of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	With Functionality > 50%	
				After Day 1	After Day 7
Communication	4	4	1	0	4
Total	4	4	1	0	4

Expected Potable Water and Electric Power System Performance (Level 1)

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	23,491	21,435	21,302	21,004	17,888	0
Electric Power	23,491	22,142	20,434	15,491	5,253	0

Causality Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Residential	503	126	15	29
	Non-Residential	16	5	1	2
	Total	519	131	17	31
2 PM	Residential	140	38	4	8
	Non-Residential	840	258	44	86
	Commute	1	2	2	0
	Total	980	295	50	95
5 PM	Residential	166	41	5	10
	Non-Residential	264	81	14	27
	Commute	3	4	7	1
	Total	433	127	25	38

Building-Related Economic Loss Estimates (Millions of Dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building loss	Structural	105.7	37.3	4.5	4.8	152.3
	Non-Structural	442.2	104.8	11.6	14.5	573.1
	Content	120.7	47.4	7.3	6.3	181.8
	Inventory	N/A	0.7	0.9	0.1	1.7
	Subtotal	668.6	190.3	24.4	25.6	909.0
Business Interruption Loss	Wage	6.1	43.0	0.8	1.2	51.0
	Income	2.6	32.5	0.4	0.3	35.8
	Rental	40.7	14.7	0.3	0.7	56.4
	Relocation	74.8	24.7	1.4	5.9	106.9
	Subtotal	124.2	114.9	2.9	8.1	250.2
Total		792.8	305.2	27.4	33.8	1,159.2

Transportation System Economic Losses (Millions of Dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Roads	561.2	0.0	0.0
	Bridges	86.0	15.9	18.4
	Tunnels	20.0	2.3	11.5
	Subtotal	667.2	6.0	2.7
Railways	Tracks	50.1	0.0	0.0
	Subtotal	50.1	0.0	0.0
		717.3	18.2	2.5

Summary of Projected Hazus Damage

Queen of the Valley Hospital and Napa State Hospital (including a facility for the criminally insane) are located in the City of Napa. St Helena Hospital is located in the unincorporated town of Angwin, and the State Veterans Home's Holderman Hospital is located in town of Yountville. Approximately half of the beds could be lost during a major earthquake due to the age and construction type of each of the hospitals. Smaller private medical facilities such as the Kaiser Clinic can augment the ability of our hospitals to care for their client populations.

Telephone systems will be affected by system failure, overloads, loss of electrical power and possible failure of some alternate power systems. Immediately following an event, numerous failures will occur, compounded by system use overloads. This will likely disable up to 80% of the telephone system for one day. County UHF/VHF and microwave radio systems are expected to operate at 40% effectiveness the first 12 hours following an earthquake, increase to 50% for the second 12 hours, then begin to slowly decline to approximately 40% within 36 hours. Microwaves systems will likely be 30% or less effective following a major earthquake.

Electrical transmission lines are vulnerable to many hazards due to their length and, in many areas, the remoteness of the lines. Damage to generation plants or substations may cause outages. Damage to generation plants will affect electrical production. Damage to substations will affect delivery. Repairs to electrical equipment may require the physically clearing roadways and movement of special equipment. Restoration of local electrical power will be coordinated with regional and local utility representatives. Up to 60% of the system load may be interrupted immediately following the initial earthquake shock wave. Much of the affected area may have service restored in days; however, severely damaged areas with an underground distribution system may create longer service delays.

Damage to natural gas facilities serving the Napa communities will consist primarily of isolated breaks in major transmission lines. Breaks in mains and individual service connections within the distribution system will be significant, particularly near the fault zones, especially in the City of Napa and in American Canyon just to the south of Napa. These many leaks pose a fire threat in the susceptible areas of intense ground shaking and/or unstable ground near the shoreline. Breaks in the system will affect large portions of the City and restoration of natural gas service could be significantly delayed.

Water availability, distribution for supporting life, and treating the sick and injured are of major concern to the City of Napa. It is expected that the primary water source, Lake Hennessey, may be inaccessible due to damage to the pipelines that distribute potable water. However, Napa is also connected to the State Water project at Jameson Canyon and has a tertiary source in Milliken Dam Water treatment facility. Any one of these three facilities remaining in operation will be able to supply the emergency potable water needs to the City of Napa and its immediately contiguous County areas, if the distribution system can be repaired.

There are three water reservoirs within the City of Napa that have all been recently retrograded and covered. If the reservoirs and water tanks remain intact, they will likely provide ample potable water to meet demands during the time the water treatment stations are being repaired.

The three reservoirs in Napa are on solid ground and are expected to be usable after a major earthquake. However, the other cities' water tank survivability is low. Therefore, potable water will most likely have to be supplied in these area communities.

Significant damage is expected on the road system. State Highway 12 is expected to be impassable from Cordelia to the Highway 29 Intersection. Interstate 80 could suffer severe surface distortion in the Fairfield and Vacaville areas, as well as damage to its numerous bridges and viaducts in the greater Bay Area. Highway 128 is subject to landslides both up valley toward Geyserville and in the hills around Lake Berryessa. Highway 29 leaving the County to the north is subject to landslides and debris flows to the south as it crosses over old bay mud and fill areas and is subject to liquefaction and surface distortion. Any combination of failures to these main highways could isolate the County for up to 72 hours with complete road restoration taking perhaps several weeks. Vehicular traffic will be limited on the foothill roads due to potential and actual landslides.

Soil liquefaction problems could cause the closure of several roads in American Canyon and areas of other cities built on unconsolidated river soils. The Napa Valley Wine Train, a tourist rail system in Napa, is expected to be severely damaged restricting travel on the system for several weeks to months. The California Northern railway system, which transverses the south County from Interstate 80 at Cordelia to Shellville along Highway 12 and crossing the Napa River Delta area south of the 12/29 Intersection through Napa Junction, will likely be severely damaged and unusable. The freight yard, repair shops and rail yard that are located at Napa Junction are expected to be severely damaged. Railroad commercial and passenger service will be restricted for at least 72 hours and possibly several weeks.

There are ten dams in Napa County, which have completed inundation studies and maps in sufficient detail to plan evacuation, mass care and emergency medical care for populations displaced by failure or threat of dam failure. Maintenance programs and activities of the Conn Dam are regularly performed, and the potential catastrophic failure of the 70-year old dam is considered to be improbable during most scenario earthquakes.

Sewage collection systems throughout the County are expected to sustain widespread damage. In the City of Napa a sanitation plant is located in a highly probable liquefaction area near the Maxwell Bridge. The Napa Sanitation District plant will also experience liquefaction and commercial electrical power losses. If backup generating systems fail, the result could be the discharge of raw sewage into the river. The sanitation plant could be out of service from one to four months, depending on damage.

Based on this modeling it is clear that any number of mitigation techniques are applicable to this threat. California already has the strictest building codes in the

country, the highest construction standards for schools and the most dynamic design and construction standards for highways, bridges and other transportation infrastructure. The recent experience of the 2003/2004 earthquakes to see this illustrated this. Paso Robles in California suffered from the effects of being in near proximity of a moderate 6.5 Richter scale event. Paso Robles suffered significant damage of about \$150 million but with very little loss of life, injuries or damage to modern structures.

UNREINFORCED MASONRY BUILDINGS

Background and the URM Law

The City of Napa has prepared a report considering the possible adoption of a mandatory seismic retrofit ordinance. Attention to the downtown's Unreinforced Masonry buildings is prompted by several factors:

- Public criticism of vacant, unkempt, and deteriorating buildings in the downtown, the economic impacts created by unsafe, URM, and/or blighted buildings, and a "challenge" to some individual building owners to take care of their properties;
- The magnitude 6.5 earthquake in San Simeon on 12/22/03, resulting in two deaths, over 40 serious injuries, and economic devastation to downtown Paso Robles;
- A subsequent editorial calling for Napa to "fix earthquake unsafe buildings" (*Napa Valley Register*, 12/26/03).
- The Downtown Napa Mixed-Use Study, which has focused attention on under-utilized buildings and/or sites; and
- Increased visibility, activity and interest in general in the overall development of downtown Napa.

In 1986, the California URM Law SB 547 became effective, requiring local jurisdictions in Seismic Zone 4 (high risk areas) to comply with three directives:

1. Create an inventory of unreinforced masonry buildings in their jurisdictions;
2. Establish an earthquake loss reduction program for these buildings; and
3. Report all information about these efforts to the Seismic Safety Commission in a yearly progress report.

The City of Napa prepared and finalized its URM inventory in 1990, and those building owners were notified as provided in the law. A URM task force was formed, consisting of City staff and property owners, as well as representatives from the building/contracting, banking, real estate, preservation, and architecture and engineering professions. They

met periodically to discuss financial issues, public education, building/engineering issues, and incentives for compliance.

In 1994, a mandatory seismic retrofit ordinance drafted by the Building Official was considered by City Council, but not adopted. The cost of seismic retrofit improvements was a concern voiced by owners at that time. Council directed staff to continue working with the URM owners to achieve voluntary efforts. Today, Napa has no mandatory seismic retrofit ordinance. URM upgrades are voluntary, or may be required in situations where occupancy increases or changes in occupancy classification demand retrofit improvements as a function of Building Code regulations. The City of Napa presently has 25 structures on this list. Three are vacant, the rest are occupied by active commercial uses.

The City's loss reduction program was enacted in 1997 when the Redevelopment Agency adopted its Seismic Retrofit Program. This program was created with input from members of the original URM Task Force, and combined incentives provided by many other jurisdictions in California, especially the City of Sonoma where a mandatory retrofit ordinance was in effect. The program provided financial incentives in the form of reimbursements to owners for a portion of the cost of architectural and engineering documents (\$1 / sq. ft.) and for construction (\$1 / sq. ft.). The Agency also funded the costs for seismic strength testing up to \$1,000. The program was amended in 1999 to provide the following incentives:

- Assists owners of commercial properties by offering reimbursement for a portion of the architectural and engineering plan costs. Properties must be located within the Redevelopment Project Area.
- Reimbursements are calculated based on commercial square footage of the building: \$2.50 / square foot.
- A maximum of \$1,000 is also reimbursable for seismic testing.
- After the structural plans are approved by the Building Official, the reimbursement is made in the form of a loan, and owners must sign a loan agreement and promissory note. A building permit must be obtained within one year of reimbursement. Retrofit construction must be completed within five years from reimbursement. One extension may be granted.

Since 1997, six owners have participated in this program for a total of \$100,730 in reimbursements. This public contribution leveraged approximately \$1,750,000 in private funds.

Property	Agency Participation
Tuscany Restaurant	\$9,000.00
Napa Valley Register Building: Sushi Mambo/Fershko, Lewis & Blevans Attys.	\$13,250.00
Migliavacca Building: Café Ciccero/Shoes On First, et al.	\$16,750.00
First National Bank Building: Ristorante Allegria/Napa Co. Landmarks	\$14,650.00
Winship Building: NV Coffee Roasting, Morgan Lane Real Estate, et al.	\$22,392.50
Napa Labor Temple: Uboldi & Heinke/Napa Steam Laundry Investors	\$24,687.50

Overall, City records indicate that 16 URM properties have been seismically retrofitted in downtown Napa and removed from the inventory. Since the 1990 inventory was prepared, several buildings thought to be URM have been analyzed by a structural engineer and determined to be reinforced. These have been removed from the inventory, resulting in the current list of 25.

There are 366 jurisdictions subject to Seismic Zone 4 URM Law. Of these, 251 jurisdictions have implemented loss reduction programs, including 130 that have enacted Mandatory Seismic Retrofit Ordinances. There are currently 82 cities/counties that now report no URM buildings on their inventory due to their mitigation programs – URM buildings have been either seismically upgraded or demolished.

Earthquake Damage Statistics

Earthquake	Date	Fault	Magnitude	Severity in Napa	Damage in Napa	Injuries in Napa
Great 1906 San Francisco	4/18/06	San Andreas	8.25	Moderate to Severe	Moderate Unknown \$ amount	Unknown
Bolinas	8/17/99		4.7	Not felt	None	None
Cloverdale	1/10-1/8/2000	Rogers	4.0, 4.2, 4.0	Not felt	None	None
Santa Rosa	1969	Rogers	5.6 and 5.7	Weak	None to Slight	None
Yountville	9/3/2000	Rogers	5.2	Severe	65 million FEMA awarded 5.5 million in grants, 2300 building permits issued for repairs	40 minor 2 severe

Earthquakes with an epicenter 60 miles from Napa since 1906 4.0 or greater

The City of Napa is located in close proximity to four known earthquake faults: Rodgers Creek (the continuation of the Hayward Fault across San Pablo Bay) 15 miles west of Napa, Concord-Green Valley located 10 miles east of Napa, the West Napa Fault which runs just west and parallel to Highway 29, and the previously-unknown Mt. Veeder/Yountville Fault which impacted Napa in September, 2000. Although the length of that fault has not been mapped, the epicenter was 10 miles northwest of Napa. It lasted for 18 seconds, was calculated at Magnitude 5.1, occurred approximately 5.8 miles underground, and caused about \$65 million in property damage.

The Rodgers Creek Fault is considered one of two in the Bay Area that pose the greatest threat for earthquake probability, the other being San Andreas. The US Geological Survey has determined that the Bay Area Regional Quake Probability of experiencing a M 6.7 event or greater is 62% before 2032. The USGS Earthquake Loss Estimation Model projects losses of \$520 Million in Napa County if the Rodgers Creek Fault experienced a M 7.1 quake. *(From USGS Brochure prepared 2/5/01).*

The 2000 Napa earthquake was analyzed in a report prepared by the Stanford University Earthquake Engineering Center. The analysis reported unusually strong ground accelerations recorded on seismograph instrumentation at Napa Valley College, Carmenet Winery, and Fire Station 3, three geographically dispersed locations. Although the epicenter was approximately 10 miles northwest of Napa, USGS engineers identify two factors accounting for the significant shaking intensity. First, the shaking was amplified by the soft sediments of alluvial soils along the Napa River and in the lower lying areas south of the City. Second, the rupture propagated from the epicenter directly to the City of Napa, shown in the shaking intensity map illustrations generated just after the quake. The intensity levels recorded in Napa were 5 to 8 times greater than shaking within one mile of the epicenter. The final summary of the Stanford report confirmed that observation and concluded with:

"These accelerations are significantly higher than most of those recorded in other California earthquakes under similar conditions. Many of the structures we visited, in particular URM masonry buildings with unbraced parapets in their facades and old wooden houses on tall crawl spaces supported by cripple walls, would have suffered more damage in our opinion if ground motions at these locations corresponded to spectral displacements of 4 cm or spectral accelerations near 1g. Thus, this earthquake should not be interpreted as an indication of adequate behavior of these types of constructions. On the contrary, this earthquake should serve as a wakeup call for owners of these types of construction to undergo at least a small level of retrofitting of their constructions. In particular bracing and anchoring of URM walls and parapets as well as lateral bracing and anchoring of cripple walls are needed." (Brief Report on the September 3, 2000 Yountville/Napa California Earthquake, by Eduardo Miranda and Hesam Aslani, John A. Blume Earthquake Engineering Center, Stanford University).

Statistics bear out this finding as well. Within the first six months after Napa's quake, the City Public Works Building Division had issued over 1,480 building permits for earthquake related repairs. Eventually, 2,300 building permits were issued. The US Small Business Administration approved 1,324 loans totaling \$22.6 million to Napa homeowners and businesses; FEMA awarded \$5.5 million in grants for home quake repairs. Officials stated that rarely will a M 5.1 quake result in a federal disaster declaration, but the damage in Napa exceeded that which

would have been normally predicted. Forty people reported injuries, the most seriously a 5-year old boy who was crushed by a fallen fireplace

The December 2003 San Simeon Earthquake most heavily impacted the City of Paso Robles, about 40 miles to the east of the epicenter. Like Napa's 2000 quake, the rupture propagated from San Simeon to Paso Robles. Although Paso Robles does have a mandatory seismic retrofit ordinance, the deadline for compliance was 2007. Many buildings in Paso Robles were damaged, though those that had undergone seismic retrofit sustained relatively minor damage, such as broken glass or loosened bricks.

CURRENT LIST OF UNREINFORCED BUILDINGS 2004

#	ADDRESS	APN	NAT'L REG	CITY LNDMRK	AE FLOOD ZONE	SUBJECT TO FEMA FLOOD-PROOFING?	SQ FT.	STATUS
1	810-816 Brown *	3-222-11			Yes	Yes	5,600	URM
2	822 Brown	3-222-12 & 14			Yes	Yes	2,200	URM
3	830 Brown	3-222-15			Yes	Yes	2,000	Demolition Pending
4	1014 Clinton	3-136-06			Yes	Yes	8,920	Engineering & Testing
5	926 Coombs	3-214-01			Yes	Yes	3,000	URM
6	1025 Coombs *	3-164-03			Yes	Yes	1,800	URM
7	1015 First	3-221-02			Yes	Yes	800	URM
8	1130 First *	3-166-04	Yes	Yes	Yes	No	19,300	URM
9	1139 First *	3-214-12			Yes	Yes	3,050	URM
10	1141 First	3-214-02			Yes	Yes	3,750	URM
11	1210 First *	3-164-06			Yes	Yes	1,750	URM
12	1212 First *	3-164-13			No **	No	18,250	URM
13	1219 First *	3-211-02	Yes	Yes	Yes	No	4,670	Construction in 2004
14	807 Main	3-222-09			Yes	Yes	1,200	URM
15	813 Main *	3-222-08		Yes	Yes	No	3,600	URM
16	815 Main	3-222-07			Yes	Yes	1,400	URM
17	823-825 Main	3-222-06			Yes	Yes	1,800	URM
18	829 Main	3-222-05			Yes	Yes	1,200	URM
19	902 Main *	3-231-07		Yes	Yes	No	8,000	URM
20	1202-1214 Main *	3-143-09			Yes	Yes	17,000	URM
21	1313-1323 Main	3-136-10			Yes	Yes	3,750	URM
22	1400 Second	3-204-06			No	No	5,775	URM
23	1424 Second	3-204-07			No	No	5,700	URM
24	920 Third *	6-133-02		Yes	Floodway	No	9,600	Engineering complete
25	376 Soscol	46-570-08		Yes	No	No	2,280	URM

* Listed on the City of Napa Historic Resources Inventory

** Property is outside of 100-year flood boundary; however, finished floor elevation is below base flood elevation.

Properties on National Register and City Landmark Inventory are exempt from flood-proofing requirements.

Italics denotes historic building name.

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Wildland Interface Fire Hazards

The City is characterized by a narrow valley floor surrounded and intermingled with steep, hilly terrain that contains areas that are very susceptible to wildland fires. Such fires expose residential and other development within the city to an increased risk of conflagration. The hilly/mountainous terrain to the City's west and east strongly influences both wildland fire behavior and the suppression capability of firefighters and their equipment. Such rough topography places limitations on accessibility for firefighting equipment so that travel time from the suppression station to a fire can greatly exceed the City's maximum acceptable response time of five minutes.

Wind is a predominant factor in the spread of fire in that burning embers are carried with the wind to adjacent exposed areas. The City has a characteristic southerly wind that originates from the San Francisco Bay and becomes a factor in fire suppression. Also, during the dry season the City experiences an occasional north wind of significant velocity that is recognized by fire fighters to be a significant factor in the spread of wildland fires.

The City is divided geographically into three parts by the Napa River and the north/south section of State Highway 29. The River and the Highway can be significant barriers to fire suppression response in times of floods or earthquakes (the City is susceptible to both). Smaller waterways that are tributaries to the River (Napa, Redwood, Dry and Tulocay Creeks) can be barriers to street extensions and linkages thereby exacerbating access difficulties.

Wildland / Urban Interface

The term "wildland/urban interface" was coined in 1976 by CDF to identify the condition where highly flammable native vegetation meets high value structures, primarily residences. In most cases, there is not a clearly defined boundary or interface between the structures and vegetation that present the hazard. Historically, residences in these ill-defined wildland/urban intermix boundary areas were particularly vulnerable to wildfires because they were constructed with a reliance on fire department response for protection rather than fire resistance, survivability and self-protection. However, in the recent past, there has developed a greater appreciation for the need to regulate development in these hazardous areas as a result of a number of serious statewide wildland fire conflagrations. (CDF recently modified the terminology for these areas to "wildland/urban intermix".)

When a wildfire ignites in a high risk wildland/urban intermix area, the priority is life and property protection. Historically, CDF forces began their attack from the most advantageous topographical or physical location, and surrounded the fire perimeter. Now, with hundreds or even thousand of structures inside the fire perimeter, the CDF's initial and extended resources are forced to divert to individual structure protection. This causes wildfire control to become secondary to protecting lives and property, thus allowing wildfires to spread unchecked, threatening and destroying more houses and natural resources.

The major wildland fire hazard risks for residential development are in the City's hilly areas characterized by steep slopes, poor fire suppression delivery access, inadequate water pressure and highly flammable vegetation. The Health and Safety element of the Napa General Plan identifies 19 Fire Hazard Areas at the city's wildland-urban interface (see Figure 2-1 Fire Hazard Areas).

The severity of the wildland fire hazard is determined by the relationship between three factors: fuel classification, topographic slope, and critical fire weather frequency. The box below lists fuel classifications; Napa's Fire Hazard Areas generally fall into the Medium Fuel category. Critical fire weather conditions occur in periods of relative low humidity, high heat and high winds. The Napa area typically has critical fire weather from two to seven days annually. Fuel, slope, and weather conditions combine to give Napa urban wildland interface areas and overall "High" hazard rating based on the Federal Emergency Management Agency's *Urban Wildland Interface Code: 2000*.

Fire Hazard Severity

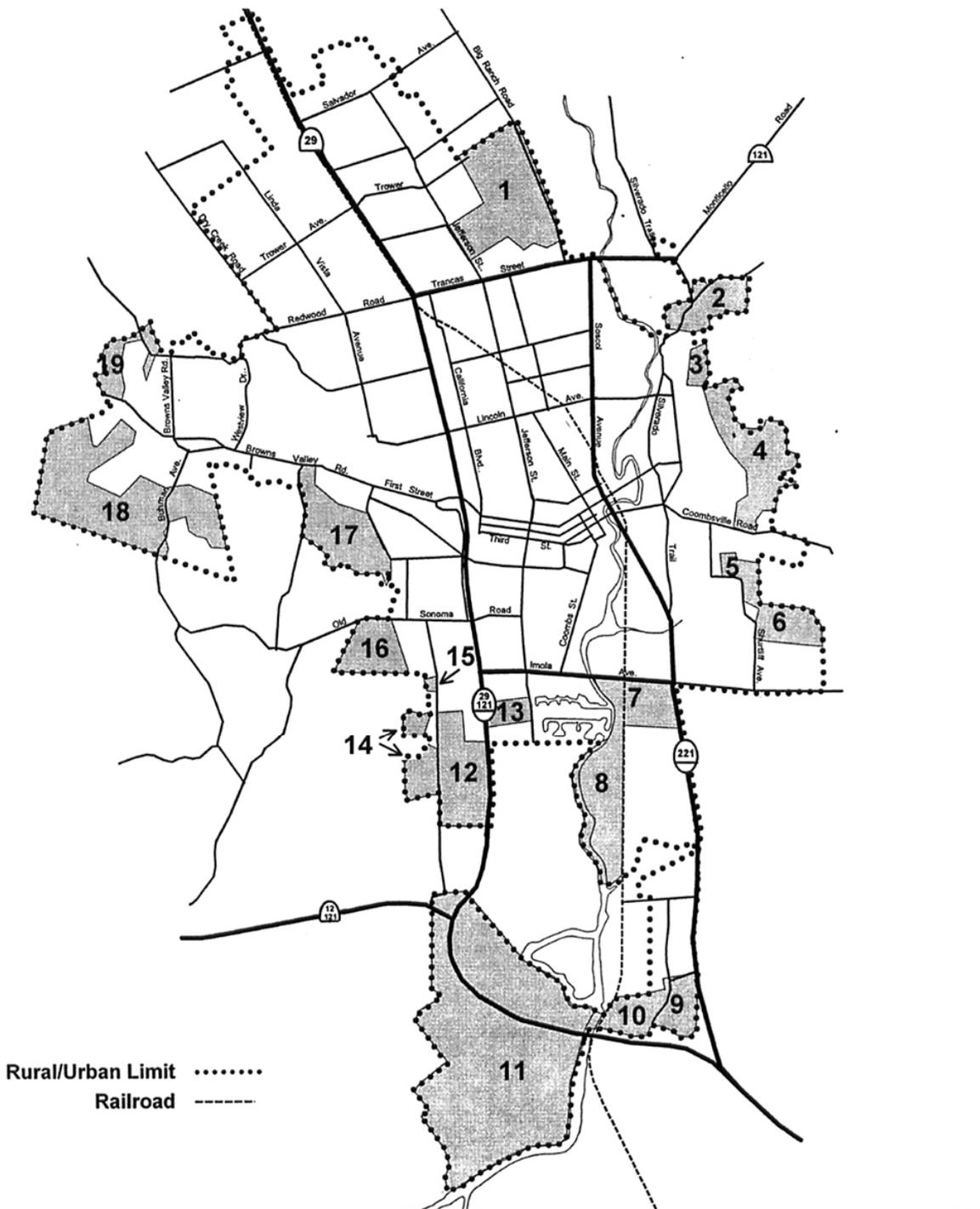
Fuel Classification	Critical Fire Weather Frequency								
	< 1 Day/Year			2 to 7 Days/Year			> 8 Days/Year		
	Slope (%)			Slope (%)			Slope (%)		
	< 40	41 – 60	> 61	< 40	41 – 60	> 61	< 40	41 – 60	> 61
Light Fuel	M	M	M	M	M	M	M	M	H
Medium Fuel	M	M	H	H	H	H	E	E	E
Heavy Fuel	H	H	H	H	E	E	E	E	E

M – Moderate
H – High
E – Extreme

Fuel Classifications

Heavy fuel ----- vegetation consisting of round wood 3 to 8 inches in diameter
Medium fuel ----- vegetation consisting of round wood 1/3 to 3 inches in diameter
Light Fuel ----- vegetation consisting of herbaceous plants and round wood less than ¼ inch in diameter.

The map on the following page identifies the Wildland Interface Fire potential in the City of Napa.

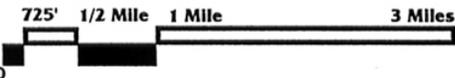


City of Napa General Plan Firehaz.DS4 12/98

**Figure 2-1
 Wildland-Urban
 Interface Fire
 Hazard Areas**



Fire Hazard Area - 1



While every effort has been made to insure the accuracy of the information shown on this page, the City of Napa assumes no responsibility for liability from any errors or omissions.



Fire Hazard Areas Inventory

The following table is an estimate of structures in the 19 identified Fire Hazard Areas shown in the Wildland-Urban Interface Fire Hazard Areas Map on the previous page. This inventory is derived from the HAZUZ 99 database, which relies on the 1990 U.S. Census.

Table 3-1

Building Inventory, Fire Areas								
Fire Area	Residential	Commercial	Industrial	Agriculture	Religion	Government	Education	Total
1	532	12	1	0	1	0	0	546
2	92	1	0	0	0	0	0	94
3 & 4	310	3	2	0	0	0	0	315
5 & 6	212	4	1	0	0	0	0	217
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	12	0	0	0	0	0	0	12
13	419	4	1	0	1	0	0	425
14	51	0	0	0	0	0	0	52
15	16	0	0	0	0	0	0	16
16	21	0	0	0	0	0	0	22
17	164	1	0	0	0	0	0	166
18	376	2	2	1	1	0	0	384
19	144	1	1	0	1	0	0	147
Total	2349	29	9	2	4	1	2	2395

Historical Losses From Urban Interface Fires

While the City of Napa has not sustained losses from an Interface fire, there is great potential. There have been two destructive fires in the County that have threatened areas of the City in 1964 and again in 1986. The graph below demonstrates the potential losses and confirms the reasons why the City must work towards implementing the identified mitigation action items.

Potential Wildland-Urban Fire Losses

Potential losses from fires at the wildland-urban interface are shown in the table below. These assumptions are worst-case for each fire area. This means that worst case fire weather conditions are assumed resulting in the loss of every building in a given Fire Hazard Area. Estimated values are for structures only and do not include the cost to fight the fires. Due to the short response times in the areas, it is assumed that there would not be any fatalities.

Methodology Used to Determine Losses for Wildfires

The figures shown for losses due to wildfire were generated by calculating the number of structures in the high hazard areas and assume that all of them would be lost in a worst case fire. The value of these structures was then calculated by prorating the number of structures in the hazard area as a percent of the number of structures in the census tract according to the data in Hazus. This percentage was then multiplied against the total value of the structures in the census tract as shown in Hazus.

Potential Wildland-Urban Fire Losses (\$1,000's)								
Fire Area	Residential	Commercial	Industrial	Agriculture	Religion	Government	Education	Total
1	63,241	23,386	779	33	957	362	877	89,634
2	12,088	1,165	618	4	128	40	115	14,158
3 & 4	40,551	3,909	2,074	12	428	134	387	47,495
5 & 6	27,354	4,883	924	32	11	105	250	33,560
7	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-
12	12	-	-	-	-	-	-	12
13	67,710	4,952	1,183	40	906	244	525	75,561
14	8,247	603	144	5	110	30	64	9,203
15	2,604	190	46	2	35	9	20	2,906
16	3,472	254	61	2	46	13	27	3,875
17	26,477	1,936	463	16	354	96	205	29,546
18	50,748	3,598	3,117	153	1,615	180	409	59,820
19	16,357	1,118	1,816	94	861	57	138	20,441
Total	318,862	45,995	11,224	391	5,452	1,270	3,018	386,212

Wildland Interface Fire forms, included on the following pages, are used to designing public education programs for the community in the most hazardous areas and for fire pre-planning and structural defense by the Fire Department.

Wildfire Hazard Rating Form
-Subdivision-

Name of Subdivision:		3138-3158 Browns Valley Road		Date:	July 16, 2003		
County:	Napa	Size (Acres):	44.53	# of Lots:	15		
Rating:	Moderate Hazard	Comments:					
		Points				Points	
A. Subdivision Design				C. Topography			
1. Ingress/Egress				1. Predominant Slope			
Two or more primary roads		1		8% or less		1	
One road		3		More than 8%, but less than 20%		4	
One way in, one way out		5	5	20% or more, but less than 30%		7	
				30% or more		10	10
2. Width of primary Road							
20 feet or more		1		D. Roofing Material			
20 feet or less		3	3	Class A rated		1	
				Class B rated		3	3
3. Accessibility				Class C rated		4	
Road grade 5% or less		1		Not rated		10	
Road grade 5% or more		3	3				
				E. Fire Protection – Water Source			
4. Secondary Road Terminus				500 GPM hydrant within 1,000 feet		1	
Loop roads, cul-de-sacs with outside turning radius of 45 feet or greater		1		Hydrant farther than 1,000 feet or draft site		2	2
Cul-de-sac turnaround radius is less than 45 feet		2		Water source within 20 minutes, round trip		5	
Dead-end roads 200 feet or less in length		3		Water source farther than 20 minutes, but less than 45 minutes round trip		7	
Dead-end roads greater than 200 feet in length		5	5	Water source farther than 45 minutes, round trip		10	
				F. Existing Building Construction Materials			
5. Average Lot Size				Noncombustible siding/deck		1	
10 acres or larger		1		Noncombustible siding/combustible deck		5	
Larger than 1 acre, but less than 10 acres		3		Combustible siding and deck		10	10
1 acre or less		5	5				
				G. Utilities			
6. Street Signs				All underground utilities		1	
Present				One underground, one above ground		3	3
Not present		1		All above ground		5	
		5	5				
B. Vegetation							
1. Fuel Types				TOTAL FOR SUBDIVISION		69	
Light		1		Rating Scale			
Medium		5		Moderate Hazard		40-59	
Heavy		10	10	High Hazard		60-74	
2. Defensible Space				Extreme Hazard		75+	
70% or more of site		1					
30% or more, but less than 70%		3					
Less than 30% of site		5	5				

Wildfire Hazard Rating Form
-Subdivision-

Name of Subdivision: Buhman/Leaning Oak		Date: July 16, 2003	
County: Napa	Size (Acres): 44.53	# of Lots: 15	
Rating: Moderate Hazard	Comments:		
	Points		Points
A. Subdivision Design		C. Topography	
1. Ingress/Egress		1. Predominant Slope	
Two or more primary roads	1	8% or less	1
One road	3 3	More than 8%, but less than 20%	4
One way in, one way out	5	20% or more, but less than 30%	7
		30% or more	10 10
2. Width of primary Road		D. Roofing Material	
20 feet or more	1	Class A rated	1
20 feet or less	3 3	Class B rated	3 3
3. Accessibility		Class C rated	4
Road grade 5% or less	1	Not rated	10
Road grade 5% or more	3 3		
		E. Fire Protection – Water Source	
4. Secondary Road Terminus		500 GPM hydrant within 1,000 feet	1 1
Loop roads, cul-de-sacs with outside turning radius of 45 feet or greater	1	Hydrant farther than 1,000 feet or draft site	2
Cul-de-sac turnaround radius is less than 45 feet	2	Water source within 20 minutes, round trip	5 5
Dead-end roads 200 feet or less in length	3	Water source farther than 20 minutes, but less than 45 minutes round trip	7
Dead-end roads greater than 200 feet in length	5 5	Water source farther than 45 minutes, round trip	10
		F. Existing Building Construction Materials	
5. Average Lot Size		Noncombustible siding/deck	1
10 acres or larger	1	Noncombustible siding/combustible deck	5 5
Larger than 1 acre, but less than 10 acres	3 3	Combustible siding and deck	10
1 acre or less	5	G. Utilities	
		All underground utilities	1
6. Street Signs		One underground, one above ground	3 5
Present		All above ground	5
Not present	1 1		
	5		
B. Vegetation			
1. Fuel Types		TOTAL FOR SUBDIVISION	42
Light	1 1	Rating Scale	
Medium	5	Moderate Hazard	40-59
Heavy	10	High Hazard	60-74
2. Defensible Space		Extreme Hazard	75+
70% or more of site	1 1		
30% or more, but less than 70%	3		
Less than 30% of site	5		

Wildfire Hazard Rating Form
-Subdivision-

Name of Subdivision: Foster/Hilton/Grandview		Date: July 16, 2003	
County: Napa	Size (Acres): 41.94	# of Lots: 37	
Rating: Moderate Hazard	Comments:		
	Points		Points
A. Subdivision Design		C. Topography	
1. Ingress/Egress		1. Predominant Slope	
Two or more primary roads	1	8% or less	1
One road	3 3	More than 8%, but less than 20%	4
One way in, one way out	5	20% or more, but less than 30%	7
		30% or more	10 10
2. Width of primary Road		D. Roofing Material	
20 feet or more	1	Class A rated	1
20 feet or less	3 3	Class B rated	3 3
3. Accessibility		Class C rated	
Road grade 5% or less	1	Not rated	10
Road grade 5% or more	3 3		
4. Secondary Road Terminus		E. Fire Protection – Water Source	
Loop roads, cul-de-sacs with outside turning radius of 45 feet or greater	1	500 GPM hydrant within 1,000 feet	1 1
Cul-de-sac turnaround radius is less than 45 feet	2	Hydrant farther than 1,000 feet or draft site	2
Dead-end roads 200 feet or less in length	3	Water source within 20 minutes, round trip	5 5
Dead-end roads greater than 200 feet in length	5 5	Water source farther than 20 minutes, but less than 45 minutes round trip	7
		Water source farther than 45 minutes, round trip	10
5. Average Lot Size		F. Existing Building Construction Materials	
10 acres or larger	1	Noncombustible siding/deck	1
Larger than 1 acre, but less than 10 acres	3 3	Noncombustible siding/combustible deck	5 5
1 acre or less	5	Combustible siding and deck	10
6. Street Signs		G. Utilities	
Present		All underground utilities	1
Not present	1 1	One underground, one above ground	3 5
	5	All above ground	5
B. Vegetation			
1. Fuel Types		TOTAL FOR SUBDIVISION	
Light	1 1		42
Medium	5	Rating Scale	
Heavy	10	Moderate Hazard	40-59
2. Defensible Space		High Hazard	60-74
70% or more of site	1 1	Extreme Hazard	75+
30% or more, but less than 70%	3		
Less than 30% of site	5		

Wildfire Hazard Rating Form
-Subdivision-

Name of Subdivision: Montecito		Date: July 16, 2003	
County: Napa	Size (Acres): 236.57	# of Lots: 100 (Approximate)	
Rating: High Hazard	Comments:		
	Points		Points
A. Subdivision Design		C. Topography	
1. Ingress/Egress		1. Predominant Slope	
Two or more primary roads	1	8% or less	1
One road	3	More than 8%, but less than 20%	4
One way in, one way out	5	20% or more, but less than 30%	7
		30% or more	10
			10
2. Width of primary Road		D. Roofing Material	
20 feet or more	1	Class A rated	1
20 feet or less	3	Class B rated	3
		Class C rated	4
3. Accessibility		Not rated	10
Road grade 5% or less	1		
Road grade 5% or more	3	E. Fire Protection – Water Source	
		4. Secondary Road Terminus	
		500 GPM hydrant within 1,000 feet	1
		Hydrant farther than 1,000 feet or draft site	2
	1	Water source within 20 minutes, round trip	5
	2	Water source farther than 20 minutes, but less than 45 minutes round trip	7
	3	Water source farther than 45 minutes, round trip	10
	5		
	5	F. Existing Building Construction Materials	
5. Average Lot Size		Noncombustible siding/deck	1
10 acres or larger	1	Noncombustible siding/combustible deck	5
Larger than 1 acre, but less than 10 acres	3	Combustible siding and deck	10
1 acre or less	5	G. Utilities	
		All underground utilities	1
6. Street Signs		One underground, one above ground	3
Present	1	All above ground	5
Not present	5		
B. Vegetation			
1. Fuel Types		TOTAL FOR SUBDIVISION	64
Light	1	Rating Scale	
Medium	5	Moderate Hazard	40-59
Heavy	10	High Hazard	60-74
		Extreme Hazard	75+
2. Defensible Space			
70% or more of site	1		
30% or more, but less than 70%	3		
Less than 30% of site	5		

Wildfire Hazard Rating Form
-Subdivision-

Name of Subdivision: Stonecrest/Ashlar		Date: July 16, 2003		
County: Napa	Size (Acres): 97.16	# of Lots: 20		
Rating: Moderate Hazard	Comments: The end of Ashlar is narrower than Stonecrest			
	Points		Points	
A. Subdivision Design		C. Topography		
1. Ingress/Egress		1. Predominant Slope		
Two or more primary roads	1	1	8% or less	1
One road	3		More than 8%, but less than 20%	4
One way in, one way out	5		20% or more, but less than 30%	7
			30% or more	10
2. Width of primary Road		D. Roofing Material		
20 feet or more	1	1	Class A rated	1
20 feet or less	3		Class B rated	3
			Class C rated	4
3. Accessibility		E. Fire Protection – Water Source		
Road grade 5% or less	1		500 GPM hydrant within 1,000 feet	1
Road grade 5% or more	3	3	Hydrant farther than 1,000 feet or draft site	2
			Water source within 20 minutes, round trip	5
			Water source farther than 20 minutes, but less than 45 minutes round trip	7
			Water source farther than 45 minutes, round trip	10
			F. Existing Building Construction Materials	
4. Secondary Road Terminus		G. Utilities		
Loop roads, cul-de-sacs with outside turning radius of 45 feet or greater	1		All underground utilities	1
Cul-de-sac turnaround radius is less than 45 feet	2		One underground, one above ground	3
Dead-end roads 200 feet or less in length	3		All above ground	5
Dead-end roads greater than 200 feet in length	5	5		
5. Average Lot Size		TOTAL FOR SUBDIVISION		
10 acres or larger	1			52
Larger than 1 acre, but less than 10 acres	3	3	Rating Scale	
1 acre or less	5		Moderate Hazard	40-59
6. Street Signs		High Hazard		
Present	1	1	Extreme Hazard	60-74
Not present	5			75+
B. Vegetation				
1. Fuel Types				
Light	1			
Medium	5			
Heavy	10	10		
2. Defensible Space				
70% or more of site	1			
30% or more, but less than 70%	3	3		
Less than 30% of site	5			

Technology/Terror Hazards

Hazardous Materials

A wide variety of hazardous materials are present in Napa County. These materials are stored, used in manufacturing and agriculture, and moved by truck, train and pipeline. The materials may be poisonous, corrosive, explosive or flammable. The poison effect may be due to chemical, radioactive or biological properties of the materials. The physical state may be as a solid, fine powder, liquid or gas, perhaps under great pressure. Quantities range from a few grams in a test tube to large storage tanks. The Napa County Department of Environmental Management is the designated administering agency for the County Area Hazardous Material Monitoring Program. In the event of a spill or release, this agency should be notified immediately.

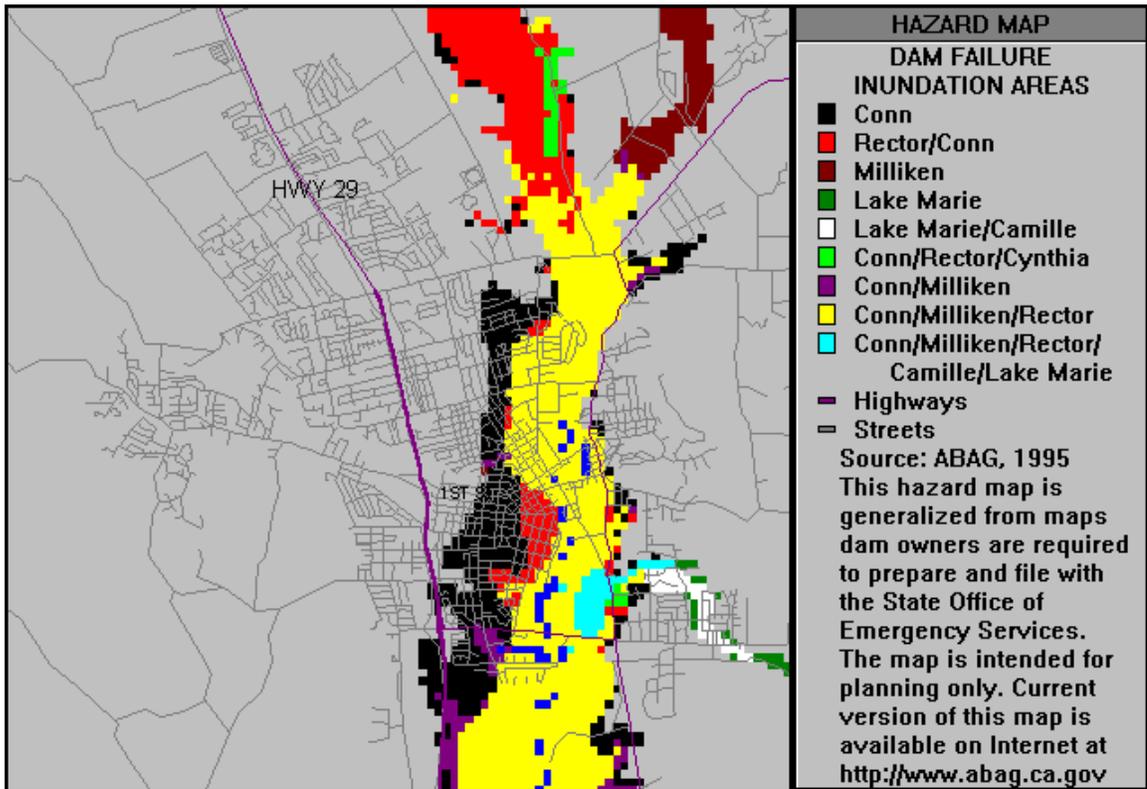
The table on the following page demonstrates the known level fixed threats that exist within the City. Numerous other sources are also found in smaller quantities throughout the City and County especially in agricultural facilities.

City of Napa Acutely Hazardous Materials Facilities List (AHM)				
Rank	HP#	Facility Name/Address	AHM	Amount
1.	0277	Queen of the Valley Hospital/1000 Trancas Street	Carbon dioxide Nitrogen	3400 CF 3810 CF
2.	1331	Dey Laboratories/2751 Napa Valley Corporate Drive	Acetylestine Hydrochloric Acid	2500 Lbs 1500 Gal
3.	1172	Kaiser Clinic/3285 Claremont Way	Liquid Oxygen Nitrous Oxide	517 CF 404 CF
4.	1096	Napa County Farm Supply/4407 Solano Avenue	Sulphur Ureacarloadamide	4800 Lbs 5000 Lbs
5.	1023	Airgas, Northern CA & NV/568 Northbay Drive	Acetylene Helium	17000 CF 25000 CF
6.	0207	Department of Transportation: Jefferson/3161 Jefferson Street	Gasoline Diesel #2	4000 Gal 4000 Gal
7.	0109	Piner's Welding Supply Services/1820 Pueblo Avenue	Acetylene Nitrogen	15000 CF 25000 CF
8.	0951	Northern California Diagnostics Lab/2748 Jefferson Street	Hydrogen-Helium Nox/N ₂	520 CF 910 CF
9.	0711	Golden State Vintners/1075 Golden Gate Drive	Sulfur Dioxide Calcium Hypochlorite Granular Propane Gas	400 Lbs 100 Lbs 500 Gal
10.	1612	Decrevel, Inc./1836 Soscol Avenue	Ferric Chloride	110 Gal
11.	1745	Highway Safety Products/935 Enterprise Way	Calcium Carbonate Polyvinyl Chloride Resin	50000 Lbs 4500 Lbs
12.	1550	California Peptide Research, Inc./918 Enterprise Way	Methylene Chloride Nitrogen	110 Gal 3500 CF
13.	2376	Electronic Data systems/2600 Napa Valley Corporate Drive	Diesel Sulfuric Acid	30000 Gal 16000 Lbs
14.	0871	Napa Valley Paint/527 Walnut Street	Vinyl Acrylic Latex Titanium Dioxide Ethanediol Solvent Blend	5000 Gal 10000 Lbs. 220 Gal 540 Gal
15.	0104	Redwood #76 2611169/2005 Redwood Road	Gasoline Lrasc Oil	12000 Gal 1000 Gal
16.	0046	Bell Products Inc./722 Soscol Avenue	Acetylene Carbon Dioxide Trichlorethare	500 CF 1200 CF 12 Lbs
17.	0030	Pacific Bell TC60T/650 Imperial Way	Sulfuric Acid	240 Gal
18.	0026	Napa Valley Register/1615 Second Street	Ammonium Thiosulfate Propane Treated Petroleum Oil	110 Gal 75 Gal 20000 Gal
19.	0117	PG&E Napa Service Center/300 Burnell Street	Methyl Chloroform Hydrogen Acetylene	365 Gal 500 CF 2500 CF
20.	0126	Pacific Bell: 1300 Clay Street/1300 Clay Street	Petroleum Hydrocarbon Lead/Acid Battery/Sulfuric Acid	5000 Gal 2454 Gal
21.	2531	PG&E Napa Service Center/300 Burnell Street	Sulfur Hexafluoride Sulfuric Acid	412 CF 32 Gal

Dam Failure

A dam failure will cause loss of life, damage to property and other ensuing hazards, as well as the displacement of persons residing in the inundation path. There could be loss of communications, damage to transportation routes and the disruption of utilities and other essential services. Public health would be a major concern. There are several dams in Napa County. The two that would cause the most inundation and damage if they were breached, while at full capacity, are the Hennessey Dam and Rector Dam.

The following map shows the potential dam inundation areas in the City of Napa.



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Terrorism

Due to its proximity to many of the Bay Area military, governmental, and financial institutions, the City of Napa is actively making preparations to respond to acts of terrorism. Despite recent advances in equipment and training, our ability to deal with problems within the City or provide mutual aid to the surrounding county is still limited. Due to its agricultural base, Napa may seem an unlikely target of terrorism, however, it could be subject to the fallout of a chemical or biological type attack targeted in one of many, highly populated cities located near its borders.

It is clear that the Federal government can and will provide many of the specialized resources to combat terrorism, however, the true effectiveness of any response to an act of terrorism will depend on what happens at the local public safety level.

Accordingly, the City of Napa has taken a number of positive steps in preparing the public safety response to acts of terrorism. Using funds from the 2003 Homeland Security Grant, the City of Napa has purchased some of the required specialized first responder equipment in order to effectively respond to acts of terrorism and protect life and property.

The City of Napa Police Department has recently received full-face respirators, which will be issued to all sworn and specialized personnel. In addition, members of the police department's Special Weapons and Tactics (SWAT) team will each be issued a Self Contained Breathing Apparatus (SCBA) in order to effectively respond to a WMD/Hazmat situation.

The Napa Police Department is actively coordinating terrorism response strategies with other local law enforcement agencies, fire and medical personnel. These strategies included full-scale, county wide, training scenarios involving responses to chemical and biological attacks on local targets.

The Napa Police Department is also encouraging first responder participation in local, state and federal training in the response and effects of terrorist events.

Problems with our current capability:

- In a major drug lab scenario, our law enforcement capability in the joint counter drug task force has the ability to ferret out drug labs, isolate them, investigate and contain the crime scene. The Napa County explosive device team can disarm or neutralize any explosive device or booby trap on scene. However, many of these sites are already chemically contaminated, and the Napa PD still does not have fully encapsulated chemical protective clothing and SCBAs, or the training to use them. The responders are at risk of exposure to toxic chemicals every time they respond to a drug lab. It is the goal of the Napa Police Department to increase its response capability and participation with the County Agencies in responding to these types of calls.

- Conversely, although the Napa Inter Agency Hazardous materials team has the equipment and training to safely operate in contaminated environment, they are not trained in maintaining the security or integrity of the crime scene, and are often not even called in during the initial take down of the lab. Secondly, our Hazmat Team due to time distance factors requires caches of pre-positioned equipment to minimize its response time to WMD or Hazardous materials events.

In a Weapons of Mass Destruction Scenario the problems are exacerbated. The incident response requires the ability to isolate the site, identify the agent, element or organism, preserve the integrity of the crime scene, maintain a safe perimeter and neutralize the threat. This will take a coordinated effort by the fire, law, environmental and public health sectors to successfully deal with these occurrences. The continuing gaps in training, equipment and interoperability that are serious in the case of drug labs could be deadly in the case of a WMD incident.

SECTION 4: MITIGATION STRATEGY

Mitigation strategies and action items were developed for the City of Napa through the process of public meeting and public-private partnership committees as mentioned in the first section of this Plan. The list of action items in this section identifies mitigation projects and includes a project ranking based upon time horizon, cost, risk, benefit and input from local stakeholders. The action items were developed to provide public policy makers with a list for potential implementation as mitigation resources, time, equipment and funding become available for the selected projects.

Local Hazard Mitigation Goals

The mitigation goals describe the overall direction that the City of Napa agencies, organizations, and citizens propose to take toward mitigating risk from natural and man-caused hazards. Goals and objectives of the Plan were developed during interviews and meetings with public officials and at public meetings. Napa hazard mitigation goals are identified below.

- Promote a flood safe community
- Promote an earthquake safe community
- Promote a fire safe community
- Promote a technology/terror safe community
- Create a more disaster resistant community

Cost-Benefit Review

City staff has attended FEMA provided training and used the Mitigation Benefit Cost Analysis (BCA) Toolkit to conduct benefit/cost analysis of potential mitigation projects (including the Borreo Building Seismic Retrofit Project). Staff has also reviewed *Developing the Mitigation Plan (FEMA 386-3)* and FEMA's *Guidelines for Benefit-Cost Analysis of PDM Applications* and is, therefore, knowledgeable of methods used for benefit cost analysis.

Each mitigation project considered by the City and prioritized in this PDM Plan included a staff level review to determine whether the project would likely exceed a 1.0 Benefit-Cost Ratio (BCR). Projects likely to exceed 1.0 BCR were included in the PDM plan; projects unlikely to exceed 1.0 BCR were not included. Therefore, while formal cost benefit review was not completed for all mitigation actions/projects during the prioritization process, the City is confident the mitigation projects included in the PDM Plan merit future consideration for PDM funding.

Mitigation Objectives and Action Items – How were they prioritized

The broad range of potential mitigation activities were considered, and below is a list of mitigation objectives and the actions identified by the City. After the Risk Assessment was completed, ideas for *Mitigation Action Items* were generated by individual employees, Supervisors and Managers in each Department, City Departments in general,

the Disaster Education Task Force and the Terrorism Working Group and from the Public Workshops. City Staff reviewed the list and items were chosen based on need, ability to meet a mitigation strategy, and a cost-benefit review. In addition, there was an effort to collaborate with Napa County and action items were chosen based on meeting a cooperative need. Similarly they were prioritized based on need, ability and ease of completion, level of importance to the community and a realistic ability to fund to action item. The City will review the Action Items on an annual basis and change, add or adjust them as necessary.

The following tables were developed to rank the mitigation projects using the following criteria; each project was assigned a priority rank, an approximate cost, a time horizon from commencement of the project to completion, and an assumption as to whether or not the project would be subject to CEQA or federal EIR requirements.

A more detailed explanation of the Objectives and Action Items follows the tables.

Description of Project	Priority	Time Horizon	Approximate Project Cost	Subject to CEQ/EIR
Flood Hazards Projects				
Complete approved Flood Control Project	1	Mid	\$136,000,000	Yes completed
Storm Drainage Projects	1	Long	\$8,552,600	Yes
Improve Countywide flood surveillance/early warning system	1	Near	\$100,000 per annum	Yes
Increase coverage of Storm Watch sensors	2	Near	\$25,000	Yes
Flood Plain Management	2	Mid	\$1,500,000	Yes
Distribute NOAA weather radios	3	Mid	\$25,000	No
Earthquake Hazard Projects				
Structural and Infrastructure Safety Program	1	Near	Current Funding	Yes
High Occupancy Structure Program	1	Near	\$100,000	Yes
Building Earthquake Safety Program	1	Near	\$55,000	No
Soils and Geological Studies for proposed City owned projects	2	Mid	Current Funding	No
City owned pre-earthquake code designed buildings	3	Mid	\$2,000,000	No
Fire Hazard Projects				
Develop Structural Protection Plans for Urban Interface Areas	1	Mid	\$100,000	No
Develop a Community Firewise Program	2	Near	\$200,000	No
Develop Defensive Space Ordinance	3	Near	\$50,000	Yes
Defensible Space Vegetation Program	3	Near	\$200,000	Yes
Technology/Terror Hazard Projects				
Improve existing communication systems	1	Mid	\$2,600,000	No
Implement Police Dept. respirator protection	1	Near	\$100,000	No
Training for Public Safety personnel regarding terrorism	1	Mid	\$100,000	No
Develop Civil Unrest Training Program	2	Near	\$10,000	No
Improve response to Mass Casualty/WMD incidents	2	Near	\$10,000	No
Develop Evacuation and Safety Maneuvers Program	2	Near	\$50,000	No
Increase agency coordination in dealing with terrorism	2	Mid	\$50,000	No
Improve support of Napa County Hazardous Device Team	3	Mid	\$100,000	No
Enhance programs hazards against dam failure	3	Mid	\$645,000	No

Description of Project	Priority	Time Horizon	Approximate Project Cost	Subject to CEQ/EIR
Technology/Terror Hazard Projects (continued)				
Hazard Materials Inspections and Inventory Program	2	Mid	\$150,000	No
Hazmat Impact Reduction Program	2	Mid	\$100,000	No
Reevaluate the short-term goals of Household Hazardous Waste Element	3	Near	Current Funding	No
Disaster Resistant Community Projects				
Upgrade CAD System	1	Long	\$2,500,000	No
Promote greater public awareness	1	Near	\$10,000	No
Maintain and equip primary Emergency Operations Center	1	Near	\$5,000 per annum	No
Improve Future Risk Analysis	1	Mid	\$2,500	No
Post Disaster Restoration Ordinances	2	Mid	\$5,000	No
Improve Risk Analysis	2	Mid	\$5,000	No
County-wide Confined Space and Water Rescue Team	3	Long	\$100,000	No
Establish the position of Disaster Coordinator for the City of Napa	2	Near	\$50,000	No
Prepare a secondary EOC site	3	Long	\$125,000	No

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Goal: To Promote a Flood Safe Community

Objective 1.1: The City shall support programs and methods to reduce the flooding of the Napa River and its tributaries.

Ideas for Implementation

Action 1.1.1: The City shall continue to assist the U.S. Army Corps of Engineers, Napa County Flood Control and Water Conservation District, other responsible agencies, and the public to maintain funding for the development of the Napa River Flood Protection Project.

Coordinating Organization: Community Development
Department and Public Works
Timeframe: Ongoing
Funding: \$136,000,000

Action 1.1.2: The City shall pursue funding for the design and construction of storm drainage projects to protect properties that will not be fully protected by the Flood Protection Project, including home elevations, property acquisitions, upstream storage such as detention basins, and channel widening with the associated right-of-way acquisitions, relocations and environmental mitigations. A complete breakdown of the projects can be found in Appendix B.

Coordinating Organization: Community Development
Department and Public Works
Timeframe: Ongoing
Funding: \$8,552,600

Objective 1.2: The City shall continue to provide for floodplain management to protect its residents and property from the hazards of development in the floodplain of the Napa River and its tributaries.

Ideas for Implementation

Action 1.2.1: The City shall continue to apply floodplain management regulations for development in the flood plain and floodway.

Coordinating Organization: Community Development
Department and Public Works
Timeframe: Ongoing
Funding: Current funding

Action 1.2.2: The City shall continue to participate in the Federal Emergency Management Agency's National Flood Insurance Program and Community Rating System.

Coordinating Organization: Community Development
Department and Public Works
Timeframe: Ongoing
Funding: Current funding

Action 1.2.3: The City shall continue to utilize the Federal Emergency Management Agency's Flood Insurance Rate Map to define the special flood hazard area, the floodway and the floodplain

Coordinating Organization: Community Development
Department and Public Works
Timeframe: Ongoing
Funding: Current funding

Action 1.2.4: The City shall balance the housing needs of its residents against the risk from potential flood-related hazards.

Coordinating Organization: Community Development
Department and Public Works
Timeframe: Ongoing
Funding: Current funding

Action 1.2.5: Should funding opportunities become available the City would encourage private property owners to participate in home elevation and acquisition programs.

Coordinating Organization: Community Development
Department and Public Works
Timeframe: Ongoing
Funding: \$1,500,000

Objective 1.3: Develop and improve the countywide flood surveillance and early warning system.

Ideas for Implementation

Action 1.3.1: The City and County of Napa have created an automated system of rain and flood gauges on the major tributaries and storm approach path to the greater Napa River Drainage system. The system is web enabled and accessible from both flood operation centers and the City website. The tool is constantly used for surveillance during the rainy season.

Coordinating Organization: City and County Public Works
Timeframe: Ongoing
Funding: \$100,000 per annum

Action 1.3.2: Increase coverage of Storm Watch sensors to include small streams that, due to land use changes, have demonstrated an impact on existing streams and urban flooding.

Coordinating Organization: City and County Public Works
Timeframe: 1 – 3 years
Funding: \$25,000

Action 1.3.3: Distribution of NOAA weather Radios to high risk, limited income families living in flood zones. Developing program of at cost NOAA radios for families in the various flood zones in Napa County.

Coordinating Organization: County Disaster Education Taskforce
Timeframe: 1 – 3 years
Funding: \$25,000

Goal: To Promote an Earthquake Safe Community

Objective 2.1: The City shall continue to require that all new buildings and infrastructure be designed and constructed to resist stresses produced by earthquakes.

Ideas for Implementation

Action 2.1.1: The City shall require all new buildings to conform to the structural requirements of the most recently adopted edition of the *California Building Code*.

Coordinating Organization: Community Development Dept.
Timeframe: Ongoing
Funding: Current funding

Action 2.1.2: The City shall continue to discourage the placing of facilities necessary for emergency services, major utility lines and facilities, manufacturing plants using or storing hazardous materials, high occupancy structures (such as multi-family residences and large public assembly facilities), or facilities housing dependent populations (such as schools and convalescent centers) within areas subject to very strong, violent, or very violent ground shaking, as indicated in the ABAG Ground shaking Intensity Maps on pages 45 and 47, unless no alternative is available and adequate mitigation measures can be incorporated into the project.

Coordinating Organization: Community Development Dept.
Timeframe: Ongoing
Funding: Current funding

Action 2.1.3: The City shall continue to require soils and geologic studies for proposed development with large client populations (such as schools and convalescent centers) within areas subject to very strong, violent, or very violent ground shaking, as indicated in the ABAG Shaking Intensity Map. Such studies should determine the actual extent of the seismic hazards, optimum location for structures, the advisability of special structural requirements, and the feasibility and desirability of a proposed facility in a specified location. Mitigation measures shall **be** incorporated as conditions of any project approval.

Coordinating Organization: Community Development Dept.
Timeframe: Ongoing
Funding: Current funding

Action 2.1.4: The City shall continue to require special construction features in the design of structures where site investigations confirm potential seismic hazards.

Coordinating Organization: Community Development Dept.
Timeframe: Ongoing
Funding: Current funding

Action 2.1.5: The City shall Continue to require that facilities necessary for emergency services be capable of withstanding a maximum credible earthquake from any of the seven known active faults in the region and remaining operational to provide emergency response.

Coordinating Organization: Community Development Dept.
Timeframe: Ongoing
Funding: Current funding

Objective 2.2: Identify options incentives and funding sources for structural retrofitting of structures that are identified as seismically vulnerable.

Ideas for implementation

Action 2.2.1: The City shall develop a program to educate the community on the various methods of retrofitting pre-earthquake code designed structures, which would include: workshops, literature and public safety announcements.

Coordinating Organization: Community Development Dept.,
 Redevelopment Dept.
Timeframe: 1 – 3 years
Funding: \$5,000

Action 2.2.2: The City shall analyze the feasibility of a mandatory versus voluntary seismic retrofit program for un-reinforced masonry buildings.

Coordinating Organization: Community Development Dept.
Timeframe: Ongoing
Funding: \$50,000

Action 2.2.3: The City shall pursue funding to seismically retrofit City-owned pre-earthquake designed structures.

Coordinating Organization: Community Development Department
Timeframe: 3 – 5 years
Funding: \$2,000,000

Action 2.2.4: The City shall encourage the study and rehabilitation of high occupancy structures (such as multi-family residences and large public assembly facilities) susceptible to collapse or failure in an earthquake.

Coordinating Organization: Community Development Dept.
Timeframe: Ongoing
Funding: \$100,000

Goal: To Promote a Fire Safe Community

Objective 3.1: The City shall compile and disseminate information regarding the fire threat to identified Urban Interface Areas.

Ideas for Implementation

Action 3.1.1: The City shall prepare a GIS based map of the fire access trails, firebreaks, water sources and structures within the City Limits and the immediate surrounding County land.

Coordinating Organization: Fire Department
Timeframe: Ongoing
Funding: Current funding

Action 3.1.2: The City shall prepare Structure Protection Plans for each of the identified Urban Interface Areas as they are updated.

Coordinating Organization: Fire Department
Timeframe: 1- 3 years
Funding: \$100,000

Objective 3.2: The City shall encourage implementation of wildfire mitigation activities in a manner consistent with the goals of promoting sustainable ecological management and community stability.

Ideas for implementation

Action 3.2.1: The City shall develop a defensible space vegetation program that is proposed to provide for the clearing or thinning of non-fire resistive vegetation along 10 feet of access and evacuation roads and driveways.

Coordinating Organization: Fire Department, Community Development Department and Property Owners
Timeframe: 1 – 3 years
Funding: \$50,000

Action 3.2.2: The City shall provide an annual and ongoing vegetation management such as the *City's Weed Abatement* program to prohibit the spread of wildfire in ground and aerial fuels. To assist homeowners in developing defensible space, this program may include roadside collection and chipping.

Coordinating Organization: Fire Department, Community Development Department and Property Owners
Timeframe: 1 – 3 years
Funding: \$200,000

Objective 3.3: The City shall attempt to decrease the potential risk associated from wildfires within the City Limits and surrounding area through a variety of actions.

Ideas for Implementation

Action 3.3.1: The City shall continue to review new development in high fire hazard areas to assure that adequate access roads, onsite fire protection systems, signage, flame-retardant building materials, and fire breaks are provided as needed.

Coordinating Organization: Fire Department, Community Development Department and Property Owners
Timeframe: Ongoing
Funding: Current funding

Action 3.3.2: The City shall develop a comprehensive defensive space ordinance to minimize risk in the interface zone. The ordinance is expected to include homeowner insights regulatory requirements and best practices. The ordinance will incorporate the *Hazardous Fire Areas Fire Protection Standard*.

Coordinating Organization: Fire Department, Community Development Department and Property Owners
Timeframe: 1 – 3 years
Funding: \$50,000

Objective 3.4: The City shall increase communication, coordination and collaboration between wildland/urban interface property owners, local and county planners, and fire prevention crews and officials to address risks, existing mitigation measures, and state and federal assistance programs to create a more Firewise community.

Ideas for Implementation

Action 3.4.1: The City shall encourage owners and occupants of single-family residences to have fire plans and practice evacuation routes.

Coordinating Organization: Fire Department, Community Development Department and Property Owners
Timeframe: Ongoing
Funding: Current funding

Action 3.4.2: The City shall consider certifying someone as a Fire Safe Specialist so they can prepare fire protection plans including defensible space, vegetation management, construction requirements, site analysis and water systems.

Coordinating Organization: Fire Department
Timeframe: 1 – 3 years
Funding: \$50,000

Action 3.4.3: The City shall develop criteria and a process for a Fire Protection Plan.

Coordinating Organization: Fire Department
Timeframe: 1 – 3 years
Funding: \$5,000

Action 3.4.4: The City shall investigate the development and adoption of minimum standards to locate, design and construct buildings and structures or portions thereof for the protection of life and property, to resist damage from wildfires, and to mitigate building and structure fires from spreading to wildland fuels.

Coordinating Organization: Fire Department, Community Development Department and Property Owners
Timeframe: 1 – 3 years
Funding: \$10,000

Action 3.4.5: Encourage the formation of a community-based approach to wildfire education and action through the *Fire Wise Program*.

Coordinating Organization: Fire Department, Community Develop Dept., CDF, City Council and Property Owners
Timeframe: 1 – 3 years
Funding: \$135,000

Goal: Promote a Technology/Terror Safe Community

Objective 4.4: Encourage training for Public Safety personnel in understanding what terrorism is and the risk associated with such an incident.

Ideas for Implementation

Action 4.1.1: Encourage first responder participation in attending available local, state and federal agency training on the effects of terrorist events. Training should include a better understanding on the potential outcomes associated with a terrorist event, and the ability to recognize the presence of, and identify, criminal activity or terrorism in an emergency. Training should also include information on weapons of mass destruction and chemical, biological, and nuclear hazards.

Coordinating Organization: Napa Police Department
Timeframe: 1 – 3 years
Funding: \$100,000

Objective 4.2: Increase inter- and intra-agency coordination on potential terrorist activity.

Ideas for Implementation

Action 4.2.1: Improve and increase the exchange of information related to terrorist activity between the Napa Police Department and local, state and federal law enforcement agencies. This can be accomplished by participating in County- and State-wide committees, and researching potential technology based programs.

Coordinating Organization: Napa Police Department
Timeframe: 1 – 3 years
Funding: \$50,000

Objective 4.3: Improve support of the Napa County Hazardous Device Team.

Ideas for Implementation

Action 4.3.1: Identify and train personnel who can assist the Napa County Sheriff Department Hazardous Device Team. Currently the team provides service for Napa County residents as well as residents of the City of Napa. The major services provided by the team include: investigation of suspicious packages, render safe operations performed on explosive devices, disposal of found explosive materials and explosive chemicals, collection of evidence at bombing scenes, and technical assistance for the Napa Police Department SWAT Team.

Coordinating Organization: Napa Police Department
Timeframe: 3 – 5 years
Funding: \$100,000

Objective 4.4: Implement police department respirator protection and training program

Ideas for Implementation

Action 4.4.1: Establish a respiratory Protection and Training Program to protect first responder health from airborne hazards or potentially hazardous materials during the performance of their work.

Coordinating Organization: Napa Police Department
Timeframe: 1 – 3 years
Funding: \$100,000

Objective 4.5: Develop training to improve response to civil unrest and riots.

Ideas for Implementation

Action 4.5.1: Improve the strategic response to civil unrest and riots through increased training and awareness. Utilizing the department’s SWAT Team, coordinate a mutual training day with the Napa Sheriff’s Department SWAT Team focusing on team tactics and response to civil unrest.

Coordinating Organization: Napa Police Department
Timeframe: 1 – 3 years
Funding: \$10,000

Objective 4.6: Improve response to Mass Casualty/WMD Incidents.

Ideas for Implementation

Action 4.6.1: Increase the Napa Police Department response to mass casualty and weapons of mass destruction incidents by participating in realistic, countywide, full-scale exercises to test the effectiveness of first responders.

Coordinating Organization: Napa Police Department
Timeframe: 1 – 3 years
Funding: \$10,000

Objective 4.7: Improve existing communication systems to effectively deal with acts of terrorism and civil unrest.

Ideas for Implementation

Action 4.7.1: Upgrade existing Computer Aided Dispatch and Records Management System. Build an inter operability CAD/RMS and telecommunication resources between County-wide Public Safety agencies

Action 4.7.2: Increase the number of Mobile Data Computers. Develop automated scheduling program to ensure personnel coverage in the event of a terrorist act.

Coordinating Organization: Napa Police Department
Timeframe: 3 – 5 years
Funding: \$2,600,000

Objective 4.8: The City shall reevaluate, modify if necessary, and implement changes to the short-term goals of the *Household Hazardous Waste Element*.

Ideas for Implementation

Action 4.8.1: Evaluate the goals of the Household Hazardous Waste Element on an annual basis through review, citizen comments and surveys.

Action 4.8.2: Continue the practice of the “hazardous waste drop off day” program.

Coordinating Organization: Public Works
Timeframe: 1 – 3 years
Funding: Current Funding Available

Objective 4.9: Enhance strategies that will limit damage to life and property secondary to a hazardous materials incident.

Ideas for Implementation

Action 4.9.1: Evaluate and develop procedures for “Shelter in Place” vs. “Evacuation” of public buildings, schools and hospitals.

Coordinating Organization: Department, Public Works,
Community Development
Department and County
Environmental Health Department
Timeframe: 3 - 5 years
Funding: \$10,000

Action 4.9.2: Develop preplans of hazardous material target hazards and make available to responding agencies.

Coordinating Organization: Department, Public Works,
Community Development
Department and County
Environmental Health Department
Timeframe: 3 – 5 years
Funding: \$90,000

Objective 4.10: Minimize the potential threat of a serious hazardous materials incident within the City Limits by developing a Hazardous Materials Inspection and Inventory Program.

Ideas for Implementation

Action 4.10.1: Collect and analyze hazardous materials incident data by Reporting District to determine the critical threats.

Coordinating Organization: Public Works, Fire Department, Napa County Fire Department and County Environmental Health Department
Timeframe: 3 – 5 years
Funding: \$25,000

Action 4.10.2: Institute and maintain a Hazardous Materials Inspection Program.

Coordinating Organization: Public Works, Fire Department, Napa County Fire Department and County Environmental Health Department
Timeframe: 3 – 5 years
Funding: \$60,000

Action 4.10.3: Institute and maintain a Hazardous Materials Inventory Program.

Coordinating Organization: Public Works, Fire Department, Napa County Fire Department and County Environmental Health Department
Timeframe: 3 – 5 years
Funding: \$60,000

Action 4.10.4: Evaluate the ability to institute and enforce hazardous materials transportation routes through the City Limits.

Coordinating Organization: Public Works, Fire Department, Napa County Fire Department and County Environmental Health Department
Timeframe: 3 – 5 years
Funding: \$5,000

Action 4.10.5: Consider policies and ordinances that reduce mixed zoning and create buffer zones between hazard and populated areas.

Coordinating Organization: Public Works, Fire Department, Napa County Fire Department, Community Development Department and County Environmental Health Department
Timeframe: 3 – 5 years
Funding: Current funding

Objective 4.11: Require all sensitive facilities (facilities housing large numbers of people who have restricted mobility, i.e., hospitals, nursing homes, day care facilities, assisted care facilities, jails, etc.) to maintain and regularly update emergency response plans identifying safety procedures and evacuation routes.

Ideas for Implementation

Action 4.11.1: Develop a program to identify evacuation routes and procedures for all sensitive facilities and implement programs to practice evacuation and safety maneuvers.

Coordination Organization: Napa Fire Department, Community Development Department and Public Works
Timeframe: Ongoing
Funding: \$50,000

Objective 4.12: Enhance outreach and education programs aimed at mitigating, reducing or preventing the hazards from dam failure.

Ideas for Implementation

Action 4.12.1: Provide education and distribute information to the community regarding flood preparedness from dam failure.

Action 4.12.2: Continue to support the education and awareness programs developed and distributed by public service organizations such as Red Cross and the Napa County Disaster Education Task Force.

Action 4.12.3: Provide through the public education division of the NFD people and materials to facilities requiring assistance.

Action 4.12.4: Request the State to minimize the risk to the City of damage from inundation resulting from failure of Rector Reservoir Dam by maintaining the dam in a safe condition.

Coordination Organization: Napa Fire Department, Disaster Education Task Force and Public Works
Timeline: Ongoing
Funding: Current Funding Available

Objective 4.13: Integrate updated information and improved technical analysis of Dam Failure into Policy and Procedure.

Ideas for Implementation

Action 4.13.1: Update the City Water Division’s Emergency Response Plan to include new information received from an updated Vulnerability Assessment.

Action 4.13.2: Conduct a risk analysis emphasizing the threat of terrorist activity and implement recommendations.

Action 4.13.3: Maintain a program of reservoir dam safety review and continue to cooperate with the State Division of Dam Safety in addressing any needed dam maintenance or structural improvements.

Coordination Organization: Public Works, Community Development Department, and Napa Police Department
Timeframe: Ongoing
Funding: \$645,000

Goal: To Create a Disaster Resistant Community

Objective 5.1: The City shall promote greater public awareness and understanding of natural hazards.

Ideas for Implementation

Action 5.1.1: Provide community education through service programs offered by the Napa City/County disaster education task force.

Coordinating Organization: Fire Department and Napa County Disaster Education Task Force
Timeframe: Ongoing
Funding: \$10,000

Action 5.1.2: The City shall support the addition of a mandatory hazards education program to the state required SEMS curricula.

Coordinating Organization: Fire Department and Napa County Disaster Education Task Force
Timeframe: Ongoing
Funding: Current funding

Action 5.1.3: The City shall continue to support the education and awareness programs developed and distributed by public service organizations such as the Red Cross.

Coordinating Organization: Fire Department and Napa County Disaster Education Task Force
Timeframe: Ongoing
Funding: Current funding

Objective 5.2: The City shall investigate alternative communications networks to avoid reliance on the commercial telephone system.

Ideas for Implementation

Action 5.2.1: The Fire and Police Departments shall develop a plan in conjunction with the County for the use of existing and planned radio systems to coordinate mutual aid.

Action 5.2.2: Upgrade radio system on field units that do not have capability to communicate on pre designated channels.

Action 5.2.3: The City shall work with the telephone company to enable the City to declare a Telephone Communication Alert to prevent overload of the telephone system in the event of an emergency.

Action 5.2.4: Upgrade the Computer aided Dispatch (CAD) system.

Coordinating Organization: Fire Department, Police Department, Public Works, Finance Department and City Clerk
Timeframe: 5 – 7 years
Funding: \$2,500,000

Objective 5.3: The City shall review City resources and efforts to maintain a state of readiness in the event of an emergency.

Ideas for Implementation

Action 5.3.1: The City shall coordinate the revision of the City of Napa Disaster Management Plan to address local needs and to satisfy all state and federal emergency management system requirements.

Coordinating Organization: Fire Department, All City Departments, Public Works and Finance Department
Timeframe: Ongoing
Funding: Current funding

Action 5.3.2: The City shall coordinate regular citywide training exercises that rehearse the procedures established by the Disaster Management Plan in order to maintain optimum readiness for disasters.

Coordinating Organization: Fire Department, All City Departments, Public Works and Finance Department
Timeframe: Ongoing
Funding: \$5,000

Action 5.3.3: The City shall maintain and equip an Emergency Operations Center (EOC) for immediate availability in the event of a disaster.

Coordinating Organization: Fire Department, All City Departments, Public Works and Finance Department
Timeframe: Ongoing
Funding: \$5,000 per annum

Action 5.3.4: As funding becomes available, secure a site and the necessary equipment to operate a back-up Emergency Operations Center.

Coordinating Organization: Fire Department, All City Departments, Public Works and Finance Department
Timeframe: 1 – 3 years
Funding: \$125,000

Action 5.3.5: The City shall hire a permanent part time disaster coordinator to help facilitate disaster programs in the City of Napa.

Coordinating Organization: Fire Department, All City Departments, Public Works and Finance Department
Timeframe: 1 – 3 years
Funding: \$50,000

Action 5.3.5: The City will collect data to complete and improve future risk analysis efforts

Coordinating Organization: Fire Department, Public Works
Timeframe: 1 – 3 years
Funding: \$5,000

Objective 5.4: The City shall develop mechanisms in advance of a major emergency to cope with the subsequent rebuilding and recovery phases.

Ideas for implementation

Action 5.4.1: The City shall prepare ordinances and regulations to expedite post-disaster restoration and rebuilding, including, but not limited to, interim zoning ordinances adopted pursuant to of Government Code Section 65858. Such ordinances and regulations could be activated in the post-disaster phase.

Coordinating Organization:	Fire Department, Public Works, Building Department and City Attorney
Timeframe:	1 – 3 years
Funding:	\$5,000

Objective 5.5: Explore opportunities to participate in Mutual-Aid Agreements with the County, CDF, and other related agencies.

Ideas for Implementation

Action 5.5.1: Explore the possibility of creating a joint “Confined Space Rescue Team”.

Coordinating Organization:	Fire Department
Timeframe:	3 – 5 years
Funding:	\$50,000

Action 5.5.2: Explore the possibility of creating a joint “Water Rescue Team”.

Coordinating Organization:	Fire Department
Timeframe:	3 – 5 years
Funding:	\$50,000

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SECTION 5: PLAN MAINTENANCE PROCEDURES

The City of Napa Hazard Mitigation Plan will be used to prioritize projects. Mitigation projects will be considered for funding through federal and state grant programs, and when other funds are made available to the City. The City Disaster Committee will be the coordinating agency for project implementation. The Napa Fire Department and Public Works Department will be responsible for mitigation project administration.

A number of state and local regulations and policies form the legal framework to implement the City of Napa's hazard mitigation goals and projects. A list of these Regulations and Plans can be found at the end of this section.

Plan Maintenance

The Plan will be maintained by formal process to ensure that the Napa Hazard Mitigation Plan remains an active and relevant document. The Plan maintenance process includes a schedule for monitoring and evaluating the Plan and producing a Plan revision every five years. This section describes how the City will integrate public participation throughout the Plan maintenance process.

Monitoring, Evaluating And Updating The Plan

The Napa Hazard Mitigation Plan will be reviewed every year, or sooner as deemed necessary by knowledge of new hazards, vulnerabilities, or other pertinent reasons. The review will determine whether a Plan update is needed prior to the required five-year update. The Plan review will identify new mitigation projects and evaluate the effectiveness of mitigation priorities and existing programs.

The Napa Fire Department will be responsible for scheduling a meeting of the Napa City Disaster Committee every year to review and update the Plan as needed. The meeting will be open to the public and advertised in the local newspaper and local radio stations to solicit public input. The public will have the opportunity to review the goals and mitigation projects at these meetings, review changing hazard situations in the City, and changes in state or federal policy relating to this Plan to ensure that it addresses current and expected needs.

The City Disaster Committee and public will also review the risk assessment portion of the Plan to determine if this information should be updated or modified, given any newly available data. The list of critical facilities will also be reviewed and enhanced with additional details.

The Disaster Committee will develop status reports detailing the success of various mitigation projects, difficulties encountered, success of coordination efforts and which strategies should be revised. These status reports will be published on the Napa City

web site and an executive summary will be published in the local newspaper to update the citizens of Napa.

The Napa Fire Department, with the assistance of other City Departments, will be responsible for the five-year update of the Plan, and will submit to the City Council and public for review and approval. Before the end of the five-year period, the updated Plan will be submitted to the State Hazard Mitigation Officer and the FEMA for acceptance. The Fire Department will notify all holders of the City Plan when changes have been made.

Implementation through existing Planning Mechanisms

Within six months of formal adoption of the Napa City Hazard Mitigation Plan, mitigation goals will be incorporated into future versions of the Napa City Emergency Plan. Meetings of the City Council and public hearings will provide an opportunity for local officials to report back on the progress made on the integration of mitigation planning elements into City planning documents and procedures.

The City adopts a capital improvement program as part of its two-year budget. The next capital improvement program update will occur in 2005. Capital improvement programs included in the Hazard Mitigation Plan will be reviewed with all others recommended by Departments in coming up with a set of CIP recommendations for the next budget cycle.

The City updates its General Plan periodically (typically every 7-10 years, with minor updates occurring more frequently). The last comprehensive update was adopted in December 1998. Programs and policies found in the Health and Safety Element have been closely coordinated with those in the Hazard Mitigation Plan to assure that they are consistent. Any future updates of the Hazard Mitigation Plan (or the General Plan) will also be coordinated so that they reinforce each other.

The City adopted a comprehensive Zoning Ordinance update in 2003. The Zoning Ordinance implements the General Plan and includes a: FP *Floodplain Overlay District* approved by FEMA, and a Flood Evacuation Area requirement beyond that which FEMA requires covering properties within the floodplain. Other zoning site development regulations used in Napa to reduce site development hazards include:

- building creek setbacks, erosion control standards and standards for protection of riparian corridors;
- a specific strict process for early geotechnical review of projects in the West Napa fault Zone;
- requirements for fire hazard reduction plans in identified fire hazard areas.

The Community Development Department, Building Division, updates its local building codes periodically and has adopted the most recent edition of the California Building Code in accordance with the Hazard Mitigation Plan recommendation relating to seismic safety. The Community Development Department also reviews development projects

against General Plan policies and programs, local area plan standards and zoning regulations.

Continued Public Involvement

Napa is dedicated to involving the public directly in review and updates of the Napa Hazard Mitigation Plan. Copies of the Plan will be catalogued and kept at all appropriate agencies in the City as well as at the Main Public Library.

Public meetings will be held annually and as part of the required five-year update of the Plan. The meetings will provide a forum for public input to the Plan.

Checklist for Annual Review of the Hazard Mitigation Plan

Point of Contact:	Local Plan Reviewed by:
Title:	
Agency:	
Phone Number:	

PLAN REVIEW CRITERIA REFERENCE PAGE #	ITEMS TO BE REVIEWED	LOCATION IN THE PLAN	COMMENTS
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PLANNING PROCESS

Documentation of the Planning Process	Is the City continuing to document the planning process, how it was prepared, who was involved and how.		
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RISK ASSESSMENT

Identifying Hazards	Are there new hazards threatening the City?		
Profiling Hazard Events	1. Can the hazard assessment be updated? 2. Has the jurisdiction experienced a hazard event since the last review?		
Assessing Vulnerability: Identifying Hazards	Is there new information regarding the types and numbers of existing and future buildings,		

	infrastructure and critical facilities located in the City?		
ASSESSING VULNERABILITY: ESSTIMATING LOSSES	Is there a change in the potential dollar losses to vulnerable structures?		
Assessing Vulnerability: Analyzing Development Trends	Describe any changes to land uses and development trends. Do mitigation options need to be considered?		

MITIGATION STRATEGY

Local Hazard Mitigation Goals	Do the mitigation goals need to be changed or updated?		
Identification and Analysis of Mitigation Measures	1. Describe any Actions Items that have been completed. 2. Are there new Action Items that need to be added? 3. Are there any changes to existing Action Items?		
Implementation of Mitigation Measures	Are there changes to the action plan describing how the actions identified will be prioritized, implemented, and administered?		

PLAN MAINTAINANCE PROCEDURES

Monitoring, Evaluating and Updating the Plan	State when the plan will be reviewed in the future.		
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Continued Public Involvement	Describe how the community was involved in the review of this plan.		
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The Disaster Committee will develop status reports detailing the success of various mitigation projects, difficulties encountered, success of coordination efforts and which strategies should be revised. These status reports will be published on the Napa City web site and an executive summary will be published in the local newspaper to update the citizens of Napa.

SECTION 6: FEDERAL, STATE & LOCAL REGULATIONS & POLICIES

Federal Environmental Protection & Historic Preservation Laws:

- National Environmental Policy Act (NEPA)
- Executive order 11990 Wetland Protection
- Executive Order 11988 Floodplain Management
- Clean Water Act (Section 404)
- Clean Water Act (Section 401)
- Executive Order 12898 Environmental Justice
- Wild and Scenic Rivers Act
- National Historic Preservation Act
- Endangered Species Act

California Environmental Protection & Historic Preservation Laws:

- California Environmental Quality Act (CEQA)
- Farmland Protection Act
- Coastal Zone Management Act

To be inserted from the State of California OES

The City of Napa recognizes that environmental compliance and historic preservation are essential components of the mitigation project planning and approval process. The City is committed to examining each proposed mitigation measure and project to determine if there are any environmental or historic issues that would require studies or reviews. The City will be compliant with federal, state and local laws and regulations including but not limited to the following:

Local Ordinances

Napa Municipal Code:

- Title 17 Zoning Ordinance: regulations governing uses and setting development standards including but not limited to Chapter 17.38 Floodplain Overlay district, Chapter 17.52 Site and Use Regulations. This latter chapter includes Seismic/Landslide Hazard Area regulations, Wetland and Creek Regulations and the River/Napa Creek Flood Protection Project Regulations.
- Chapter 8.28 Hazardous Materials
- Chapter 13.10 – 13.12 Moderate and Severe Water Shortage Regulations
- Chapter 15.50 Standard City Mitigation Measures and Project Conditions which the City establishes through Policy Resolution 27.
- Chapter 15.52 Historic Preservation
- Uniform Building Code
- Uniform Fire Code
- General Plan Policy Document
- US Army Corps of Engineers, Napa River/Napa Creek Flood Protection Project General Design Manual and Supplemental EIR/EIS, 1997
- City of Napa Water System Optimization and Master Plan Final EIR, West Yost & Associates, 1997

APPENDIX A

CITY OF NAPA

CAPABILITY TO RESPOND

AND

CRITICAL FACILITIES

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CITY OF NAPA CAPABILITY TO RESPOND TO HAZARDS

The City of Napa uses the Standardized Emergency Management System (SEMS) to respond to hazardous situations. All Employees are each trained in SEMS to the level that is appropriate for their position and responsibility. In a major disaster The Emergency Operations Center (EOC) is activated with the City Manager functioning as the Director of Emergency Services and the resources from the Fire, Police, Public Works and Community Resources functioning under the Operations Section. All field resources follow an Incident Action Plan in order to meet the defined objectives. If Mutual Aid is required it is requested through the Operational Area as outlined in the California Master Mutual Aid Agreement. The following information outlines the capabilities of the City of Napa to manage hazards.

Fire Department

The Napa Fire Department has 56 sworn personnel, 7 non-sworn and 20 Reserve Firefighters for a total of 81 personnel. The department has four Fire Stations and staffs four Paramedic Engines, one Truck Company and the Battalion Chief. Minimum Staffing is thirteen with three person companies. The department has a Hazardous Material Team, a Water Rescue Team and a Fire Investigation Team.

Napa Fire Department Inventory

EQUIPMENT	Fire Station 1					Fire Station 2		Fire Station 3				Fire Station 4			
	E1	T1	U1	E5	P1	E2	OES252	E3	E6	P3	Haz Mat	E4	E7	P4	Boat 1& 2
TYPE	I	TRK	UTILITY	I	IV	I	I / II	I	I	IV		I	I	IV	
JAWS		X	X												
AIR BAGS		X													
CLASS A FOAM	X			EDUC	X		X	X	EDUC	X		EDUC	EDUC	X	
CLASS B FOAM	X			EDUC		X		X	EDUC			EDUC	EDUC		
LTS PORTABLE	X	X	X	X		X	X	X	X			X	X		
LTS TOWER															
WATER VAC			X												
CO DETECTOR		X													
THERMAL IMAGER															
CIRCULAR SAW			X												
FAN(S)	EJ	X	2			EJ		EJ				EJ			
SALVAGE COVER	2	4	6	2		2	2	2	2			2	2		
STOKES		X													
SWIFTWATER RESCUE	X	X				X		X				X			
ROPE RESCUE	X	X	X	X		X	X	X	X			X	X		
PORTABLE PUMP							X								
CHAIN SAW		2	2			X	X								
PORTABLE TANK															
MATTRESS COVER		2	2	1		X		X	X			X	X		
ACETYLENE PACK			X												

Law Enforcement

The Napa Police Department has 78 sworn Personnel, 59 non-sworn for a total of 127 personnel. The department has a SWAT team, a Boat Patrol, a Civilian Safety Team, a Hostage Negotiations Team and a Canine Program.

Patrol Cars	Trucks	Vans	SWAT Van	Transport. Truck	Motorcars	Boat	K-9
23	6	1	1	1	5	1	2

Public Works

Public works oversees the following departments; Administrative Services, Bridges and Urban Drainage, Engineering Services, Fleet Management, Property Management, Recycling/Waste Reduction, Street, Electrical and Communications, Transit, Transportation/Engineering and Water. The department is capable of providing trained personnel and equipment to assist in flood fighting, debris removal, evacuations, water and sanitation emergencies as well as assistance in other areas.

The Public Works and Community Resources Department join forces and work under the leadership of Public Works during a disaster. In addition they fill roles in the Logistics, Operations and Planning Sections of the Emergency Operation Center.

Sedan	Van	Pickup	Dump Truck	Water Truck	Truck	Forklift	Backhoe
6	9	52	25	1	4	2	5
Asphalt Roller	Tractor	Generator	Trailer	Excavator	Compressor	Street Sweeper	
3	1	9	15	1	12	3	

CRITICAL FACILITIES

NAPA CITY AND COUNTY GOVERNMENT BUILDINGS				
	Name	Address	City	Zip
1	Administration	1195 Third Street	Napa	94559
2	Hall of Justice	1125 Third Street	Napa	94559
3	Communications	1220 Fourth Street	Napa	94559
4	County Library	580 Coombs Street	Napa	94559
5	Juvenile Hall	2350 Old Sonoma Road	Napa	94558
6	Emergency Medical Services	1500 Third Street	Napa	94559
7	Soscol Professional Plaza	1710 Soscol Avenue	Napa	94558
8	Soscol Business Park	650 Imperial Way	Napa	94559
9	Soscol Office Building	1804 Soscol Avenue	Napa	94559
10	Carither's Building	1127 First Street	Napa	94559
11	Alexandria Building	1001 Second Street	Napa	94559
12	County Court House	825 Brown Street	Napa	94559
13	Family Support Legal	1546 First Street	Napa	94559
14	H&HS EMS	1721 First Street	Napa	94559
15	County Sanitation/Animal Shelter	942 Imola Avenue	Napa	94559
16	Health & Human Service/Public Health	2344 Old Sonoma Road	Napa	94559
17	H&HS SIU	1500 Third Street	Napa	94559
18	Napa Police Department	1539 First Street	Napa	94559
19	City Hall	955 School Street	Napa	94559
20	Community Services	1600 First Street	Napa	94559
21	Housing Authority/Economic Development	1600 Clay Street	Napa	94559

NAPA MEDICAL FACILITIES						
	Facility	Address	City	Zip Code	Phone Number	Type
1	Napa Valley Dialysis	1100 Trancas Street #267	Napa	94558	224-6533	Care Center
2	Piner's Care Center	1800 Pueblo Avenue	Napa	94558	224-7925	Care Center
3	Pleasant Care	2465 Redwood Road	Napa	94558	255-3012	Care Center
4	Roberts Nursing Home	3415 Browns Valley Road	Napa	94558	257-3515	Care Center
5	Urgent Care Ctr Of Napa	3230 Beard Road	Napa	94558	254-7778	Care Center
6	Napa Valley Dialysis	1100 Trancas Street #267	Napa	94558	224-6533	Care Center
9	Primrose Care Home	3698 Jefferson Street	Napa	94558	255-8594	Care Center
10	Adapt Day Treatment Program	1600 Myrtle Avenue	Napa	94558	253-9136	Clinic
11	Community Health Clinic Ole	935 Trancas Street # 4c	Napa	94558	254-1770	Clinic
12	Excel Quality Care	575 Lincoln Avenue #240	Napa	94558	426-6522	Clinic
13	Napa State Hospital	2100 Napa Vallejo Highway	Napa	94558	253-5260	Clinic
14	Rohlffs Manor	2400 Fair Drive	Napa	94558	255-9555	Clinic
15	Senior Life Care Inc	3460 Villa Lane	Napa	94558	224-2285	Clinic
16	Transitions-St Helena Hospital	1000 Professional Drive	Napa	94558	259-2840	Clinic
17	Queen Of The Valley Hospital	1000 Trancas Street	Napa	94558	252-4411	Hospital
21	A Hidden Knoll	3158 Browns Valley Road	Napa	94558	258-1873	Nursing Home
22	A'Egis Of Napa	2100 Redwood Road	Napa	94558	251-1409	Nursing Home

NAPA MEDICAL FACILITIES (continued)						
ID	Facility	Address	City	Zip Code	Phone Number	Type
23	Heart of Napa	2300 Brown Street	Napa	94558	226-1821	Nursing Home
24	Heart That Matters	68 Coombs Street #9	Napa	94559	252-7569	Nursing Home
25	Home Care Nurses Registry	1712 Jefferson Street	Napa	94558	255-8719	Nursing Home
26	Home Care Svc-Queen-Valley	1100 Trancas Street # 300	Napa	94558	257-4124	Nursing Home
27	Meadows Care Center	1900 Atrium Parkway	Napa	94558	257-4990	Nursing Home
28	Napa Nursing Center	3275 Villa Lane	Napa	94558	257-0931	Nursing Home
29	Sierra Vista Nursing & Rehab	705 Trancas Street	Napa	94558	255-6060	Nursing Home
30	Sunrise Assisted Living-Napa	3700 Valle Verde Drive	Napa	94558	255-1100	Nursing Home
31	Your Home Nursing Service	3188 Jefferson Street	Napa	94558	225-7800	Nursing Home

NAPA PUBLIC SAFETY FACILITIES						
ID	Facility	Address	City	Zip	Phone	Type
1	Napa Fire Prevention	1600 First Street	Napa	94559	257-9590	Fire
2	Napa Fire Department	1539 First Street	Napa	94559	257-9593	Fire
3	Napa City Police Department	1539 First Street	Napa	94559	257-9223	Police
4	Napa County Sheriffs Department	1195 Third Street	Napa	94559	253-4415	Police

PUBLIC/PRIVATE SCHOOL FACILITIES

Name	Address	City	Zip	Phone
Alta Heights Elementary School	15 Montecito Boulevard	Napa	94558	253-3671
Bel Aire Park Elementary School	3580 Beckworth Drive	Napa	94558	253-3775
Browns Valley Elementary School	1001 Buhman Avenue	Napa	94558	253-3761
Casa Montessori School	780 Lincoln Avenue	Napa	94558	224-1944
El Centro Elementary School	1480 El Centro Avenue	Napa	94558	253-3771
Justin-Siena High School	4026 Maher Street	Napa	94558	255-3615
McPherson Elementary School	2670 Yajome Street	Napa	94558	253-3488
Napa Adventist Junior Academy	2201 Pine Street	Napa	94559	255-5233
Napa High School	2475 Jefferson Street	Napa	94558	253-3711
Napa Valley Christian Academy	2645 Laurel Street	Napa	94558	252-2191
New Technology High School	920 Yount Street	Napa	94558	259-8557
Northwood Elementary School	2214 Berks Street	Napa	94558	253-3471
Phillips Elementary School	1210 Shetler Avenue	Napa	94558	253-3481
Pueblo Vista Elementary School	1600 Barbara Road	Napa	94558	253-3491
Redwood Middle School	3600 Oxford Street	Napa	94558	253-3415
River School	2447 Old Sonoma Road	Napa	94558	253-6813
Salvador Elementary School	1850 Salvador Avenue	Napa	94558	253-3476
Shearer Elementary School	1590 Elm Street	Napa	94559	253-3508
Silverado Middle School	1133 Coombsville Road	Napa	94559	253-3688
Snow Elementary School	1130 Foster Road	Napa	94558	253-3666
St Apollinaris Catholic School	3700 Lassen Street	Napa	94558	224-6525
St Johns Lutheran School	3521 Linda Vista Avenue	Napa	94558	226-7970
St Johns the Baptist School	983 Napa Street	Napa	94558	224-8388
Sunrise Montessori Elementary	1226 Salvador Avenue	Napa	94558	257-2392
Sunrise Montessori Of Napa	4149 Linda Vista Avenue	Napa	94558	253-1105
Trinity Grammer & Prep	2055 Redwood Road	Napa	94558	258-9030
Valley Oaks High School	1600 Myrtle Ave	Napa	94558	253-3791
Vintage High School	1375 Trower Avenue	Napa	94558	253-3601
Westwood Elementary School	2700 Kilburn Avenue	Napa	94558	253-3678
Napa Valley Charter School	575 Third Street	Napa	94559	252-5522
West Park Elementary	2315 W Park Avenue	Napa	94558	253-3516
Kolbe Academy	1600 F Street	Napa	94559	256-4306
Napa Valley College	2277 Napa-Vallejo Highway	Napa	94559	253-3000
Blue Oak School	1436 Polk Street	Napa	94559	261-4500
Oxbow School	530 – 3 rd Street	Napa	94559	255-6000
Harvest Middle School	2449 Old Sonoma Road	Napa	94559	259-8866

APPENDIX B

FLOOD MITIGATION ASSISTANCE PROGRAM CANDIDATE PROJECTS

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Flood Mitigation Assistance Program Candidate Projects

The Flood Mitigation Assistance Program (FMA) of the Federal Emergency Management Agency (FEMA) provides grants to communities for projects that reduce the risk of flood damage to structures that have insurance coverage. The City of Napa (City) has received a FMA 1999 Planning Grant to identify projects with the Napa Flood Control and Water Conservation District (District) that can be funded under the FMA program.

This chapter is limited to one aspect of the FMA program, to develop a recommended list of projects that meet the FMA criteria for funding. It is an outgrowth of West Yost & Associates' work on the Storm Drain Master Plan for the City and the Interior Drainage Study for the District.

Representatives from the City, Napa County Flood Control and Water Conservation District, State Office of Emergency Services and Federal Emergency Management Agency formed a Planning Grant Team to help manage the grant and to recommend projects for funding priority. West Yost & Associates (WYA), as consultant to the City is also a member of the committee. In its initial work, the committee reviewed the City's floodplain management ordinance in relation to the flood mitigation program and did not recommend any changes.

The City's FMA program is aimed at reducing repetitive flood losses. Properties with repetitive losses are defined as having two or more claims of at least \$1,000 paid by the National Flood Insurance Program. A map has been prepared by the City showing the location of repetitive loss properties.

Many of the repetitive loss properties were damaged by Napa River flooding. The flooding risk from the Napa River will be significantly reduced with construction of the Napa River Flood Protection Project (Project). Continuing flood threats will be from local drainage problems and from 100-year interior drainage that floods either by ponding in low areas or flowing overland at significant depths.

Ongoing Studies

Construction has begun on the Napa River and Napa Creek Flood Protection Project. A description of facilities is included in the Supplemental General Design Memorandum, of the Corps of Engineers, October 1998. The Flood Protection Project has the primary objective of providing protection from 100-year Napa River flooding by constructing setback levees and floodwalls. It will reduce the risk of flooding to many of the repetitive loss properties.

As part of the Flood Protection Project, the Corps analyzed the interior drainage flooding that would occur after the protection project was completed. Interior drainage projects were formulated and made part of the Flood Protection Project. The project will construct interior drainage facilities including three pump stations, culverts through the levees, and floodwalls and storm drains.

An analysis was conducted for the District that identified residual flooding from a 100-year runoff event. An interior, behind the levees, 100-year runoff will pond in low areas

and will cause flooding as it flows downhill toward one of the project's three large pump stations. Projects were recommended that would reduce the residual flooding area. Other areas, for economic reasons, will remain in the floodplain and await future development proposals.

The Planning Grant Team appreciates the importance of mapping floodplains caused by sources of flooding beyond the protection offered by the Flood Protection Project. The project provides protection from the Napa River and from residual interior flooding. There are other interior drainage problems that will cause ponding and flooding during major rainfall events. These additional areas should be mapped as floodplains by FEMA. It is recommended that the Corps of Engineers publish a pre-FIRM mapping notice as a disclosure to the general public before the map is adopted by the City Council.

The City conducted a Storm Drain Master Plan that investigated storm drains in the City that are larger than 30 inches in diameter, determined design flow and pipe capacity and recommended additional storm drain improvements to provide a 10-year level of protection. Improvements were identified and listed by priority. This work also resulted in the identification of potential problem areas from a 100-year runoff.

Structural Flood Control Measures

Flood control measures found to have the greatest potential for reducing the risk from flooding include storm drains and fill. Measures found to be less effective include upstream storage, floodwalls and levees, and pumps.

The upstream detention storage needed to reduce the relatively small areas of residual ponding is disproportionate to the benefits received. Floodwalls for individual properties were found to be uneconomical when compared to other measures. Pumps, also, were not considered because of location and high cost.

Additional storm drain capacity was often an effective solution. After detailed study, structural measures may be the most effective in many situations.

Non-Structural Flood Control Measures

Storm drain improvements are but one method of mitigating repeat flooding. Storm drain improvements are presented here as a base condition that establishes a workable plan and a cost against which other methods can be measured. Non-structural solutions, if found to be economical, may be preferred.

Nonstructural methods require field surveys, identification of specific properties affected, formulation of a plan for each property, preparation of cost estimates, and construction. Flood mitigation projects can be divided into six methodologies; structural solutions including storm drains, floodwalls and levees; elevation of structures above the base flood elevation (100 year flood level); wet floodproofing; relocation of structures; dry floodproofing; and demolition. Wet floodproofing and elevation are likely candidates in the City.

Flood mitigation projects are presented below. It is recommended that field surveys and feasibility studies be initiated to determine if non-structural methods would be more economical solutions.

Flood Problems and Mitigation Projects

Several problems have been identified and improvements proposed that will reduce the risk of flooding from interior runoff after the Napa River Flood Protection Project is complete. The following improvements, grouped by general areas within the City, will reduce residual flooding from a 100-year runoff.

Soscol Avenue, East Side of Napa River

The Flood Protection Project assumes interior flood waters will continue to flow overland and along City streets, eventually reaching the lowest point in the watershed. A storage basin would collect runoff and pumps would lift it to Tulocay Creek and the Napa River. Between its source and the pump detention basin, flooding will occur caused by excessive depth of flowing water and from ponding in low areas. At the lower end, the combination of a very flat Soscol Avenue and new commercial buildings effectively limit runoff from flowing into the proposed basin.

A series of projects is proposed to reduce residual flooding along Soscol Avenue from the Expo Fairgrounds to the South Napa Marketplace.

1. The storm drain at the north end of Juarez Street between Spring Street and the river is a combination pipe and open channel. Construction of a "sealed" drain to the river that will operate under pressure will assure that there is a positive outflow even during periods of high river stages and reduce the overland flow contributing to the Expo and Soscol Avenue flooding. If a pressurized storm drain is constructed for high stages, a second storm drain is needed to drain the lower shed to the river during low river stages.
2. A similar situation exists at Taylor Street where a pressurized storm drain could maintain outflow to the river and reduce the flood volume flowing to Expo and Soscol Avenue. With the pipe pressurized, a second pipe would be needed to drain Taylor Street during periods of low river stages.
3. Much of the overland flow resulting from a 100-year runoff and blocked outfalls to the river flows into the Third Street area and the Expo Fairgrounds. There is limited attenuation of peak flows because the topography only allows ponding to about two feet deep. Some control of this flood water is needed, either a drainage channel to convey the runoff or a detention basin to reduce downstream peaks.
4. Overland flow, up to 264-acre feet, tends to pond in Soscol Avenue and flood commercial properties on both sides of the street. As the depth increases, some water makes its way through parking lots, along Oil Company Road and overland to the Tulocay storage basin. To reduce flooding along Soscol Avenue and move floodwaters to the basin, a storm drain will be needed from Oil Company Road and Soscol Avenue to a point near the basin where the pipe can empty into an open channel and then to the basin.

5. Hydrology results show uncontrolled runoff from the 270-acre watershed east of Souza Lane and Silverado Trail to be 96-acre feet. A more detailed drainage study of this shed is needed to formulate projects to control this runoff and reduce the volume of floodwater flowing to Soscol Avenue.

A storm drain has been included to convey this runoff to the Tulocay basin but a detailed study should be undertaken before a large capital outlay is committed.

6. A wide swath of overland flow will remain. A coordinated approach to acquire flowage easements will be needed to assure the unobstructed flow of water. Lower buildings will remain subject to flooding. Surveys and possibly elevation and/or floodproofing is recommended.

Soscol Avenue, West Side of Napa River

Interior drainage north of Napa Creek will flow overland to a low point between the railroad tracks and Soscol Avenue. Pumps will remove the water to the river bypass, but without a storage facility, shallow street flooding will likely occur. Also, there are low areas that will not adequately drain to the pumps.

1. Without a significant pump storage basin, cycling units to minimize ponding becomes important. A balance must be obtained between running a pump dry and allowing water to pond to damaging depths. Field surveys are needed to develop the information needed to compute the depths of this short term flooding. Surveys are also needed north along Soscol to Jordan Lane.
2. Field surveys are needed to identify structure in the resident flood plain and to determine suitability for elevation and/or floodproofing.
3. A storm drain (30- and 36-inch) is needed to remove residual flooding near Jordan Lane, north of Lincoln Avenue and along lower Soscol Avenue. These may be candidate areas for nonstructural measures.

Riverside Drive

1. The Sea Scout building and the Napa Valley Yacht Club building on Riverside Drive are on the river side of the project levee and will not be protected by the flood protection project. This building must be surveyed and a decision made to elevate and/or floodproof.

Silverado Trail

1. Milliken Creek Inn on Silverado Trail will also not be protected by the project. Surveying is needed to obtain elevation data and allow a decision to elevate and/or floodproof.

Lincoln Avenue – Carolina Street to Jordan Lane

1. The residual floodplain includes several structures along Lincoln Street and on Carolina, Ida and Maplewood Streets. Two of these structures are described separately in numbers 13 and 14 below. Surveys will determine first floor elevation

and street grades. A drain will then be made to elevate and/or floodproof or do nothing.

2. The River City restaurant sits low along Lincoln Street in the floodplain. This structure will be included in the survey and the building may be elevated and/or floodproofed.
3. The Napa Small Animal Veterinary Hospital is on Lincoln Street in the Floodplain. This structure will be included in the survey and the building may be elevated and/or floodproofed.

Imola Avenue Basin

1. The area around the proposed Imola Basin needs field surveys to identify structure type and first floor elevations. Structures at risk from overland floodwaters draining to the basin should be identified.
2. Floodproofing becomes a potential solution in the area adjacent to the pumps. Field surveys are needed to determine first floor elevations.
3. Arboreo Street has difficulty with overland flow draining. A storm drain is needed to drain the Arboreo Street area to the new drain in South Coombs Street.
4. A low area near the south end of Brown Street must be drained to the Imola Basin. A storm drain is proposed for construction along South Coombs Street.
5. A 72-inch drain is proposed along Jefferson Street to the detention basin to alleviate excessive street flows.

River Glen – Pike Drive Drain

1. Field surveys are needed to develop the information needed to route flows into the Lake Park detention basin and pump station facilities.
2. Alternatives that involve a combination of increased pipe capacity and flowage easements need to be identified. A pipeline is proposed, but further studies may result in a better solution.

Salvador Channel

1. A detailed drainage study of the Salvador Channel is recommended. 100-year floodplains need to be developed and channel, levee and bridge needs should be identified so that the channel will contain a 100-year runoff.
2. Improvements need to be designed and plans and specifications prepared after completion of the Salvador Channel study.

Table T-1. Flood Mitigation Assistance – Proposed Projects

Project No.		Location	Action/Improvement	Quantity	Unit Price (dollars)	Cost (dollars)
Soscol Avenue East Side of River (Tulocay Creek Area)						
1	C	Spring St, Silverado Trail, to Napa River	Design and construct 48" pressure pipe Design and construct 48" drain Drain inlets	1,000 lf 800 lf 12 ea	404 307 7,000	404,000 246,000 84,000
2	C	Taylor Street	Design and construct 48" pressure pipe Design and construct 48" drain	1,250 lf 850 lf	404 307	505,000 261,000
3	C	Expo Fairgrounds	Design and construct drainage channel	1,500 lf	LS	300,000
4	C	Soscol Avenue to Tulocay wetlands	Construct a 48" drain to the basin Drainage Ditch Acquire Flowage Easements	2,200 lf 600 lf	307 LS	675,000 150,000 10,000
5	C	Oil Company Road watershed	Drainage study of City/County shed Design and construct 72" drain	— 1,600 lf	— 350	20,000 570,000
6	D	Soscol Avenue near Tulocay Creek	Field Surveys / Elevate Buildings - Five Commercial Structures	5	100,000	500,000
Soscol Avenue, West Side of River						
7	D	Survey structures and 1 st floor elevations	Field surveys	3 days	1,800	5,400
8	D	Soscol Ave. – Lincoln to Vallejo	Elevate and/or floodproof structures	—	—	1/
9	C	Jordan Lane – Soscol Ave. Construct drains	Construct 30" drain 36" drain s	1,800 lf 3,060 lf	225 263	405,000 805,000
Riverside Drive						
10	B	Sea Scout Building – Laurel & Riverside	Elevate Building or floodproof	1	100,000	100,000
Silverado Trail						
11	B	Milliken Creek Inn – 1815 Silverado Trail	Elevate Building or floodproof	1	100,000	100,000

Table T-1. Flood Mitigation Assistance – Proposed Projects, cont.

Project No.		Location	Action/Improvement	Quantity	Unit Price dollars	Cost dollars
Lincoln Avenue						
12	D	Buildings on Carolina, Ida & Maplewood Streets	Elevate Buildings or floodproof	16	60,000	960,000
13	B	River City Restaurant , 505 Lincoln	Elevate Building or floodproof	1	150,000	150,000
14	B	517 Lincoln Napa Small Animal Veterinary Hospital	Elevate Building or floodproof	1	100,000	100,000
Imola Avenue Basin, West Side of River						
15	D	Imola – South Coombs	Survey structures and 1 st floor elevations	1 day	1,800	1,800
16	D	South Coombs and Imola	Floodproof, elevate, and remove structures	—	—	1/
17	C	Arboreo Street	36" drain	250 lf	263	66,000
18	C	Brown Street – Elm Street, along South Coombs Street	36" drain 48" drain	800 lf 1,600 lf	263 307	210,000 491,000
19	C	Jefferson Street	72" drain	3,000 lf	356	1,068,000
River Glen – Trout Way						
20	D	River Glen - Trout Way	Survey structure, 1 st floor elevations, street profiles, design survey, Trout Way to Lake Park	3 days	1,800	5,400
21	C	Trout Way to Lake Park	Design and construct 36" drain	800 lf	203	210,000
Salvador Channel						
22	B	Big Ranch Rd to Solano Avenue	Conduct Drainage Study	—	—	150,000 ^{2/}
23	B	Big Ranch Rd to Solano Avenue	Construct channel and structure improvements	—	—	^{2/}

Notes: 1/ Survey data are needed to determine number of structures and if elevation or floodproofing is preferable.
 2/ Salvador Channel needs a detailed engineering study

The projects in Table T-1 will reduce the risk of residual flooding although not all the projects identified may be funded under FMA. There are properties that have a flooding history and that are located in areas where some flooding is expected after the Flood Protection Project is completed. After detailed study and surveys, these properties may be candidates for floodproofing or elevating. Some projects may be funded as part of the Flood Protection Project. Other projects may be financed as drainage improvements as part of the storm drain master plan improvements. All properties shown on the map as residual flood drainage properties are shown in Table T-2.

Conclusion

All of Proposed Projects significantly reduce the risk of flooding to properties in the lower areas behind the Flood Protection Project levees and floodwalls. Some of the proposed projects do not directly protect repetitive loss properties. Pre-design studies are recommended. Engineering studies and detailed cost estimates will result in more effective allocation of grant funds.

Table T-2. Properties Not Protected by Project

Street Number	Apt	Street
1038	1040	Vallejo St
904		Napa St
900		Vallejo St
880	884	Napa St
1546		Yajome
520		Third St
1916		Silverado Tr.

Table T-3 Properties Protected by the Project But May Be Subject to Residual Flooding

Street Number	Apt	Street
706		Carolina St
2027		Ida St
2022		Ida St
2006		Ida St
2002		Ida St
849		Jackson St
1746	1750	Tanen St
1835		Soscol Ave
1745		Soscol Ave
1045	#AB	Mc Kinstry St
1031	#A	Mc Kinstry St
645		First St
415		Oil Co Rd
583		Soscol Ave
419		First St
1017	1019	Juarez St
1015		Juarez St
301		First St
1004		Juarez St
600		Fourth St

Street Number	Apt	Street
842		Dewoody St
431		Taylor St
390		Taylor St
2134		Soscol Ave
670		Maplewood Ave
665		Maplewood Ave
669		Maplewood Ave
602		Lincoln Ave
500	#A	Lincoln Ave
505		Lincoln Ave
510		Northbay Dr
1710		Soscol Ave
625		Imperial Way
1100	25	Jordan Ln
218		Soscol Ave
1701		Soscol Ave
1098		Jordan Ln
1947		Soscol Ave
1790		Soscol Ave

Table T-4. Properties Protected by the Project and Not Subject to Residual Flooding

Street Number	Apt	Street
1333		Jefferson St
1821		Silverado Tr
1815		Silverado Tr
1543		Seminary Dr
1540	1542	Behrens St
1552		Behrens St
1302		Arroyo Dr
1365		Arroyo Dr
1355		Arroyo Dr
1345		Arroyo Dr
1325		Arroyo Dr
1315		Arroyo Dr