

CONTINUOUS EARTHQUAKE PREPAREDNESS STRATEGIC INVESTMENT OF RESOURCES FOR OPTIMAL RESPONSE

**Sixth Taiwan-US-Japan Workshop on
Water System Seismic Practices ~ October 2009**



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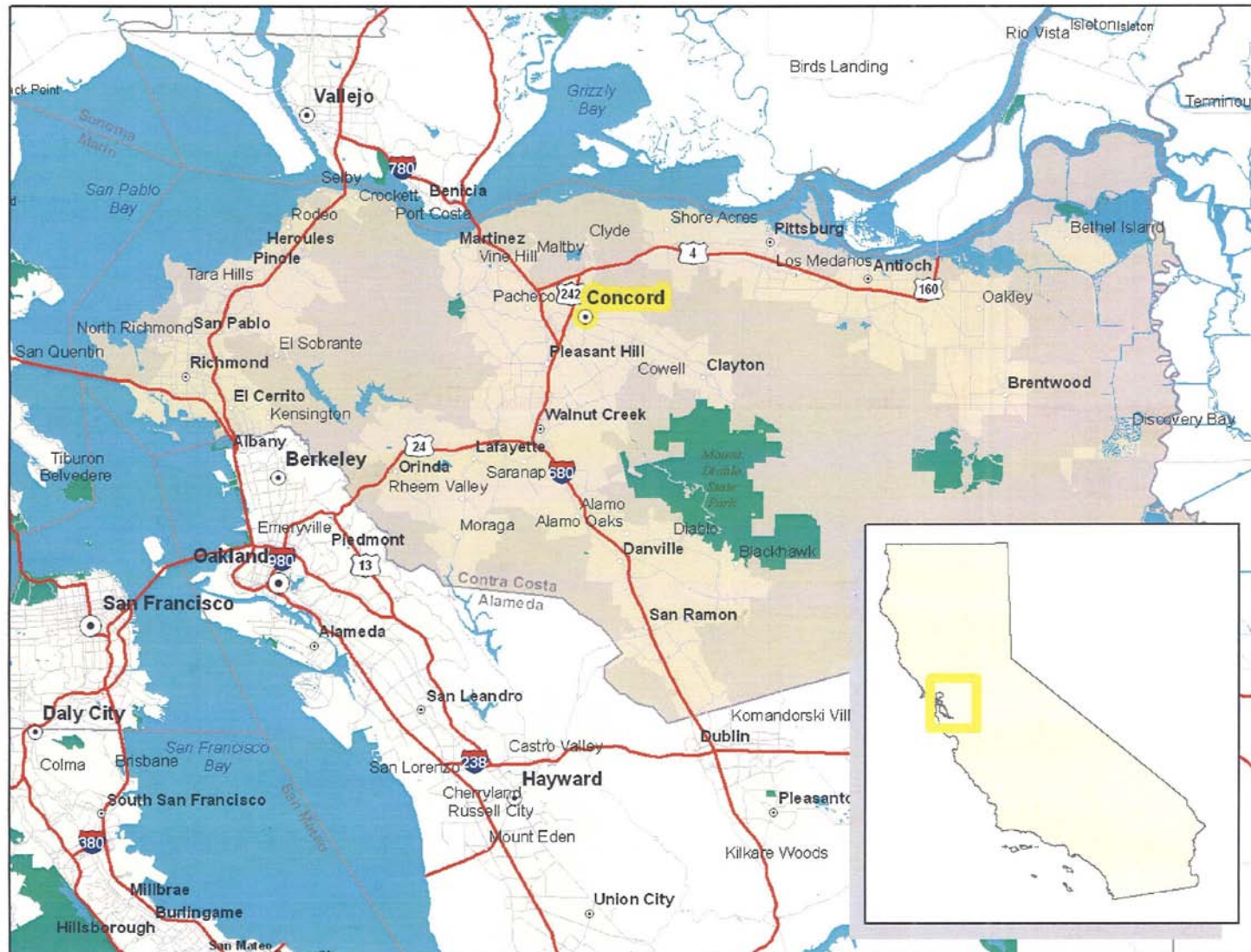
EARTHQUAKE PREPAREDNESS ~ STRATEGIC INVESTMENT OF RESOURCES FOR OPTIMAL RESPONSE

Introduction

- Over 550,000 Customers
- Convey both Treated and Untreated Water
- Customers: Municipalities, Residential, Industrial, Agricultural
- System includes:
 - 70-year old, 70-kilometer concrete lined canal
 - Source-Northern California Delta
 - 1,400 kilometers of pipeline
 - 41 treated water reservoirs; 36 treated water pump stations
 - 4 untreated water storage reservoirs
 - 3 water treatment plants (600 million litres per day)



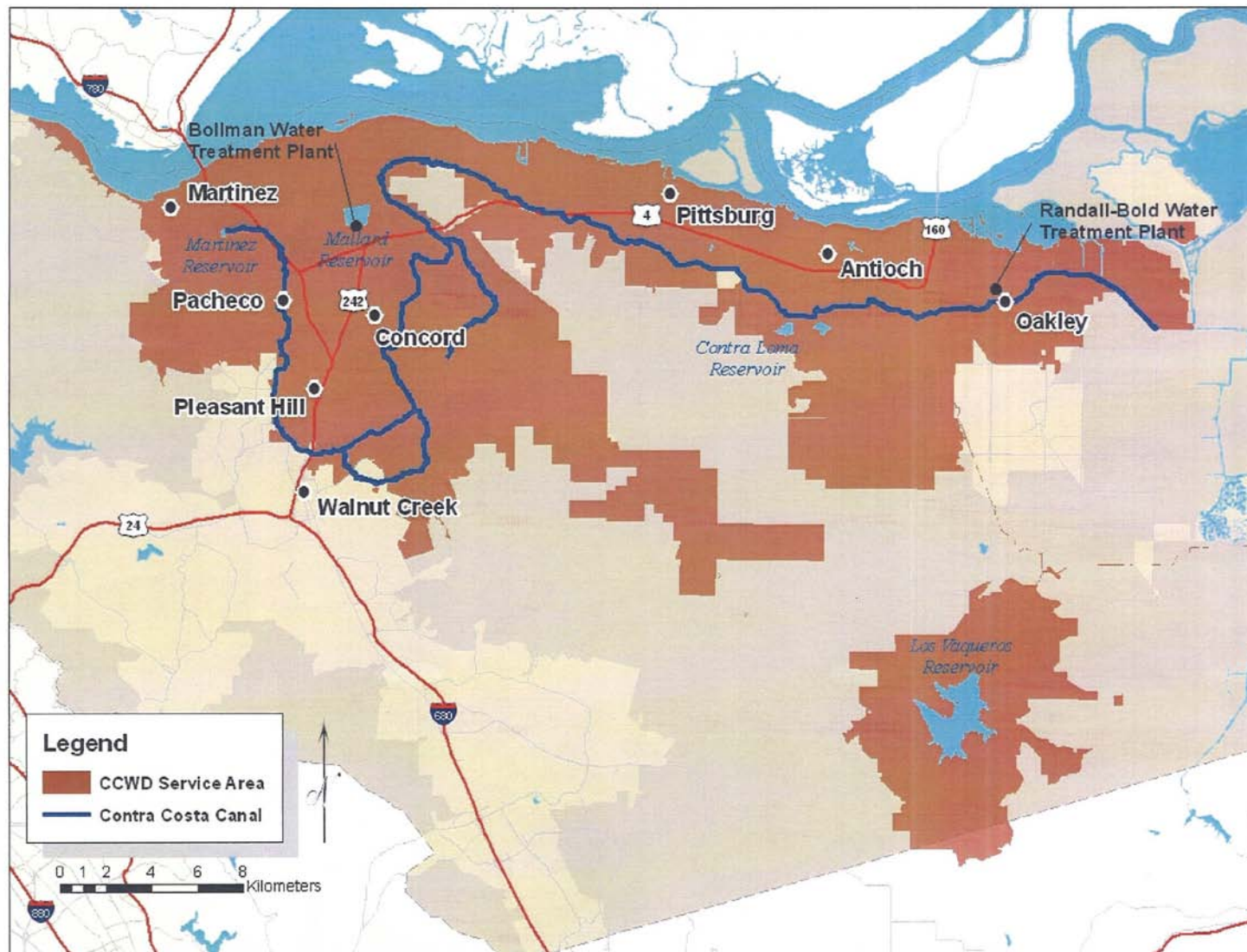
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Vicinity Map



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CCWD Service Area

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CCWD Preparedness Objective

- Sustainable Water System
 - Post-Earthquake Reliability



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Strategic Investments

- Infrastructure Upgrades – Capital Investments
- Continuous Facility Planning and Improvement
- Preparedness
 - Training
 - Planning
 - Practicing
- Strategic Alliances

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Capital Investments

- Seismic Reliability Improvements Program (SRIP) created to implement seismic reliability and design criteria
- Over \$200 million in capital and operational improvements identified to improve existing pumping and piping, storage and power systems to ensure reliable emergency operations following major disasters, particularly earthquakes

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Seismic Improvements – Implementation

- Major capital improvements
 - Backbone transmission pipelines
 - Backbone pumping
- Routine capital improvements: 10 years
 - Seismic only
 - Combined maintenance/operational/seismic
- 90% Treated Water
- 10 % Untreated Water

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Seismic Improvements – Treated Water

- New backbone transmission pipelines
- Facility structural retrofits
- Back up power connections
- Addition of seismically activated valves
- Strengthen pipeline supports and flexible connections
- Improved anchorage of system components
- Interties with adjacent water agencies
- External power generators at backbone pumping plants

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Seismic Improvements – Untreated Water

- Canal facility improvements (gates & lining replacements)
- Slope modifications (shallow the slopes)
- Backup power to key facilities
- Addition of untreated water pumping plant and piping

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Continuous Improvement Investments – Sharpening the Saw

- Ongoing capital investments ensure emergency reliability of facilities
 - Regularly review capital spending plan and update
 - New facilities designed for seismic performance
 - Existing facilities evaluated for deficiencies and improvements identified

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Earthquake Preparedness Investment-Learn from the Past

- Continuous earthquake response planning
- Study disaster responses
- Focus on key aspects and details related to your interests
 - What was done well?
 - What needs improvement?
- CCWD findings: Seven key difficulties

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Ability to Communicate is Reduced

- Direct damage to utility infrastructure
- Higher than normal demand for communication: systems “lock-up”
- People are confused in chaos and information is often incomplete or inaccurate

CCWD Plan

- Low band Radios: person-to-person
- Satellite phones
- Strengthen communication anchorage

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Outside Support is not Reliable

- Federal support is large and slow
 - Bureaucracy based, slow response
 - Unfamiliar with local needs
- State Offices
 - Not a lot of resources available for response
 - Unfamiliar with local needs

CCWD Plan

- Self-sufficiency
- Coordinate and plan with neighbors



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Transportation Systems Restricted

- Roads and bridges are damaged and destroyed
- Traffic control is mostly non-functioning
- Vehicle inventories are destroyed
- Outside support and response is needed, but clogs thoroughfares
- Security or military block access

CCWD Plan

- Pre-stage supplies and materials
- Radio system, call-in network (“hotline”)
- Reinforce facilities at major transportation corridors

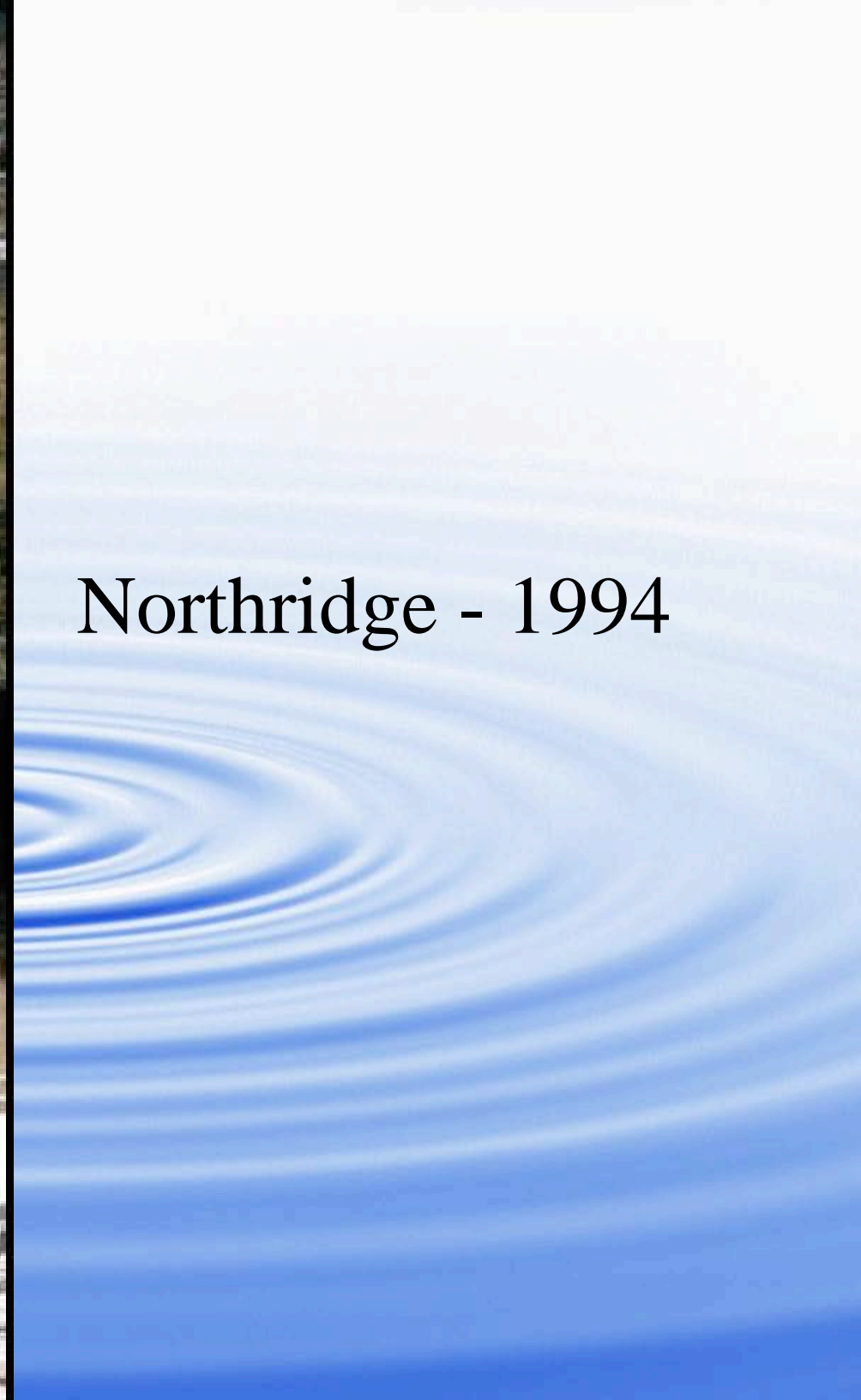




Loma Prieta - 1989



Northridge - 1994



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Power is Unreliable

- Power distribution poles and underground utilities damaged and non-functioning
- Heavy reliance on emergency power generators requires reliable fuel
- Lower standard of living
 - Heating and ventilation; appliances; computers and communication

CCWD Plan

- Emergency back-up power
- Backbone facilities
- Emergency response center

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Monetary Supply Reduced

- Financial services unavailable
- Cash is limited to cash on hand
- Cash is the only currency in some cases

CCWD Plan

- Emergency contracts in place
- Pre-deploy supplies, parts and materials
- Secure cash on hand

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Commerce Slows

- Direct damage to infrastructure, materials, equipment and supplies
- Individuals focus on personal needs, not available for business
- Inefficient monetary system

CCWD Plan

- CCWD staffing pre-deployment
- Emergency response contracts
- Cross train
- CCWD family support



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Safety and Security Reduced

- Direct damage to structures
- Leaking gas and fuel and other hazards
- Crime increases, police not available

CCWD Plan

- Secure all facilities (post 9/11/01)
- Reinforce CCWD facility hazards
- Train staff on safety and security
- Response teams, not individuals

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Earthquake Preparedness Investment - Response Plan

- Purpose clearly defined: provide the framework to direct an effective response
- Key resources
- Key responsibilities
- Expectations for responder
- Key meeting locations
- Organization chart
- Prepare necessary forms/standards/procedures

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Earthquake Preparedness Investment - Practice

- Response plan is the foundation for practice
- Practice scenarios simulating actual conditions
- Practice actual deployment of resources
- Practice with actual mapping and references
 - Keep maps current
 - Keep phone lists current
 - Make them easily available

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Earthquake Preparedness Investment - Practice

- Practice Regularly
- Form sub-teams to practice key responsibilities
- Keep exercises realistic
- Lessons learned from exercises are recorded and incorporated into response plan
- Keep emergency response plan current

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Earthquake Preparedness Investment - Train

- Training ensures learning beyond own experience and research
- Response team needs to share training lessons
- Send response team staff to assist actual disasters: battle test
- Develop network outside area: redundant support, different lessons
- Hire experienced responders to develop exercises and training
- Incorporate lessons into response plan

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Strategic Alliances Investment

- Concerted effort to coordinate effective emergency response
- Alliances with local agencies
 - East Bay Municipal Utility District
 - City of San Francisco
 - Santa Clara Valley Water District
- Regional collaboration emergency response exercise
 - Workforce planning
 - System response
 - Contracts
 - Training

(Cont'd....)



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Strategic Alliances Investment

- Large-scale emergency response exercise to develop improvements to:
 - Identify and share respective response plans
 - Practice scenario response between agencies
 - Identify mutual aid collaboration
 - Identify logistics and distribution of resources

(Cont'd....)



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Strategic Alliances Investment

- Large-scale emergency response exercise to develop improvements to:
 - Share emergency response operations centers
 - Coordinate public information and warnings
 - Pre-plan compliance with state and federal
 - Signatory to emergency compacts
 - Practice response with agencies
 - Agreements for prioritized assistance
 - Mutual aid agreements

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Conclusion

- All utilities will face disasters
 - CCWD: Strategic Investments
 - Capital Infrastructure
 - Ongoing capital maintenance and upgrades
 - Human Resources
 - Preparation
 - Training
 - Practice
 - Strategic Alliances
 - Constantly review and renew
- **Result: Make the difference when our customers need us the most**