



# Appendix C MITIGATION STRATEGY

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Appendix C: Mitigation Strategy contains the following documents in this order:

- Mitigation Strategy Guidance Criteria
- Mitigation Strategy HMPC #3 Meeting documentation
  - Meeting Agenda
  - Meeting Minutes
  - Sign-In Sheet
  - Meeting Presentation
- Mitigation Action Selection and Prioritization Criteria
- Typical Mitigation Actions by FEMA/Community Rating System Categories
- 2019 Mitigation Action Worksheet

## **Mitigation Strategy Guidance Criteria: Categories of Mitigation Measures Considered**

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The following categories are based on the Community Rating System.

- Prevention
- Emergency Services
- Property Protection
- Natural Resource Protection
- Structural Projects
- Public Information

## **Alternative Mitigation Measures per Category**

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### **Prevention**

Preventive measures are designed to keep the problem from occurring or getting worse. Their objective is to ensure that future development is not exposed to damage and does not increase damage to other properties.

- Planning
- Zoning
- Open space preservation
- Land development regulations





- Subdivision regulations
- Floodplain development regulations
- Stormwater management
- Fuels management, fire breaks
- Building codes
  - Firewise construction
- (also see Property Protection)

### **Emergency Services**

Emergency services protect people during and after a disaster. A good emergency services program addresses all hazards. Measures include:

- Warning (floods, tornadoes, ice storms, hail storms, dam failures)
  - NOAA weather radio all hazards
  - Sirens
  - Reverse 911
- Evacuation and sheltering
- Communications
- Emergency planning
  - Activating the emergency operations room (emergency management)
  - Closing streets or bridges (police or public works)
  - Shutting off power to threatened areas (utility company)
  - Holding children at school/releasing children from school (school district)
  - Passing out sand and sandbags (public works)
  - Ordering an evacuation (mayor)
  - Opening evacuation shelters (red cross)
  - Monitoring water levels (engineering)
  - Security and other protection measures (police)
- Monitoring of conditions (dams)
- Critical facilities protection (buildings or locations vital to the response and recovery effort, such as police/fire stations, hospitals, sewage treatment plants/lift stations, power substations)
  - Buildings or locations that, if damaged, would create secondary disasters, such as hazardous materials facilities and nursing homes
  - Lifeline utilities protection
  - Health and safety maintenance





## Property Protection

Property protection measures are used to modify buildings subject to damage rather than to keep the hazard away. A community may find these to be inexpensive measures because often they are implemented by or cost-shared with property owners. Many of the measures do not affect the appearance or use of a building, which makes them particularly appropriate for historical sites and landmarks.

- Retrofitting/disaster proofing
  - Floods
    - Wet/dry floodproofing (barriers, shields, backflow valves)
    - Relocation
    - Acquisition
  - Tornadoes
    - Safe rooms
    - Securing roofs and foundations with fasteners and tie-downs
    - Strengthening garage doors and other large openings
  - Drought
    - Improve water supply (transport/storage/conservation)
    - Remove moisture competitive plants (tamarisk/salt cedar)
    - Water restrictions/water saver sprinklers/appliances
    - Grazing on CRP lands (no overgrazing-see noxious weeds)
    - Create incentives to consolidate/connect water services
    - Recycled wastewater on golf courses
  - Earthquakes
    - Removing masonry overhangs, bracing, and other parts
    - Tying down appliances, water heaters, bookcases, and fragile furniture so they will not fall over during a quake.
    - Installing flexible utility connections that will not break during shaking (pipelines, too)
  - Wildland fire
    - Replacing building components with fireproof materials (roofing, screening)
    - Creating "defensible space"
    - Installing spark arrestors
    - Fuels modification
  - Noxious weeds/insects
    - Mowing
    - Spraying
    - Replacement planting
    - Stop overgrazing
    - Introduce natural predators
- Insurance





## Natural Resource Protection

Natural resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. In so doing, these activities enable the naturally beneficial functions of floodplains and watersheds to be better realized. These natural and beneficial floodplain functions include the following:

- Storage of floodwaters
- Absorption of flood energy
- Reduction in flood scour
- Infiltration that absorbs overland flood flow
- Groundwater recharge
- Removal/filtering of excess nutrients, pollutants, and sediments from floodwaters
- Habitat for flora and fauna
- Recreational and aesthetic opportunities

Methods of protecting natural resources include:

- Erosion and sediment control
- Wetlands protection
- Riparian area/habitat protection
- Threatened and endangered species protection
- Fuels management
- Set-back regulations/buffers
- Best management practices-Best management practices ("BMPs") are measures that reduce nonpoint source pollutants that enter the waterways. Nonpoint source pollutants come from non-specific locations. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, and other farm chemicals, animal wastes, oils from street surfaces and industrial areas and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams. BMPs can be implemented during construction and as part of a project's design to permanently address nonpoint source pollutants. There are three general categories of BMPs:
  - Avoidance-Setting construction projects back from the stream.
  - Reduction-Preventing runoff that conveys sediment and other water-borne pollutants, such as planting proper vegetation and conservation tillage.
  - Cleanse-Stopping pollutants after they are en route to a stream, such as using grass drainageways that filter the water and retention and detention basins that let pollutants settle to the bottom before they are drained
- Dumping regulations
- Water use restrictions
- Weather modification





- Landscape management

### **Structural Projects**

Structural projects have traditionally been used by communities to control flows and water surface elevations. Structural projects keep flood waters away from an area. They are usually designed by engineers and managed or maintained by public works staff. These measures are popular with many because they "stop" flooding problems. However, structural projects have several important shortcomings that need to be kept in mind when considering them for flood hazard mitigation:

They are expensive, sometimes requiring capital bond issues and/or cost sharing with Federal agencies, such as the U.S. Army Corps of Engineers or the Natural Resources Conservation Service.

- They disturb the land and disrupt natural water flows, often destroying habitats.
- They are built to a certain flood protection level that can be exceeded by a larger flood, causing extensive damage.
- They can create a false sense of security when people protected by a structure believe that no flood can ever reach them.
- They require regular maintenance to ensure that they continue to provide their design protection level.

Structural measures include:

- Detention/retention structures
- Erosion and sediment control
- Basins/low-head weirs
- Channel modifications
- Culvert resizing/replacement/maintenance
- Levees and floodwalls
- Fencing (for snow, sand, wind)
- Drainage system maintenance
- Reservoirs (for flood control, water storage, recreation, agriculture)
- Diversions
- Storm sewers

### **Public Information**

A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. These activities can motivate people to take protection

- Hazard maps and data





- Outreach projects (mailings, media, web, speaker's bureau)
- Library resources
- Real estate disclosure
- Environmental education
- Technical assistance

### **Climate Adaptation and Social Equity Strategies**

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Climate adaptation strategy guidance materials were distributed prior to and during the mitigation strategy planning session. Materials included the *California Adaptation Planning Guide (APG)*, a set of four complementary documents that provide guidance to support communities in addressing the unavoidable consequences of climate change. The documents provide a step-by-step process on adaptation strategy development. *California's Climate Adaptation Strategy: Safeguarding California Plan: 2018 Update* was also distributed prior to and during the mitigation strategy planning session. While information on climate change impacts was integrated into the LHMP Risk Assessment, the mitigation strategy planning session focused on discussing how climate change would affect major natural hazards in the City of Petaluma Planning Area. The HMPC was then able to review potential adaptation strategies that would help them meet adaptation needs. The APG documents provide a broad sampling of different policies and programs that address climate change. Several of the adaptation example policies and programs also focus on addressing environmental justice (EJ), reducing risk in disadvantaged communities, and promoting social equity. As a result, the HMPC considered various planning tools and resources to support compliance with California Government Code Section 65302 (Senate Bill 379). Subsection (g)(4) requires all cities and counties to include climate adaptation and resiliency strategies in the safety elements of their general plans.

### **Environmental Justice and Social Equity Strategies**

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HMPC members reviewed the *Senate Bill 1000 Implementation Toolkit: Planning for Healthy Communities*. The toolkit helped the HMPC consider various planning resources to support compliance with California Government Code Section 65302.10 and Senate Bill 1000. Senate Bill 1000, the Planning for Healthy Communities Act, mandates that cities and counties adopt an EJ element or integrate EJ goals, objectives, and policies into other elements of their General Plan. The HMPC discussed and developed various community engagement and outreach programs during the planning sessions, as well as programs that would better assess existing demographics in the City that may influence engagement, such as language access, age, and educational attainment. The intent of the strategies is to promote collaboration with community members and maintain effective relationships with Community-Based Organizations to ensure that hazard mitigation actions are prioritized in disadvantaged and vulnerable communities in Petaluma.

The resulting climate adaptation and social equity strategies were also considered during prioritization exercises. The policies and programs were then integrated into the mitigation strategy as specific actions tailored to fit the hazard mitigation, adaptation, and social equity needs of all of Petaluma's residents.





## HMPC Meeting #3 Agenda

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**Date:** 8 October 2019  
10:00 AM – 12:00 PM

**Meeting at:** City of Petaluma  
Public Works and Utilities Department  
Upstairs Conference Room  
202 North McDowell Boulevard  
Petaluma, CA 94954

**Project:** City of Petaluma Local Hazard Mitigation Plan

### **Subject/Purpose**

The purpose of the meeting is to review the goals and objectives for the LHMP and begin developing and prioritizing mitigation actions.

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1. Introductions
2. Review process and findings from risk assessment
3. Review and refine goals and objectives
4. Review possible mitigation actions and climate adaptation strategies
5. Discuss criteria for mitigation action selection and prioritization
6. Brainstorm Session #1: Develop new mitigation actions
7. Brainstorm Session #2: Prioritize mitigation actions
8. Schedule and Next Steps
9. Questions and Answers



# HMPC Meeting #3 Minutes

**Date/Time:** Monday 8 October 2019, 10:00 AM – 12:30 PM

**Location:** Upstairs Conference Room  
City of Petaluma  
Public Works and Utilities Department  
202 North McDowell Boulevard  
Petaluma, CA 94952

**Project No.:** SA19170580

**Written By:** Juliana Prosperi (Wood, Project Manager)

**Present:** Jeff Brislawn (Wood, Hazard Mitigation Lead)  
Diane Ramirez (City of Petaluma, Project Manager)  
Ron Klein (City of Petaluma, Police Department, Lieutenant)  
Cecilia A. Quiambau (City of Petaluma, HR/Risk and Safety Officer)  
Jessica Power (City of Petaluma, Fire Marshall)  
Daniel Herrera (City of Petaluma, Public Works and Utilities)  
Doug Hughes (City of Petaluma, Chief Building Official)  
Jason Beatty (City of Petaluma, Assistant Director Public Works and Utilities)  
Charlie Castillo (City of Petaluma, HR/Risk)  
Gina Benedetti Petnic (City of Petaluma, Floodplain Manager)

**Subject:** City of Petaluma Hazard Mitigation Planning Committee Meeting #3

## AGENDA TOPICS

This document is a record of attendance and a summary of the topics discussed at the above meeting including the following:

1. Introductions
2. Review process and findings from risk assessment
3. Review and refine goals and objectives
4. Review possible mitigation actions and climate adaptation strategies
5. Discuss criteria for mitigation action selection and prioritization
6. Brainstorm Session #1: Develop new mitigation actions
7. Brainstorm Session #2: Prioritize mitigation actions
8. Schedule and Next Steps
9. Questions and Answers

### 1. Introductions

Ms. Ramirez initiated the meeting and explained the purpose of the meeting was to further develop the mitigation strategy for the LHMP. Ms. Prosperi and Mr. Brislawn introduced themselves as the Wood Environment & Infrastructure Solutions consultants. There were several participants present at the meeting that were only present for a short period of time at the



previous meeting due to coordination associated with the planned power outages. The participants that attended are listed on the sign-in sheet (See Attachment A).

## **2. Review process and findings from risk assessment.**

Mr. Brislaw provided an overview of the hazards addressed in the second HMPC meeting. There were no further comments from the group, other than the need to further explore sea level rise models and scenarios to help further assess how sea level rise and tidal fluctuations may intensify flood hazards.

## **3. Review and refine goals and objectives**

Ms. Prospero reviewed the goals drafted in the previous meeting and explained she organized and categorized each goal by themes. She stated that they were five categories of goal statements focused on minimizing life and property damage, preserving the environment, public education and awareness, enhancing City staff coordination, and implementing the LHMP after adoption. During this time the HMPC had an opportunity to review and revise the goals. The group will have another opportunity to edit the goals during review of the plan. Goals are listed below:

- **Goal 1:** Minimize loss of life and property damage and protect people and property from hazards
- **Goal 2:** Preserve and protect Petaluma's environment as an efficient resource to build community resilience against natural hazards
- **Goal 3:** Educate and build community awareness on natural hazard risks and the importance of resiliency and emergency preparedness
- **Goal 4:** Enhance City staff coordination, training, and response during disasters and ensure City facilities and infrastructure provide safe places for the community to shelter during such events
- **Goal 5:** Implement the Local Hazard Mitigation Plan to prepare the City for natural and human-caused hazards

Goal statements that were more specific and measurable, but not as detailed as the mitigation actions were organized in another group and used as objectives. Ms. Prospero noted several objectives that could support the goals, specifically those related to maintaining qualified and well-trained staff, re-establishing Petaluma River as a clean and accessible waterway, and enhancing overall flood protection north of town. Some objectives were also similar to the City Council's 2019-2020 Strategic Plan goals, and tailored for the LHMP. She reminded the group that objectives define strategies to attain the goal. Preliminary objectives are listed below:

- **Objective 1.1:** Ensure public infrastructure and facilities are earthquake safe and can withstand natural hazards
- **Objective 1.2:** Maintain adequate water and wastewater services during hazard events
- **Objective 1.3:** Improve redundancy at critical facilities
- **Objective 1.4:** Improve and continue emergency planning and trainings for disaster response and recovery

- **Objective 2.1:** Restore Petaluma river to improve water quality, increase economic opportunities, increase recreation accessibility, and enhance flood protection
- **Objective 3.1:** Educate the public on water conservation during drought conditions
- **Objective 3.2:** Create partnerships with Sonoma Water to build awareness on water supply
- **Objective 3.3:** Improve emergency planning for vulnerable populations and those with special needs
- **Objective 4.1:** Enhance public facilities to ensure there are safe places and designated shelters
- **Objective 4.2:** Coordinate with other agencies during disaster training exercises
- **Objective 4.3:** Share resources with other agencies, such as Sonoma County and neighboring cities
- **Objective 4.4:** Integrate better use of information technology, communications, and GIS mapping data
- **Objective 5.1:** Schedule annual reviews of mitigation actions and regular 5-year updates to the plan

#### **4. Review possible mitigation actions and climate change adaptation strategies**

Mr. Brislawn provided an overview of types of mitigation actions: alter, avert, adapt, and avoid; he also provided examples of each type. Mr. Brislawn provided context on climate adaptation and additional background on regulatory drivers in California, such as Senate Bill 379 and best practices associated with integrating climate change science and policy and strategies into the plan. He then reviewed FEMA categories of mitigation actions. These included prevention, property protection, natural resource protection, structural projects, public information, and emergency services. Ms. Prosperi distributed various handouts on mitigation actions for the group to use to develop mitigation action ideas. Handouts included typical mitigation actions alternatives by FEMA category, selection and prioritization criteria, a sample mitigation action, and a mitigation action worksheet.

#### **5. Discuss criteria for mitigation action selection and prioritization**

Ms. Prosperi and Mr. Brislawn reviewed the mitigation action selection and prioritization criteria developed by FEMA: STAPLEE, which refers to social, technical, administrative, political, legal, economic, and environmental.

#### **6. Brainstorm Session #1: Develop new mitigation actions**

Ms. Prosperi explained the purpose of the first exercise is to develop one mitigation action for each sticky note distributed to the group. She stated there must be at least one action for every hazard. She stated that at least one action must also address each hazard and be considered mitigation, not preparedness. Mr. Brislawn added that mitigation actions should also focus on the range of mitigation types from education and awareness to structural engineering projects.

Below is a list of mitigation actions developed during the exercise with each responsible agency noted (where provided):

#### Wildfire

- Establish funding program for community to implement defensible space (Fire Department, Public Works and Utilities)
- Develop a Water System Master Plan to access capacity (Fire Department)
- Upgrade Water System to provide adaptability
- Evaluate WUI zone in the City limits and surrounding areas to develop a comprehensive plan to protect (building codes, Type 3 Fire engine, water supply, access roads) (Fire Department) (4 points)
- Install fire protection system in accordance with current code (Fire Department) (1 point)
- Establish emergency procedures and an upstaffing plan for red flag events (2 points)
- Continue to work with the County to upstaff capabilities during wildfire events
- Obtain or develop coordination plan with neighboring agencies and departments for wildland engine coverage

#### Drought

- Meet Sonoma County Water Agency goals for 20 percent maximum daily demand (MDD) (peak usage) with City groundwater wells
- Plan for additional groundwater wells, recycled water system expansion, and urban and agricultural water balance (Public Works and Utilities Department)
- Work with Sonoma Groundwater Management Agency (GSAs) on groundwater management and protection (e.g. salination concerns)
- Meet SCWA goal for City supplies from groundwater sources at 20 percent MDD
- Ensure pump stations are secure and there is site security and resiliency

#### Hazardous Materials Releases

- Develop, implement, and practice evacuation plans for areas affected by hazardous material releases (may require equipment, such as sirens for notification) (5 points)
- Implement an alert system for West Petaluma for hazard emissions (Fire Department)
- Ensure residents and businesses are aware of PG&E gas lines and emergency procedures

#### Cyber Threats

- Develop a Water Infrastructure Vulnerability Assessment Plan (that covers cyber sufficiency) (Public Works and Utilities Department)
- Determine SCADA system vulnerability (Public Works and Utilities Department) (1 point)

- Assess pump stations and site security at City facilities

#### Multi-Hazards

- Update the City Emergency Operations Plan (EOP) to accurately cover today's hazards (1 point)
- Assess vulnerability of critical facilities to damage and back-up power and whether the City has sufficient supplies to maintain essential functions (1 point)
- Develop an EOC that is equipped for all emergency disasters
- Place a generator at Community Center to ensure operation during power outages (Public Works and Utilities Department, Parks and Recreation Department)
- Ensure all COP staff/employees are prepared to be at work for a minimum of 3-5 days/Prepare go-bag location(s) for employees to stay/work and include preparations for feeding, bathing, and all essential needs (Human Resources) (6 points)
- Expand the COPE Program: Citizens Organized to Prepare for Emergencies
- Establish education program for community preparedness (Police Department, Fire Department, EDOG)
- Educate public on natural hazard links on City website and make sure handouts are available at building permit counter (flyers on earthquakes, fires, flooding, and high winds)
- Ensure effectiveness of the EOC building and supplies required to operate
- Implement annual EOC training for all ranks and positions

#### Earthquakes

- Seismically retrofit historic museum (2 points)
- Assess and retrofit City buildings for earthquakes, specifically the fire stations and police department (Building Department, Public Works and Utilities) (2 points)
- Retrofit analysis of police station, fire stations, City EOC, and City's Emergency Communication Center during emergencies (5 points)
- Retrofit museum and other facilities, such as Fire Station #1
- Place generators at critical facilities, such as shelters, fire department, police department, traffic signals, and City Hall
- Assess city buildings for seismic vulnerability (3 points)
- Assess city bridges for seismic vulnerability (3 points)
- Assess city utilities for seismic vulnerability, and water/sewer tanks and single point of failures/power loss (Public Works and Utilities) (3 points)
- Assess city water tanks for seismic stability

### Severe Weather

- Replace aging generator at police department and plan for extreme heat that can cause damage to equipment at the Communications Center

### Dam Incidents

- Create information and educational outreach materials to downstream property owners of the La Crema Winery Dam
- Assess if any downstream impacts are anticipated from breach or failure of La Crema Winery dam and develop mitigations, as appropriate

### Flood

- Enhance flood mitigation to reduce near annual floods on north end of town (Public Works and Utilities Department)
- Continue to implement flood mitigation strategies, acquisition in flood prone parcels, detention, and creek channel maintenance (Public Works and Utilities Department) (4 points)
- Keep flood maps updated with rainfall intensity (Public Works and Utilities Department)
- Begin to plan for sea level rise (Public Works and Utilities Department)
- National Flood Insurance Program (NFIP)/Community Rating System (CRS): Improve CRS rating and explore where points can be achieved and implement steps to achieve them for a higher rating

### Sea Level Rise

- Develop a Climate Adaptation Plan that addresses sea level rise (Public Works and Utilities Department)
- Explore natural protection with wetland enhancement and transition zone (Public Works and Utilities Department)
- Use dredge material to build resilience (Public Works and Utilities Department)
- Preserve open space in high hazard areas (3 points)
- Marshland protection and restoration project implementation
- Map and assess vulnerability to sea level rise and integrate the information with the City GIS mapping capabilities (3 points)
- Inventory public buildings and infrastructure that is vulnerable to sea level rise
- Assess SLR modelling for use
- Update zoning (IZO) to manage development in high risk areas
- Update SHAs to include SLR impacts to guide lines for new construction and retrofits

### 7. Brainstorm Session #2: Prioritize Mitigation Actions

The purpose of the next exercise was to select and prioritize mitigation actions based on the STAPLEE criteria. Ms. Prosperi explained the importance of prioritizing should also be based on climate adaptation feasibility and social equity. Four sticky dots were distributed to each person and participants were asked to pick their favorite action based on the criteria discussed among the group. Mitigation actions with points are shown above in parentheses. Points for each action varied from 1 point to 6 points.

### 8. Schedule and Next Steps

Ms. Prosperi stated the first public workshop is scheduled for Tuesday October 8<sup>th</sup> at 6:00 pm at the Community Center; the second workshop will be scheduled during review of the Draft LHMP.

### 9. Questions and Answers

At the end of the meeting, there were no additional questions. The meeting adjourned at 4:10 p.m.

### ACTION ITEMS

No.	Item	Action	Completion Date
1.	Submit HMPC Meeting #3 Minutes	(Wood)	12 October 2019
2.	Discuss SLR Scenarios	(Wood)	30 October 2019
3.	Organize Mitigation into Spreadsheet	(Wood)	29 October 2019

### BRAINSTORM SESSION #1



**Photo 1:** HMPC reviewing one of the dams located outside the City limits



**Photo 2:** HMPC participating in the selection and prioritization exercise



**Photo 3:** HMPC participants reviewing and prioritizing mitigation actions for earthquakes



Photo 4: HMPC participants reviewing and prioritizing mitigation actions

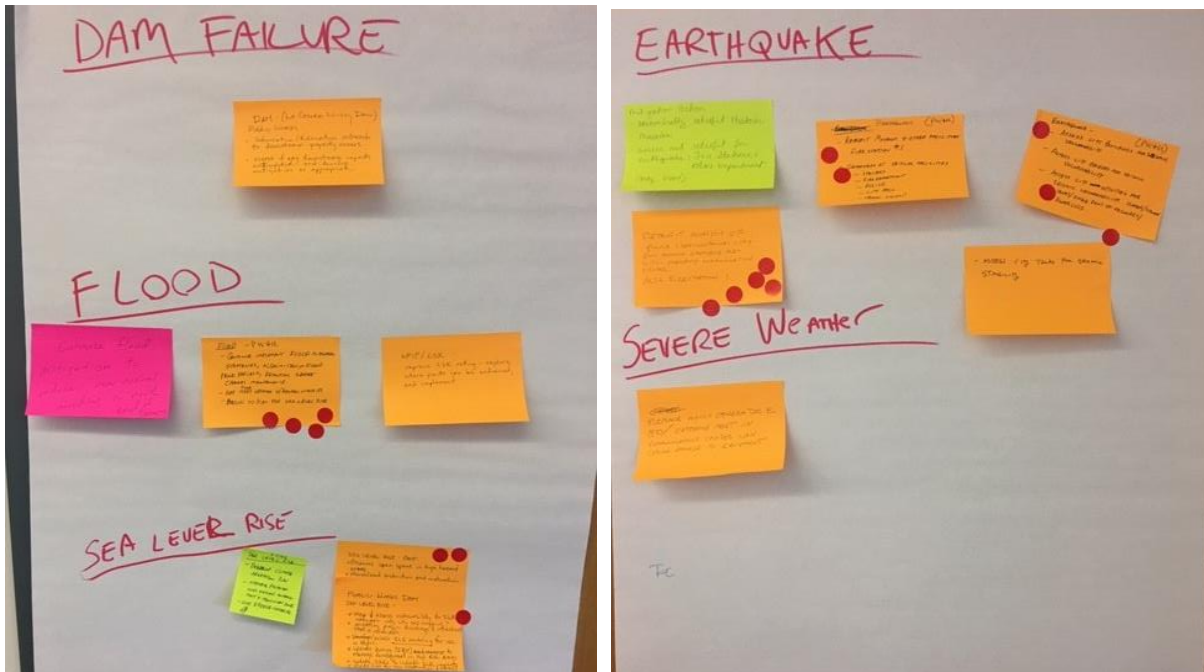


Photo 5: Mitigation actions by hazard category for dam failure, flood, sea level rise, and earthquakes



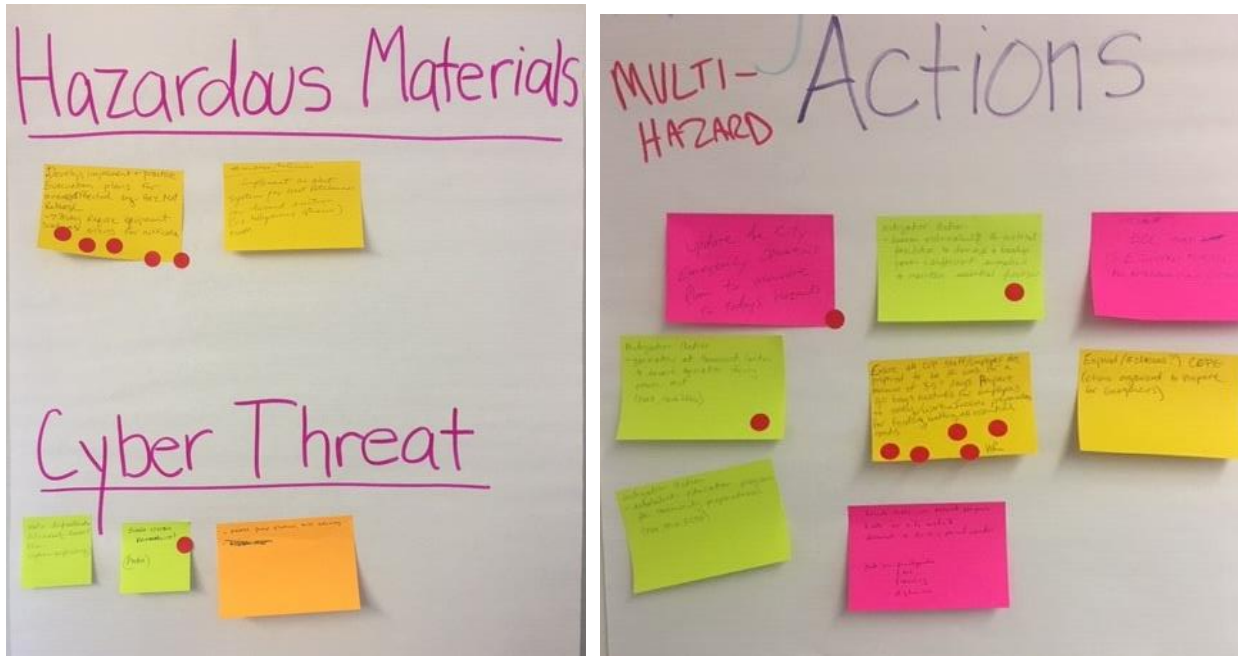


Photo 6: Mitigation actions by hazard category for human-caused hazards and for multi-hazard actions



# Local Hazard Mitigation Plan

## Sign-In Sheet

### City of Petaluma Local Hazard Mitigation Plan Hazard Mitigation Planning Committee (HMPC) Meeting #3

Monday, October 8, 2019  
10:00 a.m. – 12:00 p.m.


City of Petaluma Public Works and Utilities Department – Upstairs Conference Room  
202 North McDowell Boulevard  
Petaluma, CA 94954

This sign-in sheet documents the attendees at the City of Petaluma Hazard Mitigation Planning Committee Meeting #3. The purpose of this meeting is to review the goals prepared during the previous planning session and develop mitigation action for the Local Hazard Mitigation Plan.

<u>Name</u>	<u>Representing Agency or Department and Title</u>	<u>Phone</u>	<u>Email</u>
CHARLIE CASTILLO	HR/RISK	(707) 732-1989	ccastillo@cityofpetaluma.org
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Jessica Power	FD Fire Marshal	707-230- <sup>778-4485</sup> 0674	jpower@cityofpetaluma.org
Doug Hughes	COO-Building CBO	707 778 4306	dhughes@cityofpetaluma.org
Bron Klein	POLICE	707 778 4530	rklein@cityofpetaluma.org
Jason Beatty	PW&U	(707) 778-4514	JBEATTY@CITYOFPETALUMA.ORG
Daniel Herrera	PW&U	(707) 778-4389	DHERRERA@CITYOFPETALUMA.ORG
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Diane Ramirez	Public Works & Utilities	707 776 3658	dramirez@cityofpetaluma.org
Jeff Brislawn	Wood/CONSULTANT	303-704-5506	Jeff.brislawn@woodplc.com

<u>Name</u>	<u>Representing Agency or Department and Title</u>	<u>Phone</u>	<u>Email</u>

HMPC Meeting #3 Facilitated by:		
Project Manager: <i>Juliana Prospero</i>	Date: <i>10/8/19</i>	Signature: <i>Juliana Prospero</i>




**City of Petaluma  
Local Hazard Mitigation Plan**

Hazard Mitigation Planning Committee Meeting #3

City of Petaluma  
Public Works and Utilities Department  
202 North McDowell Boulevard, Petaluma, CA 94954

October 8, 2019

[woodplc.com](http://woodplc.com)

### Agenda

1. Introductions
2. Review Process and Findings from Risk Assessment
3. Review and Refine Goals and Objectives
4. Review Possible Mitigation Actions and Climate Adaptation Strategies
5. Discuss Criteria for Mitigation Action Selection and Prioritization
6. Brainstorm Session #1: Develop New Mitigation Actions
7. Brainstorm Session #2: Prioritize Mitigation Actions
8. Discuss Plan Implementation and Maintenance
9. Schedule and Next Steps
10. Questions and Answers

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## Introductions

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### Introductions

- City of Petaluma, Public Works and Utilities Department
  - Diane Ramirez
    - Project Manager
- Wood Environment & Infrastructure Solutions, Inc.
  - Jeff Brislawn, CFM
    - Hazard Mitigation Lead
  - Juliana Prospero, AICP
    - Project Manager

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## Review Process and Findings from Risk Assessment

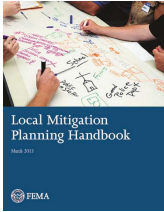
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### Review of Planning Process

#### Disaster Mitigation Act of 2000

**What it is, why its important, and why we are here today!**

- Requires local governments to have hazard mitigation plans for continued eligibility for mitigation funds, pre- and post- disaster
- Guide mitigation activities in a coordinated & economic manner
- Integrates into other existing planning mechanisms
  - 2025 General Plan
  - 2015 Floodplain Management Plan
- Directs future development: plan and build wisely
- Reduces losses
- Make communities more disaster resilient



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### Mitigation Planning and Disaster Mitigation Act

#### National Flood Insurance Program/Community Rating System

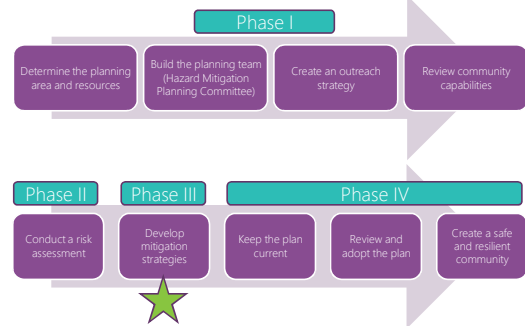
- Created in 1990 as a voluntary incentive program
- Recognizes communities that manage their floodplains beyond the minimum standards by providing discounted flood insurance rates
- Floodplain Management Planning earns credits in CRS
- Petaluma is a CRS participant



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### FEMA's 4-Phase DMA Planning Guidance



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### Review of Planning Process

#### FEMA 2013 9-Step Planning Process

- Step 1** Determine the Planning Area and Resources
- Step 2** Build the Planning Team
- Step 3** Create an Outreach Strategy
- Step 4** Review Community Capabilities
- Step 5** Conduct a Risk Assessment
- Step 6** **Develop a Mitigation Strategy**
- Step 7** Keep the Plan Current
- Step 8** Review and Adopt the Plan
- Step 9** Create a Safe and Resilient Community

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### Review of Identified Hazards

#### Risk Summary

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/Severity	Overall Significance
Dam Failure	Limited	Unlikely	Limited	Low
Drought	Extensive	Likely	Limited	Medium
Earthquake	Extensive	Likely	Significant	High
Flood	Limited	Likely	Limited	Medium
<b>Sea Level Rise</b>	<i>Under Analysis</i>			
Severe Weather: Extreme Heat	Extensive	Likely	Limited	Medium
Severe Weather: Heavy Rain/Thunderstorms/Hail/Lighting	Extensive	Likely	Limited	Medium
Severe Weather: High Winds	Extensive	Likely	Limited	Medium
Wildfire/Wildland Urban Interface	Significant	Occasional	Critical	Medium
Hazardous Material Releases	Significant	Likely	Limited	Medium
Cyber Threat	Extensive	Occasional	Critical	Low

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### Review and Refine Goals and Objectives

### Review and Refine Goals

**Goal 1:** Minimize loss of life and damage and protect people and property from hazards

**Goal 2:** Preserve and protect Petaluma's environment as an efficient resource to build community resilience against natural hazards

**Goal 3:** Educate the community on hazard risks and the importance of resiliency and emergency preparedness

**Goal 4:** Enhance City staff coordination and response during disasters and ensure City facilities provide safe places for the community to shelter during such events

**Goal 5:** Implement the Local Hazard Mitigation Plan to prepare the City for natural and human-caused hazards



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Review and Refine Objectives (and Actions)

- Maintain a qualified and well-trained City work force
- Outline risk and short falls in City infrastructure, planning resources, and staffing
- Re-establish the Petaluma River as a clean and accessible waterway
- Enhance flood mitigation to reduce year-round flooding on north end of town
- Update City Emergency Operations Plan to address today's hazards
- Ensure public facilities and infrastructure (Police Stations, Fire Stations, City Hall) are earthquake safe

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Review of Possible Mitigation Actions and Climate Adaptation Strategies

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Review Mitigation Actions

- ▶ Alter
- ▶ Avert
- ▶ Adapt
- ▶ Avoid



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Review Mitigation Alternatives

- ▶ **Alter the Hazard**
  - Prescribed burns or fuels management to reduce wildfire intensity and severity
  - Draining lakes behind weakened dams



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Review Mitigation Alternatives

- ▶ **Avert the Hazard**
  - Floodwalls
  - Debris basins
  - Drainage improvements
  - Channels and Culverts
  - Fire Breaks



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Review Mitigation Alternatives

- ▶ **Adapt to the Hazard**
  - Building Codes
  - Construction Standards
  - Land Use and Development Regulations
  - Design Standards
  - Monitoring and Warning Systems
  - Safe Rooms



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### Review Mitigation Alternatives

#### - Avoid the Hazard

- Acquisition
- Relocation
- Open Space
- Land Use Designation
- Natural System Protection



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### California Legislation: Climate Adaptation

#### Senate Bill 379

- Requires cities and counties to integrate climate adaptation into their general plans by January 1, 2017 or January 1, 2022 depending on whether or not that city or county has adopted a LHMP
- Requires the climate adaptation update to include a set of goals, policies, and objectives for their communities based on the vulnerability assessment
- Requires implementation measures, including the conservation and implementation of natural infrastructure that may be used in adaptation projects



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### Climate Change Adaptation Considerations

#### Vulnerability Assessment

- **Exposure:** What change effects will the community experience?
- **Risk and Onset:** How likely are impacts and how quickly will they occur?
- **Adaptive Capacity:** What can be done?



#### Adaptation Strategy Development

- **Prioritize Needs:** Which vulnerabilities require action?
- **Identify Strategies:** Which strategies should be pursued?
- **Prioritize and Evaluate:** Feasible? Potential costs versus benefits?

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### Climate Change Adaptation Strategies

- Measures should address both current hazards and future climate change effects
- Collaboration is key to promote complementary adaptation approaches
- Monitoring and tracking of climate change effects
- Public education and involvement in decision-making

#### Example of Sea Level Rise Strategies

- **Protect:** Nature-based shoreline/river/coast protection and management practices (e.g. living shoreline, beach nourishment, maintain open space buffer)
- **Accommodate:** Upgrade stormwater infrastructure and roadways to improve drainage
- **Managed Retreat:** Relocate critical facilities away from shoreline/river/coast



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### Mitigation Action Categories

#### FEMA Mitigation Ideas Guidance

- Plans and Regulations
- Structure and Infrastructure Projects
- Education and Awareness
- Natural systems protection

#### NFIP – Community Rating System Guidance

- Prevention
- Property protection
- Natural resource protection
- Structural projects
- Public information
- Emergency services

—See handouts—

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### Projects Eligible for FEMA Funding - Wildfire

- Defensible Space
- Hazardous Fuels Reduction Activities
  - Community level vegetation management;
  - Vegetation removal;
  - Vegetation clearing and/or thinning;
  - Slash removal; and
  - Vertical clearance of tree branches
- Structural Protection Through Ignition-Resistant Construction Activities

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**Projects Eligible for FEMA Funding - Flood Mitigation**

- Acquisition
- Dry and Wet Flood-proofing
- Elevation
- Minor Localized Flood Reduction Projects
  - Detention ponds
  - Channel stabilization
- Infrastructure Retrofit
  - Culverts, bridges, etc.

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**Projects Eligible for FEMA Funding (Other Hazards)**

- Landslides/ Geologic Hazards
  - Channel (soil) stabilization/ protection of critical facility
  - Property Acquisition
- Utility Protection/ Infrastructure Retrofit
  - Winter Weather
  - Wildfire
  - High Winds
- Safe Rooms, Generators
- Seismic Building/Infrastructure Retrofit
- “Climate Resilient” Actions (Aquifer Storage, Green Infrastructure)



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Discuss Criteria for Mitigation Action Selection and Prioritization

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**Mitigation Action Selection and Prioritization**

**STAPLEE**

- Social
- Technical
- Administrative
- Political
- Legal
- Economic
- Environmental

**Other Strategies to Consider**

- Life Safety
- Addressing High Risk Hazards
- Protect Critical Facilities/Assets
- Multiple Objectives

—See handout—

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**Mitigation Action Selection and Prioritization**

**Based on Risk**

- Estimated losses
- At-risk existing facilities
- At-risk critical facilities
- At-risk cultural and natural resources

**Other Opportunities**

- At-risk areas slated for future development
- At-risk facilities slated for future development
- Public Education
- Increased insurance coverage
- Include projects from other existing plans (General Plan)

—See handout—

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Brainstorm Session #1: Develop New Mitigation Actions

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### Disaster Mitigation Act – Mitigation Action Requirements

- Plan must have at least one action for every hazard (plan as a whole)
- Plan must have at *least one* action at a minimum that addresses each identified hazard and must be true mitigation (not preparedness), preferably of different categories.
- Actions must be prioritized
- Actions must have detail on implementation and administration
- Actions must have a review of benefit vs cost
- Actions must address existing and future development

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### Sources of Ideas for Mitigation Actions and Implementation through related planning efforts

- Draft Hazard Identification and Risk Assessment
- See handouts related to action alternatives by hazard and category
- Urban Water Management Plan
- Capital Improvement Plan
- Plan goals and objectives
- FEMA 'Mitigation Ideas' publication
- <https://www.fema.gov/media-library/assets/documents/30627>



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### Possible Mitigation Actions

#### ► Drought

- Groundwater Sustainability Plan efforts associated with SGMA compliance

#### ► Earthquake

- Conduct building inspections and track results electronically
- Earthquake hazard education and awareness
- Seismic retrofit of museum

#### ► Flood

- Implement floodwall and floodplain improvement projects
- Assess opportunities to improve Community Rating System rating to lower flood insurance costs
- Continue to leverage natural systems/sloughs for flood mitigation and sea level rise adaptation

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### Possible Mitigation Actions

#### ► Sea Level Rise

- Sea Level Rise Vulnerability Assessment and Adaptation Plan

#### ► Severe Weather: Extreme Heat

- Establish Network to assist vulnerable groups during extreme heat
- Cooling centers and shade structures

#### ► Severe Weather: Heavy Rain/Thunderstorms/Hail/Lightning/ Fog

- Protect critical facilities and equipment from lightning strikes

#### ► Severe Weather: High Wind

- Promote construction of safe rooms
- Establish clearance standards for overhead utilities
- Backup power at City critical facilities (wind, heat, sv weather, wildfire)

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### Possible Mitigation Actions

#### ► Wildfire

- Update zoning ordinance to specific development conditions in WUI
- Implement actions in related plans: CWPPs, CIPs

#### ► Hazardous Materials

- Ensure Comprehensive Emergency Management Plan is updated

#### ► Cyber Threat

- Exercise a system recovery plan
- Leverage modern hardware security features

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### Developing Actions for the Mitigation Plan

#### Brainstorm Session Exercise #1

- What Mitigation Actions should be included in the Plan?
- Review Guidance Handouts with Mitigation Actions by Categories and by Hazards
- Write idea for new action on 3 x 5 sticky note
  - Note the responsible department
  - Use additional sticky notes for each idea
- Post on large flip chart paper
- Review each other's postings



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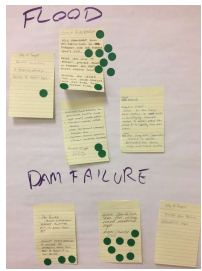
## Brainstorm Session #2: Prioritize Mitigation Actions

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### Developing Actions for the Mitigation Plan

#### Brainstorm Session Exercise #2

- Connect the Dots!
- 4 Dots per Person
- Indicate your Preferred Mitigation Activities, Keeping STAPLEE Criteria in Mind, with a Dot




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### Developing Actions for the Mitigation Plan

#### Take-Home Assignment

- See Handout; Word Version will be emailed
- Captures additional details of mitigation action/project
- Need input back by November 1<sup>st</sup>



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## Discuss Plan Implementation and Maintenance

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### Plan Implementation and Maintenance

- Assign a City Hazard Mitigation Manager and Individual Mitigation Action Leads
- Monitor changes in vulnerability, funding opportunities
- System for Monitoring Progress on Achieving Goals and Projects
- Process to integrate and implement through other related plans
- Continue public involvement
- Revise the plan as necessary and complete update within 5 years per DMA requirement
- State vs direct to FEMA

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## Schedule and Next Steps

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## Schedule and Next Steps

**PETALUMA**  
LOCAL ENERGY COMMUNITY

BUSINESS CAREER LIVING RESOURCES

### HELP CITY PLAN FOR HAZARDS

The City of Petaluma's main job is to keep our community safe. To do this, we think about all the bad things that could happen here and there. Good ways to learn the best they come in personal files alignment.

Right now we are creating a Local Hazard Mitigation Plan (LHMP) that will help us protect the community while also making us eligible for government funding and disaster assistance.

We need your help to make sure this plan is complete and reflects the needs of the entire community. There are two ways to participate:

**Public Workshop**  
Tuesday, October 8, 2019  
8:00 p.m. – 8:00 p.m.  
Larchmont Community Center  
340 N. McDowell Blvd.  
Snacks will be served. #RPXP

**Agenda**  
• Public Review  
• City Council Hearing/Adoption

The Plan will cover the most destructive kinds of hazards: natural events like earthquakes and wildfires and human-caused events like other attacks and gas explosions. Learn more: [Download the press release and Review the Steering Committee Meeting Presentation.](#)

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## When will we meet next?

- Months 1-2**
  - Kick-Off Meeting
  - Develop Planning Team
  - HMPC Meeting #1
- Months 2-3**
- Months 4-5**
  - Finalize Goals and Objectives
  - Develop Mitigation Actions
  - 1<sup>st</sup> Administrative Draft LHMP
- Month 6**
- Months 7-8**
  - 2<sup>nd</sup> Administrative Draft LHMP
  - Public Workshop #2
  - Draft LHMP
  - FEMA Region IX Mitigation Plan Review Tool
  - Cal OES Review
- Month 9**
  - Submit LHMP to FEMA
  - FEMA Approval
  - City Plan Adoption

City of Petaluma HMPC Meeting #3

## Detailed Schedule

Task	Anticipated Date
Notice to Proceed	April 17, 2019
Project Kick-off Meeting	June 10, 2019
Submit Planning Team Invite List	June 13, 2019
Planning Team Session #1 (Half-Day Workshop)	July 8, 2019
Planning Team Session #2 (Half-Day Workshop)	October 7, 2019
Planning Team Session #3 (Half-Day Workshop)	October 8, 2019
Public Workshop #1	<b>October 8, 2019</b>
Finalize Goals and Objectives	October 11, 2019
Compile Mitigation Action Worksheets	November 1, 2019
Submit 1 <sup>st</sup> Administrative Draft LHMP	December 13, 2019
City and Planning Team provides Comments on 1 <sup>st</sup> Administrative Draft LHMP	December 27, 2019
Submit 2 <sup>nd</sup> Administrative Draft LHMP	January 17, 2020
Circulate Public Review Draft LHMP (20-day public review period)	January 24, 2020
2 <sup>nd</sup> Public Workshop	February 5, 2020
Public Review Ends	February 12, 2020
Incorporate Public Comments	February 17, 2020
Complete FEMA Region IX Mitigation Plan Review Tool	February 23, 2020
Submit LHMP to Cal OES for Review	February 28, 2020
Cal OES Review	45 Days
Cal OES SHMO tele-Conference Call	TBD (late-March 2020)
Submit LHMP to FEMA for Review (via Cal OES)	TBD (late-April 2020)
City Council Hearing*	TBD

\*City Council Meetings are held on the first and third Monday of each month.

City of Petaluma HMPC Meeting #2

## Questions?

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**Example Mitigation Actions by FEMA categories with Hazards Identified in the City of Petaluma Local Hazard Mitigation Plan**

Alternative Mitigation Actions	Dam/Levee Failure	Floods	Hazardous Materials	Drought/Severe Weather: Extreme Heat	Severe Weather: Heavy Rain/Lightning/Hail	Earthquakes	Wildfires	Severe Weather: Wind/Tornadoes
<b>PLANS and REGULATIONS</b>								
Building codes and enforcement		■	■	■	■	■	■	■
Comprehensive Watershed Tax		■						
Density controls	■	■	■				■	
Design review standards		■	■			■	■	
Easements		■	■				■	
Environmental review standards		■	■			■	■	
Floodplain development regulations	■	■	■					
Hazard mapping	■	■	■				■	
Floodplain zoning	■	■	■					
Forest fire fuel reduction							■	
Housing/landlord codes			■	■	■			
Slide-prone area/grading/hillside development regulations							■	
Manufactured home guidelines/regulations		■			■	■		
Minimize hazardous materials waste generation			■					
Multi-Jurisdiction Cooperation within watershed	■	■						
Open space preservation	■	■					■	
Performance standards	■	■		■	■	■	■	■
Periodically contain/remove wastes for disposal			■					
Pesticide/herbicide management regulations			■					
Special use permits	■	■	■	■			■	
Stormwater management regulations		■	■					
Subdivision and development regulations	■	■	■	■		■	■	
Surge protectors and lightning protection					■			
Tree Management					■		■	■

Alternative Mitigation Actions	Dam/Levee Failure	Floods	Hazardous Materials	Drought/Severe Weather: Extreme Heat	Severe Weather: Heavy Rain/Lightning/Hail	Earthquakes	Wildfires	Severe Weather: Wind/Tornadoes
Transfer of development rights		■		■			■	
Utility location			■	■	■			■
<b>STRUCTURE AND INFRASTRUCTRE PROJECTS</b>								
Acquisition of hazard prone structures	■	■		■			■	
Facility inspections/reporting	■	■	■	■		■		
Construction of barriers around structures	■	■	■					
Elevation of structures	■	■						
Relocation out of hazard areas	■	■	■	■			■	
Structural retrofits (e.g., reinforcement, floodproofing, bracing, etc.)		■	■		■	■	■	■
Channel maintenance		■						
Dams/reservoirs (including maintenance)	■	■		■				
Isolate hazardous materials waste storage sties			■					
Levees and floodwalls (including maintenance)		■						
Safe room/shelter				■	■	■		■
Secondary containment system			■					
Site reclamation/restoration/revegetation		■						
Snow fences								■
Water supply augmentation				■	■			
Debris Control		■						
Defensible Space							■	
Stream stabilization		■						
<b>EDUCATION AND AWARENESS</b>								
Flood Insurance	■	■						
Hazard information centers	■	■	■	■	■	■	■	■
Public education and outreach programs	■	■	■	■	■	■	■	■

Alternative Mitigation Actions	Dam/Levee Failure	Floods	Hazardous Materials	Drought/Severe Weather: Extreme Heat	Severe Weather: Heavy Rain/Lightning/Hail	Earthquakes	Wildfires	Severe Weather: Wind/Tornadoes
Real estate disclosure	■	■	■	■	■	■	■	■
Crop Insurance				■	■	■		
Lightning detectors in public areas					■			
<b>NATURAL SYSTEMS PROTECTION</b>								
Best Management Practices (BMPs)		■	■	■	■		■	
Forest and vegetation management	■	■		■	■		■	■
Hydrological Monitoring	■	■	■	■	■			
Sediment and erosion control regulations	■	■	■					
Stream corridor restoration		■		■				
Stream dumping regulations		■	■					
Urban forestry and landscape management		■		■	■		■	■
Wetlands development regulations		■	■	■			■	
<b>EMERGENCY SERVICES</b>								
Critical facilities protection	■	■	■	■	■	■	■	■
Emergency response services	■	■	■	■	■	■	■	■
Facility employee safety training programs	■	■	■	■	■	■	■	■
Hazard threat recognition	■	■	■	■	■	■	■	■
Hazard warning systems (community sirens, NOAA weather radio)	■	■	■	■	■	■	■	■
Health and safety maintenance	■	■	■	■	■	■	■	■
Post-disaster mitigation	■	■	■	■	■	■	■	■
Evacuation planning	■	■	■	■			■	

# Mitigation Action Selection and Prioritization Criteria

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Does the proposed action protect lives?

Does the proposed action address hazards or areas with the highest risk?

Does the proposed action protect critical facilities, infrastructure, or community assets?

Does the proposed action meet multiple objectives (multi-objective management)?

## **STAPLE/E**

Developed by FEMA, this method of applying evaluation criteria enables the planning team to consider in a systematic way the social, technical, administrative, political, legal, economic, and environmental opportunities and constraints of implementing a particular mitigation action. For each action, the HMPC should ask, and consider the answers to, the following questions:

### **Social**

Does the measure treat people fairly (different groups, different generations)?

### **Technical**

Will it work? (Does it solve the problem? Is it feasible?)

### **Aministrative**

Is there capacity to implement and manage project?

### **Political**

Who are the stakeholders? Did they get to participate? Is there public support? Is political leadership willing to support it?

### **Legal**

Does your organization have the authority to implement? Is it legal? Are there liability implications?

### **Economic**

Is it cost-beneficial? Is there funding? Does it contribute to the local economy or economic development? Does it reduce direct property losses or indirect economic losses?

### **Environmental**

Does it comply with environmental regulations or have adverse environmental impacts?

## City of Petaluma Local Hazard Mitigation Plan New Mitigation Action Worksheet

**Name of Jurisdiction:** \_\_\_\_\_

Use this to record potential mitigation projects (1 page per project) identified during the planning process to include in the plan. Provide as much detail as possible and use additional pages as necessary. Complete and return to Juliana Prospero by **November 1, 2019**.

<b>Mitigation Project Title</b>	
<b>Issue/Background</b>	
<b>Other Alternatives</b>	
<b>Responsible Office</b>	
<b>Priority (High, Medium, Low)</b>	
<b>Cost Estimate</b>	
<b>Benefits (Avoided Losses)</b>	
<b>Potential Funding</b>	
<b>Schedule</b>	

Prepared by: \_\_\_\_\_  
 Phone: \_\_\_\_\_  
 Email: \_\_\_\_\_

Please return worksheets by mail, email, or fax to: Juliana Prospero <a href="mailto:juliana.prosperi@woodplc.com">juliana.prosperi@woodplc.com</a> 10940 White Rock Road, Suite 190 Rancho Cordova, CA, 95670 Tel 303-503-7794 Fax 916-636-3208
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