

Appendix C Mitigation Strategy

C.1 Mitigation Strategy Handout

Tri-City Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP) Planning Committee Meetings #3 & #4 - Mitigation Strategy September 19 & 20, 2023

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**Tri-City Multi-Jurisdictional
Local Hazard Mitigation Plan (LHMP)
Planning Committee Meetings #3 & #4
Mitigation Strategy**

**Tuesday September 19, 2023 (1:00 - 4:00 pm)
Wednesday September 20, 2023 (9:00 am - 12:00 pm)**

**Alameda County Water District - Board Room
43885 S. Grimmer Blvd.
Fremont, CA 94538**

Planning Committee Meeting #3:

1. Introductions
2. Grant Update
3. LHMP Project Status and Next Steps/Timeline
4. Risk Assessment Status and Hazus
5. Priority Hazards Review
6. Develop Plan Goals and Objectives
7. Introduction to Planning Committee Meeting #4: Mitigation Alternatives/Actions/Projects

Planning Committee Meeting #4:

1. Introductions
2. Review Mitigation Categories and Selection Criteria
3. Brainstorming of Mitigation Alternatives/Actions/Projects by Hazard
4. Prioritization of Mitigation Actions/Projects
5. Questions

**Mitigation Strategy Meetings
September 19 & 20, 2023
Day 1**

Status of the 2024 Tri-City LHMP Project/Next Steps

FEMA's 4-Phase-10 Step DMA/CRS Planning Process

Phase I: Organize Resources

- 1) Get organized
- 2) Plan for public involvement
- 3) Coordinate with other departments and agencies

Phase II: Risk Assessment

- 4) Identify the hazard(s)
- 5) Assess the risks

Capability Assessment

Phase III: Mitigation Strategy

- 6) Set planning goals
- 7) Review mitigation alternatives
- 8) Draft an action plan

Phase IV: Adoption and Implementation

- 9) Adopt the plan
- 10) Implement the plan, evaluate its worth, and revise as needed

LHMP Project Schedule/Key Dates

LHMP Meetings

- **September 19** (Tuesday) PC* Meeting #3 (Mitigation Strategy: Goals Development) (1:00-4:00 pm)
- **September 20** (Wednesday) PC Meeting #4 (Mitigation Strategy: Actions and Projects) (9:00 am - 12:00 pm)
- **January 24** (Wednesday) Final Public Meeting #3 (6:00-7:30 pm)
- **January 25** (Thursday) PC Meeting #5 (9:00 am -12:00 pm)

Mitigation Strategy Meetings - Follow up

- **September 29** (Friday) Mitigation Strategy (goals/actions) processed and sent to Project Team/PC
- **October 27** (Friday) Mitigation Action (Project) Worksheets and edits/refinement to draft Goals and Objectives due to Foster Morrison

LHMP Document Drafts

- **November 10** (Friday): PC (First) Draft LHMP to Project Team/PC
- **December 8** (Friday): Project Team/PC comments due on Draft Plan
- **December 21** (Thursday): Comments incorporated into Public Review (Second) Draft to Project Team/PC
- **January 2** (Tuesday): Public Review Draft on Participating Jurisdictions' websites
- **February 2** (Friday): All Project Team, PC and Public input to Foster Morrison
- **February 16**: All final comments incorporated and LHMP submittal to Cal OES – February 2024

*PC = Planning Committee

Tri-City Planning Area Hazard Identification & Profiles

| Hazard | Geographic Extent | Likelihood of Future Occurrences | Magnitude/Severity | Significance | Climate Change Influence | | |
|---|---|----------------------------------|--------------------|--------------|--------------------------|--|---|
| Climate Change | Extensive | Highly Likely | Critical | High | – | | |
| Coastal Flooding and Sea Level Rise | Limited | Highly Likely | Limited | Medium | High | | |
| Dam Failure | Sig – Ext. | Unlikely | Catastrophic | High | Medium | | |
| Drought & Water Shortage | Extensive | Likely | Limited | Medium | High | | |
| Earthquake | Extensive | Occasional/ Highly Likely | Catastrophic | High | Low | | |
| Flood: 1%/0.2% annual chance | Significant | Occasional | Critical | High | High | | |
| Flood: Localized/Stormwater Flooding | Extensive | Highly Likely | Limited | Medium | Medium | | |
| Landslide | Limited | Likely | Limited | Medium | Medium | | |
| Levee Failure | Limited | Unlikely | Limited | Medium | Medium | | |
| Severe Weather: Extreme Cold and Freeze | Extensive | Highly Likely | Limited | Medium | Medium | | |
| Severe Weather: Extreme Heat | Extensive | Highly Likely | Limited | Medium | High | | |
| Severe Weather: Heavy Rain and Storms | Extensive | Highly Likely | Limited | Medium | Medium | | |
| Severe Weather: High Winds and Tornadoes | Extensive | Highly Likely | Negligible | Medium | Medium | | |
| Subsidence | Limited | Likely | Negligible | Low | Medium | | |
| Tsunami | Limited | Unlikely | Limited | Medium | Low | | |
| Wildfire | Limited | Highly Likely | Critical | Medium | Medium | | |
| <table style="width: 100%; border: none;"> <tr> <td style="width: 35%; vertical-align: top;"> <p>Geographic Extent <i>Limited:</i> Less than 10% of planning area <i>Significant:</i> 10-50% of planning area <i>Extensive:</i> 50-100% of planning area</p> <p>Likelihood of Future Occurrences <i>Highly Likely:</i> Near 100% chance of occurrence in next year, or happens every year. <i>Likely:</i> Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less. <i>Occasional:</i> Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years. <i>Unlikely:</i> Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.</p> </td> <td style="width: 65%; vertical-align: top;"> <p>Magnitude/Severity <i>Catastrophic:</i> More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths <i>Critical:</i> 25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability <i>Limited:</i> 10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability <i>Negligible:</i> Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid</p> <p>Significance (Medium or High Significance=Priority Hazard) <i>Low:</i> Minimal potential impact <i>Medium:</i> Moderate potential impact <i>High:</i> Widespread potential impact</p> <p>Climate Change Influence <i>Low:</i> Minimal potential impact <i>Medium:</i> Moderate potential impact <i>High:</i> Widespread potential impact</p> </td> </tr> </table> | | | | | | <p>Geographic Extent <i>Limited:</i> Less than 10% of planning area <i>Significant:</i> 10-50% of planning area <i>Extensive:</i> 50-100% of planning area</p> <p>Likelihood of Future Occurrences <i>Highly Likely:</i> Near 100% chance of occurrence in next year, or happens every year. <i>Likely:</i> Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less. <i>Occasional:</i> Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years. <i>Unlikely:</i> Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.</p> | <p>Magnitude/Severity <i>Catastrophic:</i> More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths <i>Critical:</i> 25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability <i>Limited:</i> 10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability <i>Negligible:</i> Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid</p> <p>Significance (Medium or High Significance=Priority Hazard) <i>Low:</i> Minimal potential impact <i>Medium:</i> Moderate potential impact <i>High:</i> Widespread potential impact</p> <p>Climate Change Influence <i>Low:</i> Minimal potential impact <i>Medium:</i> Moderate potential impact <i>High:</i> Widespread potential impact</p> |
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Risk Assessment Methodology

Calculating Likelihood of Future Occurrence

The frequency of past events is used in this section to gauge the likelihood of future occurrences. Based on historical data, the likelihood of future occurrence is categorized into one of the following classifications:

- **Highly Likely:** Near 100% chance of occurrence in next year, or happens every year.
- **Likely:** Between 10 and 90% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
- **Occasional:** Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
- **Unlikely:** Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Calculating Vulnerability

Vulnerability is measured in general, qualitative terms, and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential:

- **Extremely Low:** The occurrence and potential cost of damage to life and property is very minimal to non-existent.
- **Low:** Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium:** Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High:** Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have already occurred in the past.
- **Extremely High:** Very widespread and catastrophic impact.

Defining Significance (Priority) of a Hazard

Defining the significance or priority of a hazard to a community is based on a subjective analysis of several factors. This analysis is used to focus and prioritize hazards and associated mitigation measures for the plan. These factors include the following:

- **Past Occurrences:** Frequency, extent, and magnitude of historic hazard events.
- **Likelihood of Future Occurrences:** Based on past hazard events.
- **Ability to Reduce Losses through Implementation of Mitigation Measures:** This looks at both the ability to mitigate the risk of future occurrences as well as the ability to mitigate the vulnerability of a community to a given hazard event.

Risk Assessment Summary: Tri-City 2024 LHMP

Climate Change

- The 2023 State of California Hazard Mitigation Plan stated that climate change is clearly affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year. The number, magnitude, and severity of hazard events and disasters are significantly increasing resulting in catastrophic events. Climate Change has the potential to significantly alter the nature and frequency of most hazards.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: High
- Priority Hazard

Coastal Flooding and Sea Level Rise

- No state or federal disaster declarations specific to coastal flooding and sea level rise; although coastal flooding was likely a component of many of the disaster declarations for flood. The NCDC reported 4 events of coastal flooding and high surf for Alameda County.
- The frequency and severity of coastal flooding is expected to increase as sea levels rise.
- The western edge of the Tri-City Planning Area encompasses miles of shoreline, which is subject to coastal flooding and SLR.
- Coastal flooding is more intense during periods of king tides. NOAA notes that a king tide is a non-scientific term people often use to describe exceptionally high tides. Higher than normal tides typically occur during a new or full moon and when the Moon is at its perigee, or during specific seasons around the country. Should flooding occur around a king tide, damages in the Tri-City would be higher.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: High
- Priority Hazard

Dam Failure

- There are 23 dams in Alameda County that were constructed for flood control, storage, treatment impoundments, electrical generation, and recreational purposes. Of the 23 dams in Alameda County, 11 were rated as Extremely High Hazard, 7 are rated as High Hazard, 3 as Significant Hazard, and 2 as Low Hazard. Outside of Alameda County, 2 EH Hazard dams located in Santa Clara County also have inundation areas that intersect with the Tri-City Planning Area.
- Of these dams, 7 Extremely High Hazard, 2 High Hazard, and 3 Significant Hazard dams have the potential to impact (i.e., inundation areas) the Tri-City Planning Area.
- 1 of the Extremely High Hazard dams (Decoto), 2 High Hazard dams (Middlefield, Quarry Pits) and 2 Significant Hazard dams (Shinn, Rubber Dam #3, and Patterson) are owned by ACWD.
- Likelihood of Future Occurrence: Occasional
- Vulnerability: Extremely High
- Priority Hazard

Drought and Water Shortage

- Historical drought data for the Tri-City Planning Area and region indicate there have been 5 significant multi-year droughts in the last 84 years.
- 2 state disaster declarations in 1976 and 2014; 1 federal disaster declaration in 1976.
- ACWD supplies water to the Tri-City Planning Area. Their supply includes water that originates as precipitation within the Alameda Creek watershed and water that is transported from the Sacramento/San Joaquin River Delta through the South Bay Aqueduct. Sixteen wells are used to pump water from the groundwater basin to a system of distribution mains serving residents and businesses. These 16 wells are capable of producing up to 47.5 million gallons of water per day (MGD). An additional 20 percent of ACWD's water supply comes from the Hetch Hetchy Reservoir in Yosemite National Park. That water is purchased from the San Francisco Public Utilities Commission. ACWD also receives about 10 MGD of water from the Newark Desalinization Facility. This is the first brackish water desalinization (Desal) facility in Northern California.
- During the 2014-2016 drought years, ACWD customers reduced overall water use by 28% relative to baseline demands in 2013. The District experienced unprecedented participation in water use efficiency programs during the 2014-2016 drought years, as well as continued water use efficiency savings from plumbing code requirements, and currently estimated in its UWMP that a permanent 11% demand reduction will last beyond the end of drought.
- Likelihood of Future Occurrence: Likely
- Vulnerability: Medium
- Priority Hazard

Earthquake

- Geological data indicates that the Bay Area is located within an area of relatively high seismic activity and is traversed by multiple faults associated with the Pacific and North American plates.
- Level of earthquake hazard varies substantially by location and is primarily determined by several factors: earthquake magnitude, earthquake epicenter, earthquake depth, and soil and rock conditions.
- Since 1836, eight earthquakes of magnitude 6.0 or greater have occurred in the region. These include: 1906 M7.8 San Francisco; 1984 M6.4 Morgan Hill; 1989 M7.1 Loma Prieta; 2014 M6.0 Napa.
- Since 1950, there has been 1 disaster declaration in both Alameda County for the 1989 Loma Prieta Earthquake.
- Since 1950, there have been 35 earthquakes >5.0 occurring within 90 miles of the Planning Area (centered on Fremont).
- For the Tri-City Planning Area, the most damaging earthquakes would be those nearest to the Tri-City area (especially the Hayward Fault, as compounded by the Rogers Creek Fault; the Calaveras Fault, and also to a lesser extent possibly the Concord and Greenville Faults.) Large earthquakes on the San Andreas fault could also affect the Planning Area.
- Various Hazus Scenarios are being developed to model impacts associated with earthquake events on several of these faults.
- Damages from earthquakes may include those from ground shaking and surface rupture and also include secondary impacts from earthquake liquefaction, earthquake induced landslides, dam, reservoir and levee failures, and fires.
- Based on analysis of the Alquist-Priolo fault zones (where surface rupture could occur), portions of the Tri-City Planning Area is located in Alquist Priolo Zones.

- The Uniform Building Code (UBC) identifies four seismic zones in the United States. The zones are numbered one through four, with Zone 4 representing the highest level of seismic hazard. The UBC establishes more stringent construction standards for areas within Zones 3 and 4. All of California lies within either Zone 3 or Zone 4. The Planning Area is within the more hazardous Zone 4.
- The expected consequences of a major earthquake on the Tri-City Planning Area include not only building damage, but also casualties (injuries and deaths) and loss of important functions. The buildings most at risk are older buildings, designed to lower seismic performance standards compared to current or recent code buildings, especially buildings that are non-ductile such as masonry buildings.
- Liquefaction is a process where loose, wet sediments lose bearing strength during an earthquake and behave similar to a liquid. Settling or lateral spreading can cause major damage to buildings and to infrastructure such as roads, underground utilities, and levees.
- Based on the CGS Seismic Hazard Zone (liquefaction) Maps, the Tri-City Planning Area is underlain by many areas at risk to liquefaction. Almost the entire Planning Area is in the Moderate, High, or Very High Liquefaction Susceptibility Zones.
- In addition, several areas within the Tri-City Planning Area are also prone to earthquake induced landslides based on CGS mapping. These areas are generally confined to the sloped areas of the Planning Area where the susceptibility to landslides are greatest. This is predominantly in the Hills Open Space Area within the eastern portion of the Planning Area.
- Likelihood of Future Occurrence: Likely
- Vulnerability: Extremely High
- Priority Hazard

Flood Hazards

FEMA Mapped Floodplains - 1%/0.2% Annual Chance

- Historically, flooding associated with severe winter storms has been among the most common disasters in the Bay Area. The Tri-City Planning Area has frequently suffered significant damage in past severe winter storms from floods as well as from high winds, landslides, debris flows and erosion.
- 20 state federal disaster declarations related to heavy rains and flooding in Alameda County.
- 55 NCDC flood events since 1993 for Alameda County.
- The Tri-City Planning Area has several winter storm events every year, with damages in these events ranging from minor cleanup to millions of dollars. 4 severe storm events occurred in 1986, 1998 and 2005-2006, and 2016. Since 2016, 3 federal and 2 state declarations for severe storms and flooding occurred in 2017. There have been three federal disaster declarations to date from flooding in 2023.
- The most common damage from winter rains and storms and associated flooding have been to infrastructure, including: washouts of culverts; landslides or debris slides affecting roads, and bridges; erosion of channels and adjacent areas; and tree falls.
- Likelihood of Future Occurrence: 1%-Occasional; 0.5%-Unlikely;
- Vulnerability: High
- Priority Hazard

Localized/Stormwater flooding

- Flood hazard areas for the Tri-City Planning Area are not limited to areas within FEMA-mapped floodplains, and include areas affected by localized, stormwater flooding events.

- Since the last plans, 6 federal and 4 state declarations for heavy rain and storms, flooding, and other damages occurred.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Landslide

- Historically, the Tri-City Planning Area has experienced damage from various slope failures associated with heavy rains and winter storm events. Fremont was close to being in the path of the 1998 Mission Peak slide. Also, in December of 2022 and again in January of 2023, Niles Canyon Road in Fremont was closed due to mudslides.
- CGS maps show portions of the Planning Area in high to very high susceptibility areas to Deep-Seated Landslides. These areas are generally confined to the sloped areas of the Planning Area, predominantly in the Hills Open Space Area within the eastern portion of the Planning Area.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Levee Failure

- There are numerous levee segments in the Tri-City Planning Area.
- Levee failures can occur during high water events and under normal non-flood conditions. There are numerous causes for such failures, including scour, foundation failures, under-seepage, through-seepage, animal burrows, and others. Levees can also fail as a result of earthquakes.
- The probability of levee failure is increasing over time due to sea level rise, increased flooding potential from global climate change resulting in early winter snow melts, and the likelihood of an earthquake.
- Based on the DFIRMS, there are several 0.2%, X-protected by levee flood zones that protect the Tri-City Planning Area. (Note: This is based on levees that are certified as providing 100-year level of protection). However, other non-certified levee segments are located throughout the Planning Area.
- No disaster declarations for levee failure have occurred in Alameda County since 1950.
- Likelihood of Future Occurrence: Occasional
- Vulnerability: High
- Priority Hazard

Severe Weather

Extreme Cold and Freeze

- The Planning Area experiences annual occurrences of winter weather, including extreme cold and freeze. Alameda County's monthly average maximum temperatures in the coldest months (November through March) range from the low-40s to the mid-50s. The lowest recorded daily extreme was 21°F on December 22, 1922. In a typical year, maximum temperatures fall below 32°F on 6.5 days.
- No federal disaster declarations related to freeze or Cold. 5 NCDC events for extreme cold and freeze/snow since 1996.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Extreme Heat

- Annual occurrences – it gets hot every summer. In Alameda County, monthly average maximum temperatures in the warmest months (June through September) range from the upper-60s to the low 70s. The highest recorded daily extreme was 109°F on September 4, 1971. In a typical year, maximum temperatures exceed 90°F on 3.5 days.
- The NCDC data shows 25 extreme heat incidents for both Alameda County since 1996.
- September of 2022 saw many hot days, with cooling centers being opened. A state proclamation was declared for the heat.
- Climate change will continue to affect this hazard in the future.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Heavy Rains and Storms (Thunderstorms, Hail, Lightning)

- Significant Tri-City Planning Area history: annual occurrences. According to the WRCC, average annual precipitation in the Planning Area is 14.31 inches per year. The highest recorded annual precipitation is 31.52 inches in 1983; the highest recorded precipitation for a 24-hour period is 13.67 inches on March 1, 1907. The lowest recorded annual precipitation was 6.89 inches in 1959.
- 20 state and federal disaster declarations related to heavy rains and flooding in Alameda County; 27 NCDC heavy rain and storm events since 1993 in Alameda County.
- Severe storms/heavy rains are the primary cause of most major flooding. It also contributes to landslides, debris flows, and erosion in the Planning Area.
- The Tri-City Planning Area generally has several winter storm events every year, with damages in these events ranging from minor cleanup to millions of dollars. 4 severe storm events occurred in 1986, 1998 and 2005-2006, and 2016. Since the last plan, 3 federal and 2 state declarations for severe storms and flooding occurred in 2017. There have also been three federal disaster declarations to date from severe storms and flooding in 2023.
- The most common damage from winter rains and storms and associated flooding have been to infrastructure, including: washouts of culverts; landslides or debris slides affecting roads, and bridges; erosion of channels and adjacent areas; and tree falls.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

High Winds and Tornadoes

- Annual occurrences of high wind events
- No state or federal disaster declarations. The NCDC data recorded 358 high wind incidents for Alameda County since 1955. This includes 3 tornado events (all of which were F0 – 1982, 1992, 1994). Diablo winds are a significant concern in the region and can contribute to wildfire spread and associated damage.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Subsidence

- According to the 2023 State HMP, the primary causes of subsidence in California is associated with groundwater pumping, peat loss, and oil extraction.
- Union City mentioned a sinkhole in 2023 occurred. They noted that “We have seen other sink holes develop in Union City in the past and believe this will likely occur in our City again.”
- USD in their Sea Level Rise Report noted that the National Research Council tracks subsidence and their “values include subsidence of 1.5 mm yr-1 for all of California south of Cape Mendocino due to deep tectonic movements.” The report also noted potential subsidence issues resulting from the added fill in the area on poorly compacted Bay Muds.
- 2023 State Plan has Tri-City mapped near an area where subsidence is occurring due to groundwater pumping.
- Likelihood of Future Occurrence: Unlikely – Occasional
- Vulnerability: Medium
- Non-Priority Hazard (for the Planning Area as a whole)

Tsunami

- There has been no state or federal disaster declarations in Alameda County due to tsunami. The NCDC identifies 1 Tsunami event for Alameda County - March 11, 2011.
- The 2021 Alameda County LHMP reported that more than 71 tsunamis have been recorded in San Francisco Bay since 1854. Most of these tsunamis were generated by earthquakes in distant subduction zones near Russia, Japan, or Alaska. The worst tsunami to hit the Bay Area was generated in Alaska by a M 9.2 earthquake on March 27, 1964. This event produced a 2-foot runup in the nearby City of Alameda and a 4-foot runup in the City of Oakland. On March 11, 2011, a tsunami generated in Japan from the Fukushima earthquake resulted in a 2-foot runup in the nearby cities of Alameda and Berkeley.
- While life safety and property damage are a significant concern, other tsunami impacts are to natural resources (wetlands, endangered species, and habitat areas).
- Likelihood of Future Occurrence: Occasional
- Vulnerability: Medium
- Priority Hazard

Wildfire

- Wildfires occur on an annual basis in the Tri-City Planning Area.
- Any ignition has the potential to become an out of control wildfire.
- 1 state (1970) and 2 federal (1970 and 1991 (Tunnel Fire)) disaster declarations since 1950. 18 NCDC Events.
- Under normal conditions, most fires that start in the Tri-City Planning Area are efficiently controlled by firefighters with no loss of life or structures. A phenomenon known as “Diablo winds” can affect the severity of a wildfire. Red Flag days occur during conditions of low humidity, high temperatures, and hot, dry Diablo winds blowing in from the east and usually occur in the fall months. In recent years, these events are occurring more often.
- During the 75-year period between 1923 and 1998, 11 Diablo wind-driven fires in the Berkeley/Oakland hills burned a total of 9,840 acres, destroyed more than 4,000 homes, took 26 lives, and resulted in over \$2 billion in financial losses. The most significant fire in this period was the October 20, 1991 Tunnel Fire in the Oakland-Berkeley hills. The fire resulted in 25 deaths, 150 injuries,

and the displacement of over 10,000 persons. With destruction and damage to over 3,400 residential units, losses were in excess of \$1.5 Billion in 1991 dollars.

- The threat of catastrophic wildfires under Diablo wind conditions presents significant risks to public health and safety, homes, and property along the wildland-urban interface (WUI). This risk increases with an increase in development along the WUI.
- Recent drought conditions have exacerbated the risk of major wildland/urban interface fires in or near the Tri-City Planning Area.
- Wildfire smoke from other areas outside the Planning Area have occurred numerous times in the past. Though the fire itself may not affect the Tri-City, smoke and air quality effects have been felt and will continue to be an issue in the Planning Area.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Extremely High
- Priority Hazard

Tri-City Priority Hazards (by Jurisdiction)

City of Fremont

Priority Hazards:

- Climate Change
- Coastal Flooding and Sea Level Rise
- Dam Failure
- Earthquake
- Flood: 1%/0.2% annual chance
- Flood: Localized/Stormwater
- Landslide
- Levee Failure?
- Severe Weather: Extreme Cold and Freeze?
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms (hail, lightning)
- Severe Weather: High Winds and Tornadoes?
- Tsunami
- Wildfire

Non-Priority Hazards:

- Drought and Water Shortage
- Subsidence
-
-

City of Newark

Priority Hazards:

- Climate Change
- Coastal Flooding and Sea Level Rise
- Dam Failure
- Drought & Water Shortage
- Earthquake
- Flood: 1%/0.2% annual chance
- Flood: Localized/Stormwater
- Landslide
- Levee Failure
- Severe Weather: Extreme Cold and Freeze?
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms (hail, lightning)
- Severe Weather: High Winds and Tornadoes?
- Tsunami
- Wildfire

Non-Priority Hazards:

- Subsidence
-
-

City of Union City

Priority Hazards:

- Climate Change
- Coastal Flooding and Sea Level Rise
- Dam Failure
- Drought & Water Shortage
- Earthquake
- Flood: 1%/0.2% annual chance
- Flood: Localized/Stormwater
- Landslide
- Levee Failure
- Severe Weather: Extreme Cold and Freeze?
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms (hail, lightning)
- Severe Weather: High Winds and Tornadoes?
- Tsunami?
- Wildfire

Non-Priority Hazards:

- Subsidence
-
-

Alameda County Water District

Priority Hazards:

- Dam Failure
- Earthquake
- Severe Weather: Heavy Rains and Storms (hail, lightning)

Non-Priority Hazards:

- Climate Change
- Coastal Flooding and Sea Level Rise
- Drought & Water Shortage
- Flood: 1%/0.2% annual chance
- Flood: Localized/Stormwater
- Landslide
- Levee Failure
- Severe Weather: Extreme Cold and Freeze
- Severe Weather: Extreme Heat
- Severe Weather: High Winds and Tornadoes
- Subsidence
- Tsunami
- Wildfire

Union Sanitary District

Priority Hazards:

- Climate Change
- Coastal Flooding and Sea Level Rise
- Dam Failure
- Drought & Water Shortage
- Earthquake
- Flood: 1%/0.2% annual chance
- Flood: Localized/Stormwater
- Landslide
- *Levee Failure?*
- *Severe Weather: Extreme Cold and Freeze?*
- *Severe Weather: Extreme Heat*
- *Severe Weather: Heavy Rains and Storms (hail, lightning)*
- *Severe Weather: High Winds and Tornadoes?*
- Subsidence
- *Tsunami?*
- Wildfire

Non-Priority Hazards:

-
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Mitigation Strategy: Goals

The most important element of the LHMP is the resulting mitigation strategy which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy is comprised of three components:

6. Mitigation Goals
7. Mitigation Actions
8. Mitigation Action (Implementation) Plan

Mitigation Goals

Up to now, the Planning Committee has been involved in collecting and providing data for the Tri-City Local Hazard Mitigation Plan. From this information, a Risk Assessment has been developed that describes the risk and vulnerability of the Tri-City Planning Area to identified hazards and includes an assessment of the area's current capabilities for countering these threats through existing policies, regulations, programs, and projects.

This analysis identifies areas where improvements could or should be made. Formulating Goals will lead to incorporating these improvements into the Mitigation Strategy portion of the LHMP. Our planning goals should provide direction for what risk reduction activities can be undertaken to make the Tri-City Planning Area more disaster resistant.

Mitigation Goals are general guidelines that represent the community's vision for reducing or avoiding losses from identified hazards. Goals are stated without regard for achievement, that is, implementation, cost, schedule, and means are not considered.

Goals are public policy statements that:

- **Represent basic desires of the jurisdiction;**
 - **Encompass all aspects of planning area, public and private;**
 - **Are nonspecific, in that they refer to the quality (not the quantity) of the outcome;**
 - **Are future-oriented, in that they are achievable in the future; and**
 - **Are time-independent, in that they are not scheduled events.**
- ❖ ***While goals are not specific (quantitative), they should not be so general as to be meaningless or unachievable.***
 - ❖ ***Goal statements may form the basis for objectives. They should be stated in such a way as to develop one or more objectives related to each goal.***
 - ❖ ***The key point in writing goals is to remember that they must deal with results, not the activities that produce those results.***
 - ❖ ***Consider other planning area goals from other regional/county/city programs, plans and priorities.***

Types/Sources of other area mitigation plans/ programs include:

- General Plans
- Master Plans
- Stormwater Program and Plans
- Flood/Watershed Management Plans and Studies
- Drought Plans, Urban/Integrated Regional Water Management Plans
- Community Wildfire Protection Plans
- Strategic Fire Plans
- Dam Emergency Action Plans
- Emergency Operations Plans
- Climate Plans
- Others?

2018 California State Hazard Mitigation Plan Goals

1. Significantly reduce life loss and injuries.
2. Minimize damage to structures and property, as well as minimizing interruption of essential services and activities.
3. Protect the environment.
4. Promote community resilience through integration of hazard mitigation with public policy and standard business practices.

2023 (Draft) State Hazard Mitigation Plan Goals

GOAL 1—Significantly reduce risk to life, community lifelines, the environment, property, and infrastructure by planning and implementing whole-community risk reduction and resilience strategies.

GOAL 2—Build capacity and capabilities to increase disaster resilience among historically underserved populations, individuals with access and functional needs, and communities disproportionately impacted by disasters and climate change.

GOAL 3—Incorporate equity metrics, tools, and strategies into all mitigation planning, policy, funding, outreach, and implementation efforts.

GOAL 4—Apply the best available science and authoritative data to design, implement, and prioritize projects that enhance resilience to natural hazards and climate change impacts.

GOAL 5—Integrate mitigation principles into laws, regulations, policies, and guidance to support equitable outcomes to benefit the whole community.

GOAL 6— Significantly reduce barriers to timely, efficient, and effective hazard mitigation planning and action.

Tri-City Goals from Previous LHMPs (This is what we are updating)

City of Fremont 2016 LHMP

The goal of the LHMP is to maintain and enhance a disaster-resistant City by reducing the potential for loss of life, property damage, and environmental degradation from natural disasters, while accelerating economic recovery from those disasters. This goal is unchanged from the 2005 and 2012 plan and continues to be the goal of the City of Fremont.

City of Newark, Union City, USD (and old ACWD) 2017 LHMP

1. Protect the public's health and safety and minimize the damage to essential services, structures, property, and infrastructure as a result of hazards.
2. Promote hazard mitigation as an integrated public policy and as a standard business practice.
3. Encourage the development and implementation of long-term, cost effective, and environmentally sound mitigation projects.
4. Build and support local capacity to enable the public to prepare, respond, and recover from the impact of natural hazards.
5. Provide increased safety through the provision of adequate infrastructure, public education, and outreach programs.

6. Incorporate elements of hazard mitigation into cross functional planning and regulatory initiatives.
7. Retrofit, purchase, or relocate structures in high hazard areas, especially those known to be repetitively damaged.

ACWD 2022 LHMP

1. Protect the public's health and safety and minimize damage to essential services, structures, property, and infrastructure as a result of hazards.
2. Promote hazard mitigation as an integrated public policy and as a standard business practice.
3. Encourage the development and implementation of long-term, cost effective, and environmentally sound mitigation projects.
4. Build and support local capacity to enable the public to prepare, respond, and recover from the impact of natural hazards.
5. Provide increased safety through the provision of adequate infrastructure, public education, and outreach programs.
6. Incorporate elements of ACWD specific hazard mitigation into regional planning and regulatory initiatives.
7. Continuously monitor the functions of ACWD infrastructure in high hazard areas, especially those known to be in areas of potential damage from identified events.

Other Example Goal Statements

- Minimize risk and vulnerability from natural hazards
- Increase communities' awareness of vulnerability to hazards
- Increase the use of shared resources
- Improve communities' capabilities to mitigate losses
- Maintain coordination of disaster plans with changing DHS/FEMA needs
- Maintain FEMA eligibility/position jurisdictions for grant funding
- Maintain/enhance the flood mitigation program to provide 200/500-year flood protection
- Maintain current service levels
- Provide protection for existing buildings from hazards
- Provide protection for future development from hazards
- Provide protection for natural and cultural resources from hazard impacts
- Provide protection for people's lives from hazards
- Provide protection for public health
- Provide protection for critical services (fire, police, etc.) from hazard impacts
- Provide protection for critical lifeline utilities from hazard impacts
- Reduce exposure to hazard related losses
- Reduce the number of emergency incidents
- Make better use of technology

General Recommendation for Categories of Goals

- Reduce Losses/Protection of Life, Property, Public Health, and the Environment from all Hazards
- Reduce Losses/Protection of Critical Facilities and Infrastructure from all Hazards
- Public Education
- Increase County Capabilities to all Hazards
- Any Hazard-specific goals
- Integrate strategies for the protection of underserved and vulnerable populations

Goals Development

The purpose of goal's development is to reach a consensus on goals for the Tri-City 2024 LHMP. Provided above are example goals for this LHMP. ***You may reword those above or develop your own goals.*** These goal statements should serve as examples. It is vital that our Planning Committee establish its own goals.

You will each be given 3 sticky notes. On each note you will write what you think the goals for this Tri-City LHMP should be. Use one sticky note for each goal.

When done, we will:

- Pin/tape them to the wall/easel-chart and arrange them by category
- Combine and reword them into 3-5 goals for the plan and send them out to the Planning Committee for further review and refinement.

**Mitigation Strategy Meetings
September 19 & 20, 2023
Day 2**

Mitigation Strategy Action Development: Ground Rules

Rule 1: Each Participating Jurisdiction **MUST** have a Mitigation Action/Project to address each of their Priority Hazards (those rated as a high or medium significance in their Hazard Identification table).

Rule 2: Every Mitigation Action/Project **MUST** be supported by Risk Assessment Data contained within Chap 4 of the Base Plan and/or within jurisdictional annexes. Note: this might necessitate backfilling the hazard risk assessment data.

Rule 3: The Mitigation Actions/Projects for this 2024 LHMP should reflect each Participating Jurisdictions' WISH LIST for mitigation, regardless of funding source.

Rule 4: Any Mitigation Action/Project that might be considered for FEMA mitigation grant funding over the next 5-years covered by this LHMP **MUST** be included in this 2024 LHMP.

Rule 5: While the updated Mitigation Strategy should include all potential Mitigation Actions/Projects for each Participating Jurisdiction (regardless of funding source), keep in mind that no jurisdiction is obligated to implement ANY of the identified Mitigation Actions/Projects – all are always subject to funding and changing priorities.

Rule 6: Each Mitigation Action/Project to be included in this LHMP **MUST** have a Mitigation Action Worksheet completed by the owning Department or Agency. This applies to Mitigation Actions/Projects being carried forward from each Jurisdictions' previous LHMPs.

Rule 7: Each Participating Jurisdiction **CAN LATER** include Mitigation Actions/Projects that might not get identified during this Mitigation Action/Project Prioritization process – the key is to complete a Mitigation Action Worksheet for any project to be included in the LHMP prior to submittal to Cal OES/FEMA.

REMEMBER: Having a FEMA approved LHMP for your Jurisdiction is a prerequisite for being eligible to apply for FEMA pre and post mitigation funding.

Mitigation Strategy: Actions

Mitigation Actions are specific projects and activities that help achieve the goals and accomplish risk reduction in the community.

Categories of Mitigation Actions

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
 - ✓ Building Codes
 - Fire-Wise Construction
 - ✓ Floodplain development regulations
 - ✓ Geologic Hazard Areas development regulations (for roads too!)
- Storm Water Management
- Fuels Management, Fire-Breaks

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

- Warning (flooding, tornadoes, winter storms, geologic hazards, fire)
 - ✓ NOAA Weather Radio
 - ✓ Sirens
 - ✓ “Reverse 911” (Emergency Notification System)
- Emergency Response
 - ✓ Evacuation & Sheltering
 - ✓ Communications
 - ✓ Backup power supply/generators
 - ✓ Emergency Planning
 - Activating the EOC (emergency management)
 - Closing streets or bridges (police or public works)
 - Shutting off power to threatened areas (utility company)
 - Holding/releasing children at school (school district)
 - Ordering an evacuation (mayor)
 - Opening emergency shelters (Red Cross)
 - Monitoring water levels (engineering)
 - Security and other protection measures (police)
- 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
- Post-Disaster Mitigation
- Building Inspections
 - ✓ ID mitigation opportunities & funding before reconstruction

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/Elevation
 - Acquisition
 - Retrofitting
 - ✓ High Winds/Tornadoes
 - Safe Rooms
 - Securing roofs and foundations with fasteners and tie-downs
 - Strengthening garage doors and other large openings
 - ✓ Winter Storms
 - Immediate snow/ice removal from roofs, tree limbs
 - “Living” snow fences
 - ✓ Geologic Hazards (Landslides, earthquakes, sinkholes)
 - Anchoring, bracing, shear walls
 - Dewatering sites, agricultural practices
 - Catch basins
 - ✓ 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
 - ✓ Wildfire, Grassfires
 - Replacing building components with fireproof materials
 - Roofing, screening
 - Create “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 natural 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:

- Wetlands Protection
- Riparian Area/Habitat Protection/Threatened-Endangered Species
- Erosion & Sediment Control
- 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:

9. Avoidance: setting construction projects back from the stream.
10. Reduction: Preventing runoff that conveys sediment and other water-borne pollutants, such as planting proper vegetation and conservation tillage.
11. 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
- Set-back regulations/buffers

- Fuels Management
- Water Use Restrictions
- Landscape Management
- Weather Modification

STRUCTURAL: Projects that 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 or requiring Environmental Assessments.
- 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
- Anchoring, grading, debris basins (for landslides)
- 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, speakers, displays)
- Library Resources
- Real Estate Disclosure
- Environmental Education

Mitigation Actions/Projects from previous LHMPs (This is what we are updating)

| Mitigation Action (2016/2017/2022 LHMPs) | Complete | Ongoing | Not Started | Project in LHMP Update |
|--|----------|---------|-------------|------------------------|
| 2016 City of Fremont Mitigation Actions | | | | |
| Perform appropriate seismic and fire safety analysis based on current and future use for all City-owned facilities and structures. | | | | |
| Strengthen, rehabilitate or replace City facilities and structures, based on the seismic and fire safety analysis, as funding is available. | | | | |
| Conduct ongoing training for first responders and City personnel to ensure they have the necessary training and equipment to deal with a hazard (including natural and man-made disasters). | | | | |
| Reduce seismic and fire risk in existing development through building and fire code updates and enforcement. | | | | |
| Explore local legislation to regulate the storage of hazardous materials to be protected from flood zones, rising sea levels and tsunami inundation areas. | | | | |
| Coordinate disaster preparation and mitigation practices with private sector, public institutions and other public bodies. | | | | |
| Protect vulnerable water facilities to ensure an adequate water supply during emergencies and disaster recovery. | | | | |
| Protect vulnerable electric systems and facilities and build resiliency so disruption to the system is minimized during and following disasters. Ensure adequate redundancy and fuel is available to maintain critical facilities. | | | | |
| Improve the disaster-resistance of the natural gas delivery system to increase public safety and to minimize damage and service disruption following a disaster. | | | | |
| Protect vulnerable wastewater facilities to ensure wastewater is treated during emergencies and disaster recovery. | | | | |
| Perform hazard vulnerability analysis for solid waste management facilities utilized by the City. | | | | |
| Integrate Climate Action Plan goals and actions with the Local Hazard Mitigation Plan goals and actions, if determined feasible. | | | | |
| Integrate climate change research and adaptation planning into City operations and services. | | | | |
| Rehabilitate the City’s storm water system to reduce local flooding of nearby streets, utilities and buildings, caused by storm drainage during storms, high tides, sea level rise, seismic events and power outages. | | | | |
| Streamline the permitting process to rebuild residential and commercial structures following disasters. | | | | |
| Provide outreach activities related to hazard mitigation and disaster preparedness. | | | | |
| Reduce hazard vulnerabilities for non-City-owned buildings throughout Fremont. | | | | |

| Mitigation Action (2016/2017/2022 LHMPs) | Complete | Ongoing | Not Started | Project in LHMP Update |
|--|----------|---------|-------------|------------------------|
| Utilize vegetation management to reduce risks in existing development | | | | |
| The City's Soft-Story Residential Building Program, Existing Tilt-Up Concrete and Reinforced Masonry Buildings Programs were to be completed by 2008. All known buildings have been retrofitted and removed from the list of buildings out of compliance. If additional buildings are found to be out of compliance, the City will continue to implement the programs. | | | | |
| Continue the City's participation in the National Flood Insurance Program. | | | | |
| Establish cooling centers and encourage landscaping improvements to reduce Fremont resident's vulnerability to extreme heat events, severe storms, and associated hazards. | | | | |
| Collaborate with ACWD, local, state, regional and federal partners to increase the security of Fremont's water supply from climate change impacts. | | | | |
| Mitigate the impacts of sea level rise in Fremont, by making shoreline and Bay lands facilities more resilient to earthquake, storm and high water elevation hazards in order to maintain functionality and protect inland facilities. Define any associated tsunami hazards and mitigation. | | | | |
| 2017 City of Newark Actions | | | | |
| Where appropriate, support retrofitting, purchase, or relocation of structures in hazard-prone areas to prevent future structure damage. Give priority to properties with exposure to repetitive losses. | | | | |
| Continue to support the Planning Area-wide actions identified in this plan. | | | | |
| Actively participate in the plan maintenance strategy identified in this plan. | | | | |
| Consider participation in incentive-based programs such as the Community Rating System, Tree City, and StormReady. | | | | |
| Maintain good standing under the National Flood Insurance Program by implementing programs that meet or exceed the minimum NFIP requirements. Such programs include enforcing an adopted flood damage prevention ordinance, participating in floodplain mapping updates, and providing public assistance and information on floodplain requirements and impacts. | | | | |
| Integrate the HMP into other plans, programs, or resources that dictate land use or redevelopment. | | | | |
| Adopt the 2016 California Building Code. | | | | |
| Update the city zoning code, including considerations for hazard mitigation. | | | | |
| Include elements of the HMP to inform future updates to the Newark Climate Action Plan. | | | | |

| Mitigation Action (2016/2017/2022 LHMPs) | Complete | Ongoing | Not Started | Project in LHMP Update |
|--|----------|---------|-------------|------------------------|
| Complete Railroad overcrossing at Central Avenue to prevent isolation during seismic event. | | | | |
| Replace Eucalyptus groves with non-hazardous tree species. | | | | |
| Conduct storm drainage improvements along Lindsay Tract Street | | | | |
| Retrofit police administration building to essential services/critical facility standards. | | | | |
| Retrofit Administration Building and Library to current seismic standards. | | | | |
| Relocate current Emergency Operations Center (EOC) and update critical EOC equipment. | | | | |
| Develop a comprehensive post disaster recovery plan. | | | | |
| Develop a comprehensive Continuity of Operations (COOP) Plan for Administration and templates for individual department COOP development. | | | | |
| Retrofit and update the Fire Station Training Facility (Station 27). | | | | |
| Develop a jurisdiction-wide tree inventory and long-term tree management plan including an outreach initiative encouraging Newark residents to conduct tree maintenance on private property. | | | | |
| Developed a phased approach to citywide tree inspection and pruning. | | | | |
| Develop a comprehensive public outreach campaign that informs residents of pipeline risks in the community and provides safety information on how to identify potential pipeline failure hazards. | | | | |
| 2017 Union City Mitigation Actions | | | | |
| Where appropriate, support retrofitting, purchase, or relocation of structures in hazard-prone areas to prevent future structure damage. Give priority to properties with exposure to repetitive losses. | | | | |
| Continue to support the Planning Area-wide actions identified in this plan. | | | | |
| Actively participate in the plan maintenance strategy identified in this plan. | | | | |
| Consider participation in incentive-based programs such as the Community Rating System, Tree City, and StormReady. | | | | |
| Maintain good standing under the National Flood Insurance Program by implementing programs that meet or exceed the minimum NFIP requirements. Such programs include enforcing an adopted flood damage prevention ordinance, participating in floodplain mapping updates, and providing public assistance and information on floodplain requirements and impacts. | | | | |
| Integrate the hazard mitigation plan into other plans, programs, or resources that dictate land use or redevelopment | | | | |
| Seek City Council approval and funding for a full-time Emergency Manager job classification. | | | | |
| Update the citywide Continuity of Operations/Continuity of Government (COO/COG) Plan from the Comprehensive Emergency Management Plan (CEMP), and implement required COO/COG actions. | | | | |

| Mitigation Action (2016/2017/2022 LHMPs) | Complete | Ongoing | Not Started | Project in LHMP Update |
|--|----------|---------|-------------|------------------------|
| Based on EOC staffing capabilities assessment, ensure that mandated training is provided to all employees in SEMS, FEMA ICS-100, ICS-200, IS-700, and IS-800; and ensure that employee training records are securely maintained. | | | | |
| Based on EOC staffing capabilities assessment, ensure that mandated training is provided to employees who require advanced knowledge and application of the ICS, such as primary and alternate EOC Section Chiefs and senior field personnel, to include at least ICS-300, ICS-400, and the FEMA Professional Development Series; and ensure that employee training records are securely maintained. | | | | |
| Based on EOC staffing capabilities assessment, ensure that all Police Department staff who may be assigned the role of incident commander at an emergency/disaster scene have received Incident Commander training; and ensure that employee training records are securely maintained. | | | | |
| Monitor local availability of upcoming training opportunities for city staff regarding incident staffing, disaster response, and recovery. | | | | |
| Conduct EOC tabletop exercise(s) to evaluate capabilities and train employees in their assigned EOC role(s). | | | | |
| Develop and exercise a Disaster Debris Management Plan. | | | | |
| Enhance public education and awareness of natural and manmade hazards in the community and public understanding of disaster preparedness, including foreign language translations. | | | | |
| Ensure all property address signage meets current Building and Fire Code standards. | | | | |
| Develop improved capabilities to incorporate GIS technology by all departments into services provided to the public and for use during emergency/disaster incidents. | | | | |
| Conduct a test of emergency communications and information systems interoperability, to establish baseline capabilities for employee call-back, communications between the EOC and incident command, and communications with the Operational Area and Mutual Aid resources. | | | | |
| Implement Fire Department field inspection system using portable computers for engine company inspections and Fire Prevention inspections, to integrate inspections, re-inspections, invoicing, permits, CUPA and business license data. | | | | |
| Review, revise, and update the Comprehensive Emergency Management Plan (CEMP) – ACFD contract requirement | | | | |
| Conduct a gap analysis of the Union City Emergency/Disaster preparedness and response program, to include a comprehensive review of employee training requirements and needs, plans and procedures, EOC equipment and staffing capabilities, and related analyses. | | | | |
| Conduct a seismic and functional assessment of the CERT trailer behind Fire Station #31, for use as the designated Alternate EOC site. | | | | |
| Train appropriate staff in FEMA’s Hazards-US GIS extension and Benefit/Cost Analysis Tool for use in potential grant applications and post-disaster property assessments. | | | | |

| Mitigation Action (2016/2017/2022 LHMPs) | Complete | Ongoing | Not Started | Project in LHMP Update |
|--|----------|---------|-------------|------------------------|
| Acquire handheld GPS trackers to develop an urban tree inventory for monitoring the health of trees and identifying potentially dangerous dead or dying trees. | | | | |
| Develop a long-term urban forest management plan to address adverse future impacts on the City's natural resources. | | | | |
| Develop and maintain a landscape design manual to provide general guidance and education to the public on water efficiency in landscaping and to serve as a resource for water efficient landscape design and installation, including lists of recommended site appropriate native and drought-tolerant plant species. | | | | |
| Integrate climate change and natural hazards planning in to current city plan revisions and future planning initiatives. | | | | |
| Work with ACWD to design and install seismically resilient backbone pipeline through liquefiable soils in Union City | | | | |
| Acquire emergency generators for the City's critical facilities, specifically Fire Station 31, the Senior Center, and Corporation Yard. | | | | |
| Conduct a comprehensive structural seismic analysis of the City's facilities. | | | | |
| Establish a Broadband-WiFi10g network in the Station District. | | | | |
| Establish a Broadband-WiFi10g network backbone infrastructure along major thoroughfares throughout the City. | | | | |
| Conduct a Feasibly Study to review necessary improvements required to make Mark Green Sports Center a base camp for recovering families after crisis | | | | |
| Conduct a Feasibility Study to identify temporary morgue facilities. | | | | |
| Conduct a Feasibility Study to review the highway overpass bridge of Alvarado Niles Road over I-880 , for any seismic upgrades | | | | |
| Coordinate with the city of Hayward to conduct a Feasibility Study to review any seismic upgrades for the I-880 overpass over Whipple Road | | | | |
| Construct grade separations on the Niles Subdivision and the Oakland Subdivision in the Decoto neighborhood, and on the Coast Subdivision on Union City Boulevard, Smith Street, Dyer Street, and Alvarado Boulevard. | | | | |
| Acquire two Mobile Emergency Operations Centers | | | | |
| Acquire two 4-wheel drive emergency response vehicles capable of supporting emergency/disaster workers with enhanced safety when traveling into and out of disaster zones or dangerous locations. | | | | |
| Acquire four radio charging stations for spare radios. | | | | |
| Acquire two Mobile Ultra High Frequency (UHF) Base Units to communicate with deployed field radios. | | | | |
| Acquire 100 portable beds/cots for use to support sheltering/mass care operations during a disaster. | | | | |
| Acquire four satellite phone. | | | | |
| Acquire two rescue boats | | | | |

| Mitigation Action (2016/2017/2022 LHMPs) | Complete | Ongoing | Not Started | Project in LHMP Update |
|--|----------|---------|-------------|------------------------|
| Establish redundant, offsite copies of crucial information and all City data to be able to maintain basic network functions. | | | | |
| Establish a fully redundant data center with no outage if the main building fails. | | | | |
| Acquire offsite battery backups to carry energy load until generators start. | | | | |
| Develop unmanned aerial vehicle (UAV) capability for hazard mitigation surveys and post-disaster damage assessments; and develop policies, procedures and staff training guidelines for UAV use. | | | | |
| Develop multi-cultural training presentations and handouts in multiple languages, to expand participation in the Community Emergency Response Team (CERT) program. | | | | |
| Establish a central paging system for all City locations to be expanded for SMS/cell phone alerts during major disasters. | | | | |
| Establish a high speed link from all City facilities back to City Hall | | | | |
| Establish a second location in the City to provide internet/email/external connections, as a backup to the existing City Hall systems that perform this function. | | | | |
| Establish a portable unit or fixed location for use as a community preparedness training site, volunteer coordination point, and disaster first responder work station center with access to the City's computer network, to supplement the Emergency Operations Center. | | | | |
| Expansion of central lock system to all off sites and all doors. | | | | |
| 2022 Alameda County Water District Actions | | | | |
| Develop and maintain an asset management program that tracks natural hazard events that impact the District and captures damages to District assets, service disruption and other perishable data (e.g., high water marks, preliminary damage estimates, damage photos) to support future mitigation efforts including the implementation and maintenance of the HMP). If feasible, review historic incident reports and jobs for information related to past hazard events. | | | | |
| Reevaluate standby generator needs and purchase and install as needed, such as at the desalinization plant and aquifer reclamation production wells. | | | | |
| Design and install a seismically resilient backbone pipeline through liquefiable soils, primarily in Union City. | | | | |
| Install emergency isolation valves into the distribution system with remote operation capability, as appropriate. | | | | |
| Retrofit and/or update District tanks and reservoirs to improve seismic resilience, including reservoir roof at the following: Alameda, Decoto, Middlefield, and Patterson. | | | | |
| Consider the purchase and installation of fuel cells as alternative emergency power backup systems at Newark Desalination Facility and the Blending Facility. | | | | |

| Mitigation Action (2016/2017/2022 LHMPs) | Complete | Ongoing | Not Started | Project in LHMP Update |
|---|----------|---------|-------------|------------------------|
| Conduct channel betterments on the Vallecitos Channel or install a pipeline adjacent to the channel to increase reliability of flows to facilitate groundwater recharge. | | | | |
| Repair diversion capability through the Kaiser embankment to ensure post disaster groundwater recharge capabilities and to protect the natural and beneficial functions of the Kaiser Ponds. | | | | |
| As needed, review, update and enhance intertie agreements with the City of Hayward and the City of Milpitas. | | | | |
| Consider identifying a sister jurisdiction and develop a protocol for exchanging post event Shakecast information. | | | | |
| Study water supply reliability alternatives including recycled water, and Lake Del Valle and Los Vaqueros reservoir storage expansion projects to improve water supply capabilities from catastrophic losses of supply. | | | | |
| Continue to participate in local emergency response trainings and exercises. | | | | |
| Ensure appropriate staff is trained to support District functions when the Emergency Operations Center is activated. | | | | |
| Continue to integrate the capital improvement program with the HMP. | | | | |
| Continue to prioritize and implement distribution system replacements and improvements to identified critical consumers and/or vulnerable areas. | | | | |
| Where appropriate, support retrofitting, purchase or relocation of structures located in high hazard areas and prioritize those structures that have experienced repetitive losses. | | | | |
| Actively participate in the plan maintenance protocols outlined in Volume I of the HMP | | | | |
| Continue implementing a comprehensive demand management program. | | | | |
| Continue existing vegetation management program to minimize risk of wildfire and landslides. | | | | |
| Consider a post-disaster recovery plan and coordinate with Tri Cities on their debris management plans. | | | | |
| Review the City of Fremont’s HMP and coordinate with Fremont’s Emergency Planner to further develop HMP. | | | | |
| Installing a second Deep Aquifer water well at the Mowry Wellfield which is not known to be impacted by PFAS and will prove to be beneficial for long term water supply reliability. As a portion of the groundwater supply is utilized by ACWD as dry year and multi-year critical drought reserve, it’s use is being limited by the detection of PFAS. A second well, will make a portion of the dry year and multi-year critical drought reserve available again, thereby alleviating impacts. | | | | |

| Mitigation Action (2016/2017/2022 LHMPs) | Complete | Ongoing | Not Started | Project in LHMP Update |
|--|----------|---------|-------------|------------------------|
| Construct a system to treat 6 MGD of well water at the blending facility for PFAS and increase the amount of water the facility can provide to our customers while maintaining PFAS levels below the Notification Levels. As a portion of the groundwater supply is utilized by ACWD as dry year and multi-year critical drought reserve, it's use is being limited by the detection of PFAS. Treatment will make the dry year and multi-year critical drought reserve available again, thereby alleviating impacts. | | | | |
| Complete a redesign of blending facility to allow low production and neat chemical feed. | | | | |
| Evaluation and preliminary design of an intertie with San Francisco Inter-Bay Pipeline 1, 2 and/or 5. | | | | |
| Complete desalinization facility reliability enhancements as indicated in the Integrated Resources Plan. | | | | |
| 2017 Union Sanitary District Mitigation Actions | | | | |
| Build a new facilities maintenance shop – facility will meet seismic standards and built on a raised foundation to accommodate hazards of sea level rise and flooding | | | | |
| Equalization Storage Basin at Alvarado. Basin will temporarily hold waste water if discharge through the East Bay Dischargers Authority (EBDA) system is interrupted. This prevents discharge of treated waste into Alameda Creek. | | | | |
| Build Digester No. 7. With decreased liquid flow and increased solids management, increased digester operations are required to properly treat solid waste which will also generate additional bio-gas for co-generation of electricity. | | | | |
| Rebuild East Aeration Tank Roof – The tank concrete roof has been identified as seismically unstable and has a weakened load capacity. Loss of this structure reduces our treatment capacity by 20%. | | | | |
| Seismic upgrade of Primary Clarifier 1-4 - The roof structure over the clarifiers has been identified as seismically unstable. Loss of this structure would reduce our treatment capacity by approximately 85 percent. | | | | |
| Upgrade Standby Power Generation System - Replace the current 6 standby diesel generators for the treatment plant with newer more reliable generators that produce fewer emissions. | | | | |
| Emergency back-up data communications – provide redundant data communications for monitoring and operation of USD wastewater pumping and treatment equipment at the treatment plant and pump stations. | | | | |
| Integrate the HMP into other plans and programs (e.g. CIP, District-Wide Master Plan) | | | | |
| Develop and implement a program and process to capture historical and perishable data after any event to support future mitigation efforts. | | | | |
| Participate in the HMP maintenance and updating outlined in Volume I of this HMP. | | | | |
| Improve Public Information and Public Outreach to include Hazard Mitigation Programs. Includes newsletter and educational video. | | | | |

| Mitigation Action (2016/2017/2022 LHMPs) | Complete | Ongoing | Not Started | Project in LHMP Update |
|---|----------|---------|-------------|------------------------|
| Seismic Retrofit of Concrete Structures - This is an ongoing project of improving concrete structures as we have other repairs or improvements of the structure. Planned actions and estimates are from our documented seismic assessments | | | | |
| Newark Pump Station Emergency Outfall – Establish an outfall from the Newark pump station to the SF bay. This will allow discharge of wastewater if the forcemain to the treatment plant is damaged or the treatment plant is damaged and prevent wastewater backup into communities and wetland areas causing a public health concern. | | | | |
| Forcemain Alameda creek crossing ground stabilization – The soil around the forcemain near Alameda creek has been identified as very unstable. This will stabilize the soil and forcemain pipeline to prevent sewage leakage into Alameda creek and the wetland areas | | | | |
| Forcemain lining – Forcemain is constructed of segmented concrete pipe. This project will line the pipeline to prevent leakage at joints if the pipeline moves or settles. Much of this pipeline is within protected wetland areas. | | | | |
| Admin Seismic Upgrade – This building was identified to be critical to life safety and restoring basic service. The building has seismic deficiencies and is vulnerable to damage from a seismic event. | | | | |
| Control Building Seismic Upgrade - This building was identified to be critical to life safety and restoring basic service. The building has seismic deficiencies and is vulnerable to damage from a seismic event. | | | | |
| Field Ops Building Seismic Upgrade – This building was identified to be critical to life safety and restoring basic service. The building has seismic deficiencies and is vulnerable to damage from a seismic event. | | | | |

Mitigation Strategy: Action (Implementation) Plan

The mitigation action plan describes how the mitigation actions will be implemented, including how those actions will be prioritized, administered, and incorporated into the community's existing planning mechanism. Each participating jurisdiction must have a mitigation action(s) and an action plan specific to that jurisdiction and its priority hazards and vulnerabilities.

Mitigation Criteria

For use in selecting and prioritizing Proposed Mitigation Measures

1. STAPLEE

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

- Community Acceptance
- Effect on Segment of Population
- Social Benefits

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

- Technical Feasibility
- Reduce Community Risk
- Long Term Solution/Sustainable
- Secondary Impacts

Administrative: Do you have the capacity to implement & manage project?

- Staffing
- Funding Allocated
- Maintenance/Operations

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

- Political Support
- Local Champion
- Public Support
- Achieves Multiple Objectives
- Supported by a broad array of Stakeholders

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

- Existing Local Authority
- State Authority
- Potential Legal Challenges

Economic: Is it cost-beneficial? Is there funding? Does it contribute to the local economy or economic development?

- Benefit of Action
- Cost of Action
- Cost Effective/Economic Benefits
- Economically Viable
- Outside Funding Required

Environmental: Does it comply with Environmental regulations?

- Effect on Land/Water
- Effect on Endangered Species
- Effect on Cultural Resources
- Effect on Hazmat sites
- Consistent with Community Environmental Goals
- Consistent with Environmental Laws
- Environmental Benefits

2. SUSTAINABLE DISASTER RECOVERY

- Quality of Life
- Social Equity
- Hazard Mitigation
- Economic Development
- Environmental Protection/Enhancement
- Community Participation

3. SMART GROWTH PRINCIPLES

- Infill versus Sprawl
- Efficient Use of Land Resources
- Full Use of Urban Resources
- Mixed Uses of Land
- Transportation Options
- Detailed, Human-Scale Design

4. OTHER

- Does measure address area with highest risk?
- Does measure protect ...
 - ✓ The largest # of people exposed to risk?
 - ✓ The largest # of buildings?
 - ✓ The largest # of jobs?
 - ✓ The largest tax income?
 - ✓ The largest average annual loss potential?
 - ✓ The area impacted most frequently?

- ✓ Critical Infrastructure (access, power, water, gas, telecommunications)
- Timing of Available funding
- Visibility of Project
- Community Credibility

Mitigation Action Prioritization Instructions

The committee's brainstormed list of mitigation actions and projects are organized by hazard and posted on flip-chart paper around the room.

You each have 3 sets of colored dots:

- 3 red dots
- 3 blue dots
- 3 green dots

The red dots are for high priority (5 points each)

The blue dots are for medium priority (3 points each)

The green dots are for low priority (1 point each)

Place your dots on any mitigation action/project, using the different colors to indicate your priority. You may use as many of your dots, of any color, on any mitigation action/project --- or you may spread them out using as few of your dots as you wish. The scored dots will indicate the consensus of the Planning Committee.

Use the list of mitigation selection criteria (above) to help you make your determinations.

Your votes will indicate the consensus of the team.

After the totals are counted, we will discuss them further to confirm or modify any of the results as necessary to best meet the goals of this LHMP.

Tri-City Mitigation Action Worksheet

| | |
|---|--|
| Jurisdiction: | |
| Mitigation Action/Project Title: | |
| Hazards Addressed: | |
| Issue/Background: | |
| Project Description: | |
| Other Alternatives: | |
| Existing Planning Mechanism(s) through which Action will be implemented: | |
| Responsible Office/Partners: | |
| Cost Estimate: | |
| Benefits (Losses Avoided): | |
| Potential Funding: | |
| Timeline: | |
| Project Priority (H, M, L): | |

| | |
|--------------------------------|--|
| Worksheet completed by: | |
| Name and Title: | |
| Phone: | |

Tri-City LHMP Update Mitigation Strategy Meetings – Action Prioritization

Actions sorted by Vote Hazard

| Agency/ Department | Mitigation Action Title | Hazards Addressed | Votes (Points)* |
|---|--|---|--------------------|
| Projects identified during Mitigation Strategy Meeting | | | |
| All | Enhance Public Education and Outreach program for all hazards (priority and non-priority) | Multi-Hazard | 8 |
| Fremont lead / All | Enhance GIS clearinghouse/portal – Southern Alameda County GIS Authority mapping consortium (Union City to rejoin) | Multi-Hazard | 72 |
| Cities | Update severe weather response plans / EOP annexes | Multi-Hazard | 0 |
| All | Communication upgrades -systems, equipment, etc. to communicate during and post disaster (alternative to cell communication) | Multi-Hazard (earthquake) | 32 |
| All | Acquire satellite coms to ensure communications post disaster | Multi-Hazard | 11 |
| All | EOC relocations and/or retrofits (EQ safe) | Multi-Hazard | 23 |
| All | Establish / update backup power to critical facilities and infrastructure | Multi-Hazard | 46 |
| | Establish / update backup power to emergency shelter locations | Multi-Hazard | 22 |
| | Secure mobile back up power sources | Multi-Hazard | 0 |
| Newark / Union City | Update Climate Action Plan w/adaptation considerations and implement resulting projects | Climate Change | 43 |
| Fremont | Climate Ready Fremont Update, with implementation of resulting projects | Climate Change | 14 |
| | Carb Zero emission vehicle standards compliance | Climate Change | 6 |
| USD | ETSU Project Upgrades (Enhanced Treatment Site Upgrades) | Climate Change / Drought & Water Shortage / Earthquake | 11 |
| All Cities | Develop, Update and Implementation of Urban Forest / Tree Management Plan (includes Newark Urban Forest Master Plan – 16 votes) | Climate Change / Drought & Water Shortage / Severe Weather: Extreme Heat, Heavy Rain and Storms | 46 |
| Newark | Eucalyptus Grove Reduction | Climate Change / Drought & Water Shortage / Severe Weather: Extreme Heat, Heavy Rain and Storms | 14 |
| | Xeriscaping | Climate Change / Drought & Water Shortage / Severe Weather: Extreme Heat | 1 |

| Agency/ Department | Mitigation Action Title | Hazards Addressed | Votes (Points)* |
|-----------------------|---|--|--------------------|
| | Retrofit key respite areas/cooling centers with air scrubbing, filtration systems | Climate Change / Severe Weather: Extreme Heat / Wildfire | 0 |
| USACE w/ Partners | Construct sea wall around South Bay | Coastal Flooding & Sea Level Rise | 14 |
| | Salt marsh levee breach project | Coastal Flooding & Sea Level Rise | 24 |
| | South Bay salt pond restoration project (Cargill) | Coastal Flooding & Sea Level Rise | 24 |
| USD | Evaluate and harden/replace force mains in coastal areas | Coastal Flooding & Sea Level Rise | 8 |
| Newark | Sea level rise resiliency study | Coastal Flooding & Sea Level Rise | 17 |
| All | EAP coordination, training, exercises (w/dam owners) | Dam Failure | 10 |
| ACWD | Continue to regularly inspect and monitor dams, especially during severe weather events | Dam Failure | 6 |
| | Coordinate and evaluate dams of concern and possible failures, with a focus on earthquake risk | Dam Failure / Earthquake | 8 |
| | Evaluate Alert & Warning program relative to dams and earthquake risk | Dam Failure / Earthquake | 4 |
| ACWD | Seismic upgrades to Alameda and Patterson reservoirs | Earthquake | 4 |
| ACWD, others? | Upgrades / earthquake retrofits of water mains and hydrants | Earthquake | 22 |
| SFPUC, others? | SFPUC (Hetch-Hetchy) pipeline emergency plan | Earthquake | 1 |
| All | Evaluate and update materials and construction specifications for critical facilities and infrastructure | Earthquake | 9 |
| All | EQ evaluations, hardening and retrofits for existing critical facilities and infrastructure and community lifelines | Earthquake | 46 |
| All Cities | Review and update construction standards with adoption of CBC and development of local amendments | Earthquake | 10 |
| Fremont | Fire Station hardening/retrofit | Earthquake | 6 |
| | Groundwater recharge planning | Drought & Water Shortage | 0 |
| | Establish and maintain water use efficiency team program | Drought & Water Shortage | 6 |
| USD | Construct digesters to flow solids | Drought & Water Shortage | 0 |
| | Conduct water supply assessments | Drought & Water Shortage | 0 |
| | Continue updates to Integrated/Urban Regional Water Management Plans | Drought & Water Shortage | 0 |

| Agency/ Department | Mitigation Action Title | Hazards Addressed | Votes (Points)* |
|------------------------|---|--|--------------------|
| USD | Force main ground stabilization | Flood: 1%/0.2% / Localized Flooding / Heavy Rains and Storms | 13 |
| USD | I & I system improvements to prevent intake of groundwater | Flood: 1%/0.2% / Localized Flooding / Heavy Rains and Storms | 15 |
| All | Implement stormwater master plans | Flood: 1%/0.2% / Localized Flooding / Heavy Rains and Storms | 44 |
| Fremont | Implement five 404 FEMA mitigation projects -Sullivan Underpass – minimize future storm damage to pumps -Stanley Bridge – protect bridge abutment from scouring and erosion during storms -Morrison Canyon Rd. – Increase pipe circumference to prevent future clogging of culverts during storms and prevent erosion -Mill Creek soil stabilization -Rancho Higuera Historical Park – Improvements to prevent future levee breaches during storms and downstream damage | Flood: 1%/0.2% / Localized Flooding / Heavy Rains and Storms / Landslide | 25 |
| Newark | Flood control projects resulting from 2023 storms -lines H & I improvements | Flood: 1%/0.2% / Localized Flooding / Heavy Rains and Storms / Landslide | 27 |
| | Wetlands restoration/preservation – flood mitigation | Flood: 1%/0.2% / Localized Flooding / Heavy Rains and Storms / Coastal Flooding and Sea Level Rise / Levee Failure | 15 |
| Newark / Union City | Review and update flood protection ordinance | Flood: 1%/0.2% / Localized Flooding / Heavy Rains and Storms / Coastal Flooding and Sea Level Rise / Levee Failure | 19 |
| Fremont | Rural Morrison Canyon road slide mitigation | Landslide | 5 |
| Fremont, Others? | Soil monitoring in/along key roadways | Landslide | 9 |
| Fremont | Mission Peak hillside monitoring existing slide | Landslide | 2 |
| Fremont | Signage to warn of landslide areas | Landslide | 0 |
| | 1. Levee breach repair – Rancho E. Pine?? | Levee Failure | 13 |
| | Signage project to warn residents, visitors where the Tsunami evacuation areas are located | Tsunami | 1 |
| All Cities | Continue to adopt CBC w/ local amendment updates | Wildfire | 5 |

| Agency/ Department | Mitigation Action Title | Hazards Addressed | Votes (Points)* |
|--|--|----------------------|--------------------|
| | Continue to update vegetation management ordinance | Wildfire | 8 |
| Fremont | Update vegetation management ordinance | Wildfire | 6 |
| Union City | Fuels mitigation project – Alco Fire | Wildfire | 16 |
| All Cities / Caltrans | Fuels mitigation work on evacuation areas | Wildfire | 19 |
| All Cities | Fuels reduction - Goats | Wildfire | 1 |
| Projects taken from Goal Statements | | | |
| | Update EOPs and annexes to address historically underserved populations, individuals with a disability or access and functional needs, and communities disproportionately impacted by disasters and climate change | Multi-Hazard | N/A |
| | Develop debris removal plan as part of recovery planning, to include right of entry, financing, mapping, and protocols for hazardous waste disposal | Multi-Hazard | N/A |
| | Develop procedures for ingress and egress for first responders during a major disaster | Multi-Hazard | N/A |
| All | Develop, share, and maintain comprehensive GIS datasets of critical facilities, infrastructure, community lifelines, and other key assets | Multi-Hazard | N/A |
| Fremont | Develop strategy to reduce wildfire risk in surrounding hillside areas | Wildfire | N/A |

C.2 Categories of Mitigation Measures Considered

The following categories of mitigation measures are based on the National Flood Insurance Program (NFIP) Community Rating System (CRS).

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

C.3 Cities of Fremont, Newark, and City of Union City Analysis of Alternative Mitigation Measures per Category

Note: This review of mitigation measures is in compliance with the FEMA’s nationally accepted six mitigation categories and FEMA’s CRS Program requirement to provide a comprehensive evaluation of the six mitigation categories with a specific requirement that Preventative Measures be thoroughly reviewed. This review leads to the projects incorporated into the mitigation strategy action plan. This Section specifically focuses on the mitigation measures and potential mitigation strategies specific to City

of Fremont, the participating CRS community to this plan and the Cities of Newark and Union City, also LHMP participants, considering joining the CRS.

C.3.1. Preventive Measures

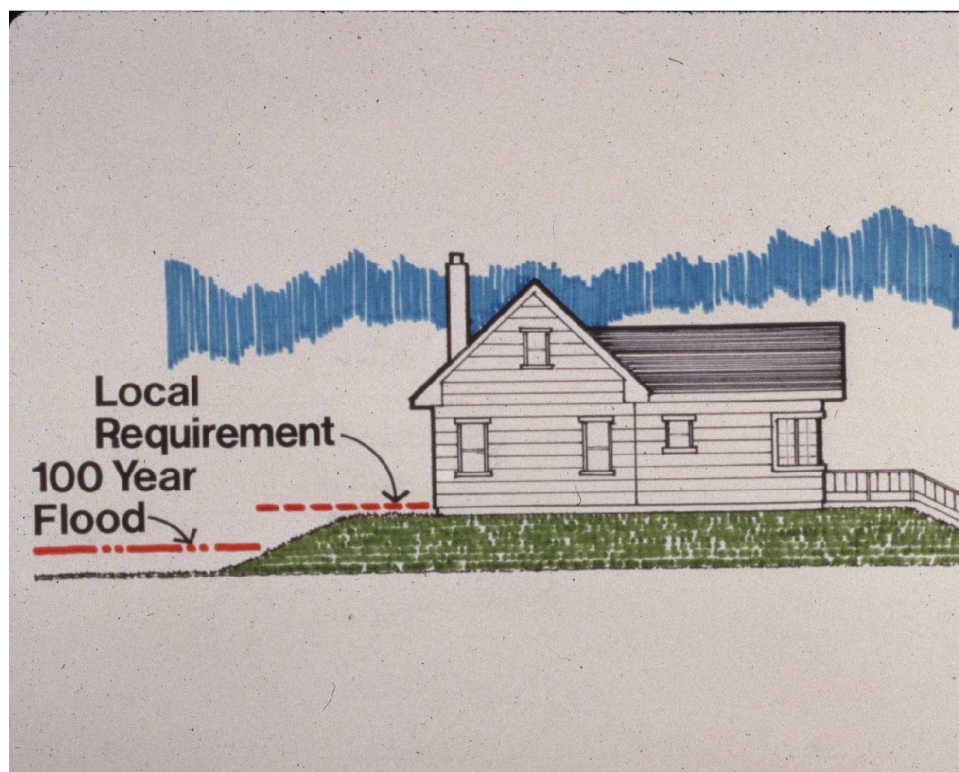
Preventive measures are designed to keep a problem - such as flooding - from occurring or from getting worse. The objective of preventive measures is to ensure that future development is not exposed to damage and does not cause an increase in damage to other properties. Building, zoning, planning, and code enforcement offices usually administer preventive measures. Some examples of types of preventive measures include:

- Building codes and floodplain regulations
- Comprehensive land use planning, zoning, and open space preservation
- Stormwater management and subdivision regulations

Building Codes

Building codes provide one of the best methods of addressing natural hazards. When properly designed and constructed according to code, the average building can withstand many of the impacts of natural hazards. Hazard protection standards for all new and improved or repaired (and substantially damaged) buildings can be incorporated into the local building code. Building codes can ensure that the first floors of new buildings are constructed to be higher than the elevation of the 100-year flood or 1% annual chance flood (the flood that is expected to have a one percent chance of occurring in any given year). This is shown in Figure C-1.

Figure C-1 Building Codes and Flood Elevations



Floodplain Regulations

Most communities with a flood problem participate in the NFIP. The NFIP regulations codified within 44 CFR sets minimum requirements for the participating communities' standards for development, subdivision of land, construction of buildings, installation of mobile homes, and improvements and repairs to buildings. These are usually spelled out in a separate ordinance. More recently in California, communities are adopting the new State of California model ordinance for local agencies to use/adopt that are integrated with the I-Codes, specifically the flood resistant design and construction sections within the 2021 International Building Code, Residential Code, and other I-Codes and ASCE 24-14. Adoption of the new model ordinance (or Appendix G) reflects consistency with the current I-Codes, which meet the minimum requirements of the NFIP and in some instances, exceeds the minimum NFIP requirements.

The NFIP minimum requirements are summarized below. It should be stressed that these are minimum requirements. Local conditions, such as high velocity flooding or the presence of a potential dam failure, may warrant higher local standards.

Enforcement

To ensure that communities are meeting the NFIP standards and the new California model ordinance (Appendix G of the CA Building Code), the Federal Emergency Management Agency (FEMA) periodically conducts a Community Assessment Visit. During this visit, the maps and ordinances are reviewed, permits

are checked, and issues are discussed with staff. Failure to meet all of the requirements can result in one or more consequences:

- Reclassification under the Community Rating System to a higher class
- Probation, which entails a \$50 surcharge on every flood insurance policy in the community, or
- Suspension from the NFIP.

Suspension is the most serious. It means that the community is out of the NFIP and the following sanctions are imposed:

- Flood insurance will not be available. No resident will be able to purchase a flood insurance policy.
- Existing flood insurance policies will not be renewed.
- No direct federal grants or loans for development may be made in identified flood hazard areas under programs administered by federal agencies, such as HUD, EPA, and the Small Business Administration.
- Federal disaster assistance will not be provided to repair insurable buildings located in identified flood hazard areas for damage caused by a flood.
- No federal mortgage insurance or loan guarantees may be provided in identified flood hazard areas. This includes policies written by FHA, VA, and others.
- Federally insured or regulated lending institutions, such as banks and credit unions, must notify applicants seeking loans for insurable buildings in flood hazard areas that there is a flood hazard and the property is not eligible for federal disaster relief.

These sanctions can be severe for any community with a substantial number of buildings in the floodplain. Most communities with a flood problem have joined the NFIP and are in full compliance with their regulatory obligations.

One way to assure good administration and enforcement is to have Certified Floodplain Managers on staff. The Association of State Floodplain Managers administers the national Certified Floodplain Manager (CFM®) program.

Minimum National Flood Insurance Program Regulatory Requirements

The NFIP is administered by FEMA. As a condition of making flood insurance available for their residents, communities that participate in the NFIP agree to regulate new construction in the area subject to inundation by the 100-year (base) flood (i.e., 1% annual chance flood). The floodplain subject to these requirements is shown as an A or V Zone on the Digital Flood Insurance Rate Map (FIRM).

Under the NFIP, there are five major floodplain regulatory requirements. Additional floodplain regulatory requirements may be set by state and local laws. As referenced above, the State of California has developed a model ordinance for local agencies to use/adopt that are integrated with the I-Codes, specifically the flood resistant design and construction sections within the 2021 International Building Code, Residential Code, and other I-Codes and ASCE 24-14. The model California ordinance meets and exceeds the minimum requirements of the NFIP.

All development in the 1% annual chance floodplain must have a permit from the community. The NFIP regulations define "development" as any manmade change to improved or unimproved real estate,

including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

12. Development along a river or other channel cannot obstruct flows so as to cause an increase in flooding on other properties. An analysis must be conducted to demonstrate that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.
13. New buildings may be built in the floodplain, but they must be protected from damage from the base flood. In riverine floodplains, the lowest floor of residential buildings must be elevated to be at or above the base flood elevation (BFE). Nonresidential buildings must be either elevated or floodproofed. Note: the new California model ordinance replaces Occupancy/Risk Categories with Flood Design Classes for the purpose of establishing elevations of lowest floors, flood-resistant materials equipment and floodproofing.
14. Under the NFIP, a "substantially improved" building is treated as a new building. The NFIP regulations define "substantial improvement" as any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the start of construction of the improvement. This requirement also applies to buildings that are substantially damaged.
15. Communities are encouraged to adopt local ordinances that are more comprehensive or provide more protection than the federal criteria. The NFIP's Community Rating System provides insurance premium credits to recognize the additional flood protection benefit of higher regulatory standards.

Local Implementation: Cities of Fremont, Newark, and Union City

The Cities of Fremont, Newark and Union City have adopted the 2022 California Building Code based on the 2021 International Building Code. The City of Fremont has a Floodplain Damage Prevention Ordinance (2023) that exceeds minimum NFIP standards and includes some higher regulatory standards, and is consistent with the flood resistant design and construction sections within the 2021 International Building Code, Residential Code, and other I-Codes and ASCE 24-14. The Cities of Newark and Union City have also adopted the 2022 California Building Code based on the 2021 International Building Code. However, the City of Newark's local Flood Ordinance was adopted in 2009 and has not been updated to meet the requirements of the 2022 California Building Code and the new California Model Flood Ordinance. Likewise, the City of Union City's local Flood Ordinance was adopted in 2011 and has not been specifically updated to meet the requirements of the 2022 California Building Code and the new California Model Flood Ordinance.

Just as important as having code standards is the enforcement of the code. Adequate inspections are needed during the course of construction to ensure that the builder understands the requirements and is following them. Making sure a structure is properly elevated and anchored requires site inspections at each step. The Cities of Fremont, Newark, and Union City indicate that their Floodplain Management Ordinances are adequately enforced.

Reduce Future Flood Losses

Future flood losses should be reduced by enforcement of current floodplain regulations:

City of Fremont. For new residential and non-residential construction or substantial improvements, Fremont requires that either the lowest finished floor be elevated at least 1 foot above the base flood elevation or that below the base flood level the structure is flood-proofed and watertight.

City of Newark. For new residential construction or substantial improvements of any structure, Newark requires that either the lowest floor, including basement, be elevated to or above the base flood elevation. Nonresidential construction shall either be elevated in conformance with subdivisions (C)(1) or (C)(2) of this section or together with attendant utility and sanitary facilities: a. be floodproofed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water; b. have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and c. be certified by a registered professional engineer or architect that the standards of this subsection are satisfied. Such certifications shall be provided to the building official. New construction and substantial improvement of any structure in Zone AH or AO shall have the lowest floor, including basement, elevated above the highest adjacent grade at least as high as the depth number specified in feet on the FIRM, or at least two feet if no depth number is specified. Nonresidential structures may meet the standards in paragraph c of this subdivision as described above.

City of Union City. For new residential construction or substantial improvements of any structure, Union City requires that either the lowest floor, including basement, be elevated to or above the base flood elevation. Nonresidential construction shall either be elevated in conformance with subdivisions (C)(1) or (C)(2) of this section or together with attendant utility and sanitary facilities: a. be floodproofed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water; b. have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and c. be certified by a registered professional engineer or architect that the standards of this subsection are satisfied. Such certifications shall be provided to the building official. New construction and substantial improvement of any structure in Zone AH or AO shall have the lowest floor, including basement, elevated above the highest adjacent grade at least as high as the depth number specified in feet on the FIRM, or at least two feet if no depth number is specified. Nonresidential structures may meet the standards in paragraph c of this subdivision as described above.

Enacting and enforcing the current standards and/or adopting higher regulatory standards reduces future flood losses by regulating development within flood hazard areas.

Current Standards

As described above, the Cities of Fremont, Newark and Union City have Floodplain Management Ordinances that meet the NFIP's minimum floodplain regulatory requirements. With the adoption of Fremont's new 2023 Flood Damage Prevention Ordinance, NFIP standards are exceeded in some areas including establishing additional freeboard, as detailed below. The flood ordinances for the three cities are designed to:

- To protect human life and health;
- To minimize expenditure of public money for costly flood control projects;
- To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- To minimize prolonged business interruptions;

- To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- To help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future flood blight areas;
- To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

The flood ordinances for the three cities include methods and provisions for:

- Restricting or prohibiting development which are dangerous to health, safety, and property due to flood hazards, or which result in damaging increase in flood heights or velocities;
- Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
- Controlling fill, grading, dredging, and other development which may increase flood damage; and
- Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

In addition, all new construction or substantial improvements shall be:

- Designed or modified and adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy
- Constructed in ways that minimize flood damage
- Constructed with materials resistant to flood damage
- Constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities designed or located so as to prevent water from entering or accumulating within components during flooding
- Require within Zones AH or AO, adequate drainage paths around structures on slopes to guide floodwaters around and away from proposed structures.

The Cities of Fremont, Newark, and Union City have regulations that exceed minimum NFIP standards. This includes:

- Floodways are delineated and certain requirements apply to construction within these floodways so as to not result in any increase in flood levels during the occurrence of the base flood discharge.

The City of Fremont has additional requirements that exceed minimum NFIP standards. This includes:

- Requiring new construction and substantial improvements to have the lowest flood, including basement, elevated a minimum of 1 foot above the base flood elevation.

While none of the floodplain managers in the Cities of Fremont, Newark, or Union City are currently Certified Floodplain Managers (CFMs), they are all working towards a certification.

Manufactured Homes

Manufactured or mobile homes are usually not regulated by local building codes. They are built in a factory in another state and are shipped to a site. They do have to meet construction standards set by the U.S. Department of Housing and Urban Development. All mobile homes constructed after 1976 must comply with HUD's National Manufactured Home Construction and Safety Standards. These standards apply uniformly across the country and it is illegal for a local unit of government to require additional construction requirements. Local jurisdictions may regulate the location of these structures and their on-site installation.

Manufactured homes: The NFIP allows communities to exempt mobile homes in existing mobile home parks from some of the flood protection requirements. The CRS provides up to 50 points if the community does not use this exemption.

Local Implementation

The Floodplain Ordinances for the Cities of Fremont, Newark, and Union City all include specific requirements for the placement, installation, elevation, and anchoring of manufactured homes. However, the ordinances for all three cities currently exempt existing manufactured homes and only apply to new and replacement manufactured homes and additions and/or substantial improvements. Thus, none of the Cities benefit from this element.

CRS Credit

Building Codes: The CRS encourages strong building codes. It provides credit in two ways: points are awarded based on the community's BCEGS classification and points are awarded for adopting the International Code series. The CRS also has a prerequisite for a community to attain a Class 6 or better within the CRS program, the community must have a BCEGS class of 5/5 or better. To attain a Class 4 or better in the CRS program, the community must have a BCEGS class of 4/4 or better.

The Cities of Fremont, Newark, and Union City have all adopted the 2022 California Building Code which includes the 2021 International Code series with State enhancements.

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) was implemented in 1990 as a program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. The National Flood Insurance Reform Act of 1994 codified the Community Rating System in the NFIP.

- The CRS recognizes 18 creditable activities, organized under four categories numbered 300 through 600:
 - ✓ Public Information
 - ✓ Mapping and Regulations
 - ✓ Flood Damage Reduction
 - ✓ Flood Preparedness
- The City of Fremont participates in the CRS program and is currently a CRS Class 7.
- By implementing these floodplain management activities, the residents of the City of Fremont qualify for flood insurance premium rate reductions. When communities go beyond the minimum standards for floodplain management, the CRS can provide discounts up to 45% off flood insurance premiums. A CRS Class 7 provides for a 15% premium discount on flood insurance premiums.

The Cities of Newark and Union City do not currently participate in the CRS program but are evaluating participation in the future. Thus, the residents within the City do not currently benefit from discounts to flood insurance premiums.

Floodplain Management – Higher Regulatory Standards: There are many higher regulatory standards that warrant CRS credit as previously discussed. These standards include:

- Delineating a floodway, the area of higher hazard near the channel. This would allow development outside the floodway (called the "floodplain fringe") without engineering studies to determine their impact on others.
- Requiring all new construction to be elevated one or two feet above the base flood elevation to provide an extra level of protection from waves and higher floods. This extra protection is reflected in a distinct reduction in flood insurance rates.
- Having all developers (not just the larger ones) provide flood data where none are available.
- Specifications to protect foundations from erosion, scour and settling.
- Prohibiting critical facilities from all or parts of the floodplain.
- Prohibiting hazardous materials.
- Requiring buffers adjacent to streams or natural areas.
- Restrictions on use of enclosures below elevated buildings.
- Flood storage lost due to filling and construction must be compensated for by removal of an equal volume of storage.
- The CRS also provides credit for having trained staff and a higher credit if the staff members are Certified Floodplain Managers.

It should be noted that one of the prerequisites for participation in the CRS is that the community be in full compliance with the minimum requirements of the NFIP. A community with a number of "potential violations" risks being removed from the CRS entirely.

Comprehensive Land Use Planning, Zoning, and Open Space Preservation

Building codes provide guidance on how to build in hazardous areas. Planning and zoning activities direct development away from these areas, particularly floodplains and wetlands. They do this by designating land uses that are compatible with the natural conditions of land that is prone to flooding, such as open space or recreation. Planning and zoning activities can also provide benefits by simply allowing developers more flexibility in arranging improvements on a parcel of land through the planned development approach.

General and Comprehensive Plans

These plans are the primary tools used by communities to address future development. They can reduce future flood-related damages by indicating open space or low density development within floodplains and other hazardous areas. Unfortunately, natural hazards are not always emphasized or considered in the specific land use recommendations.

Generally, a plan has limited authority. It reflects what the community would like to see happen. Its utility is that it guides other local measures, such as capital improvement programs, zoning ordinances, and subdivision regulations.

Capital Improvement Plans

A capital improvement plan can guide a community's major public expenditures for a 5- to 20-year period. Capital expenditures may include acquisition of open space within the hazardous areas, extension of public services into hazardous areas, or retrofitting existing public structures to withstand a hazard.

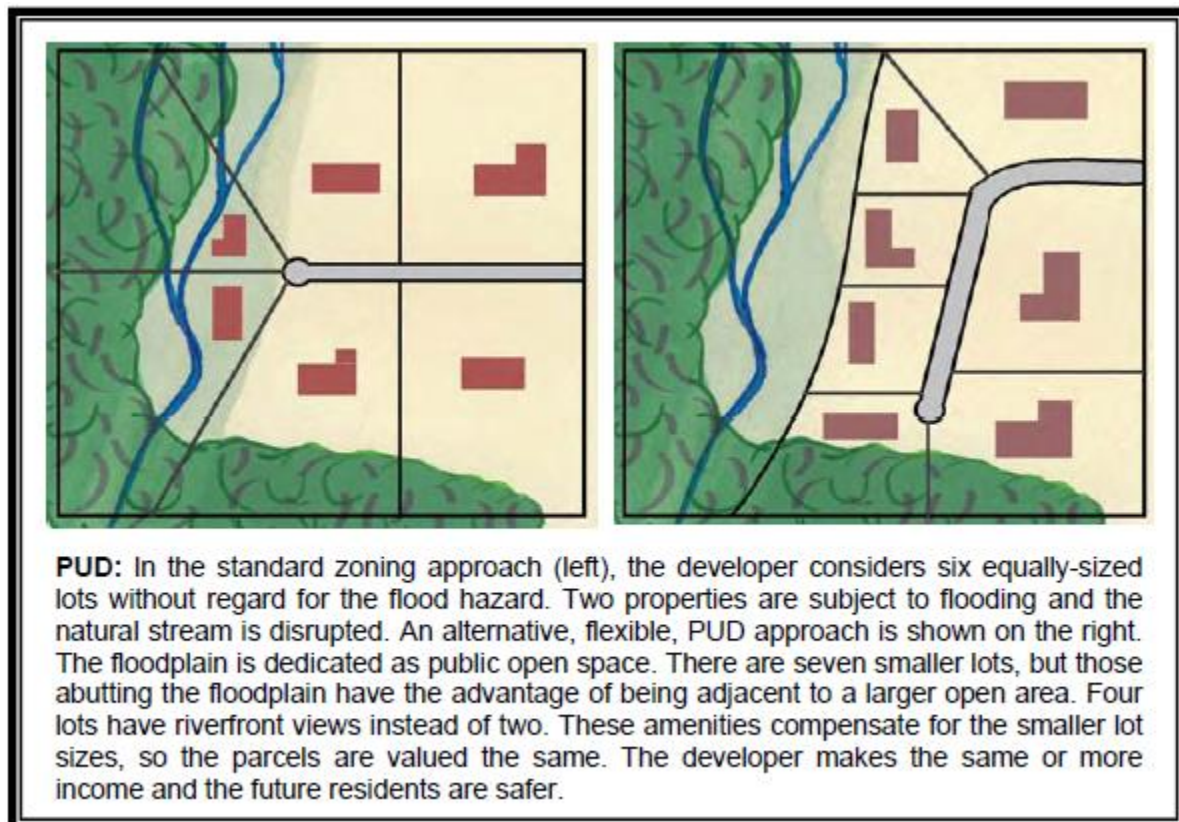
Zoning

A zoning ordinance regulates development by dividing a community into zones or districts and setting development criteria for each of those zones or districts. Zoning codes are considered the primary tool to implement a general/comprehensive plan's guidelines for how land should be developed.

Zoning ordinances can limit development in hazardous areas, such as reserving floodplain zones for agricultural uses. Often, developers will produce a standard grid layout. The ordinance and the community can allow flexibility in lot sizes and location so developers can avoid hazardous areas.

One way to encourage such flexibility is to use the planned unit development (PUD) approach or cluster development. The PUD and cluster approaches allow the developer to easily incorporate flood hazard mitigation measures into the project. Open space or floodplain preservation can be facilitated as site design standards and land use densities can be adjusted to fit the property's specific characteristics, as shown in Figure C-2.

Figure C-2 Zoning for Development in the Floodzone



Open Space Preservation

Keeping the floodplain and other hazardous areas open and free from development is the best approach to preventing damage to new developments. Open space can be maintained in agricultural use or can serve as parks, greenway corridors and golf courses.

Comprehensive and capital improvement plans should identify areas to be preserved by acquisition and other means, such as purchasing an easement. With an easement, the owner is free to develop and use private property, but property taxes are reduced or a payment is made to the owner if the owner agrees to not build on the part set aside in the easement.

Although there are some federal programs that can help acquire or reserve open lands, open space lands and easements do not always have to be purchased. Developers can be encouraged to dedicate park land and required to dedicate easements for drainage and maintenance purposes. These are usually linear areas along property lines or channels. Maintenance easements also can be donated by streamside property owners in return for a community maintenance program.

Local Implementation

General Plan: City of Fremont's current General Plan was last adopted in 2011, with an update to the Housing Element occurring in 2022. The City of Newark's General Plan is dated 2013, with updates to the Housing, Safety, and Environmental Justice Elements in 2023. The City of Union City's General Plan is dated 2019, with updates to the Housing and Safety Elements in 2023.

Zoning and Open Space Preservation: The Cities' General Plans in coordination with the local Codes, protects current open space. As General Plans are updated, zoning codes, including provisions for open space and other land preservation and development constraints are added.

Reduce Future Flood Losses

Enacting the General Plans and the comprehensive zoning and future land uses contained in the Cities' General Plans will help to reduce future flood losses by managing development in hazardous areas including identified floodplains.

Current Standards

The City of Fremont has a Planning and Zoning ordinance developed to ensure that buildings and structures constructed in the City comply with the provisions of the ordinance pertaining to the erection, construction, reconstruction, moving, conversion, alteration or addition to any building or structure. The purpose of this title is to implement the city's general plan and to protect and promote the public health, safety, peace, comfort, convenience, prosperity and general welfare. This title implements the goals and policies of the City of Fremont General Plan by regulating the use of land and structures within the city.

Working in conjunction with the City's zoning ordinance, the City has established an open space district to permit limited but reasonable use of open lands while protecting the public health, safety and welfare from the dangers of seismic hazards and unstable soils; preserve the topography of the city that shapes it and gives it its identity; allow land to be used for agricultural production in its natural or as near natural state as possible; coordinate with and carry out regional, county, and city open space plans; and where permitted, encourage the clustering of dwelling units in order to preserve and enhance the remainder of open space lands as a limited and valuable resource. This includes provisions related to City Parks, General Open Space, the Hillside, Hill Face, and Hill Open Space, and the Resource Conservation and Public Open Space. These zoning ordinance and open space designations help reduce hazard impacts and are adequately administered and enforced.

The City of Newark also has a Zoning Ordinance designed to implement the City's general plan and to protect and promote the public health, safety, peace, comfort, convenience, prosperity and general welfare of the City. This includes establishing land use and development standards specific to each land use designation as identified in the code for the orderly growth and development of the city, and guide and to control the use of land to provide a safe, harmonious, attractive, and sustainable community. These zoning ordinance and open space designations help reduce hazard impacts and are adequately administered and enforced.

The City of Union City also has a Zoning Ordinance designed to implement the City's general plan and to promote and protect the public health, safety, morals, comfort, convenience and the general welfare of the people. This includes dividing the City into zones and districts restricting and regulating therein the location, construction, reconstruction, alteration and use of buildings, structures and land for residence, business, industrial and other specified uses. The City's Zoning Ordinance works in conjunction with the City's Open Space Zoning District designation. The purpose and intent of this district is to:

- Provide adequate recreation and open space lands for the needs of the population, present and future;
- Preserve and protect open space lands as a limited and valuable resource;
- Discourage premature and unnecessary conversion of open space land to urban areas in order to discourage noncontiguous patterns of development which unnecessarily increase the cost of community services to community residents;
- Prevent incompatible development of areas which should be preserved or regulated for scenic, historic, or conservation purposes;
- Insure the retention of certain lands in their natural or near natural state, so as to protect the public health, safety, and welfare of the community from natural disasters such as fire, flood, erosion, seismic activity, etc.

Provisions of this district also provide for the reasonable use of open space land while at the same time preserving and protecting its inherent open space character. These zoning ordinance and open space designations help reduce hazard impacts and are adequately administered and enforced.

CRS Credit

The CRS provides flood insurance discounts to those communities that implement various floodplain management activities that meet certain criteria. Comparing local activities to those national criteria helps determine if local activities should be improved.

Credits are provided for regulations that encourage developers to preserve floodplains or other hazardous areas from development. There is no credit for a plan, only for the enforceable regulations that are adopted pursuant to a plan. Credits are also provided for setting aside floodplains for low density zoning, such as five acre lots or conservation.

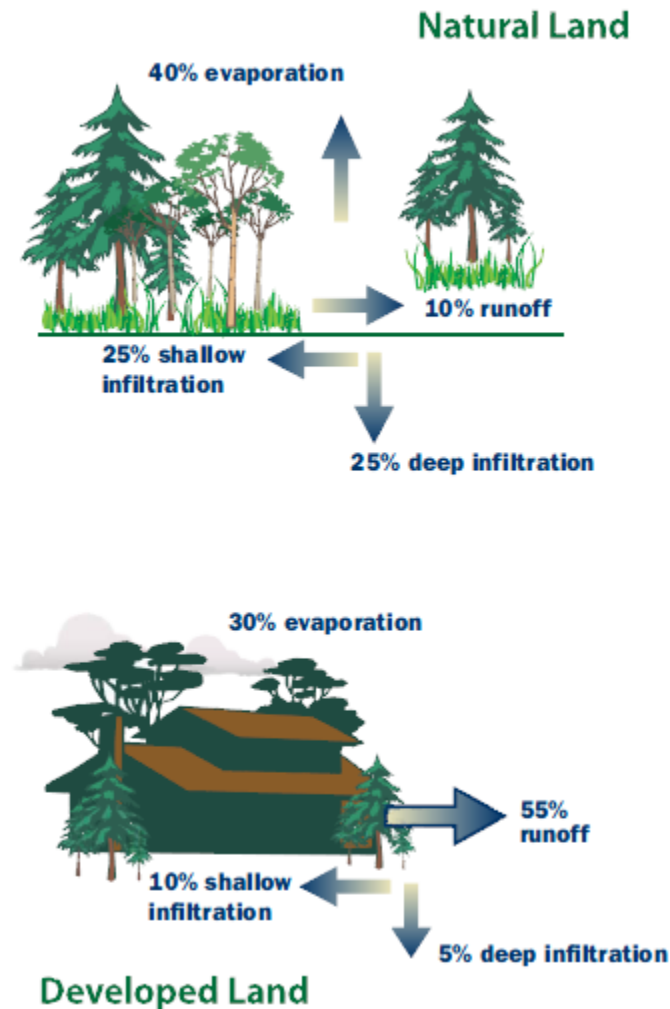
Preserving flood prone areas as open space is one of the highest priorities of the Community Rating System. Up to 1,450 points can be given, based on how much of the floodplain is in community public undeveloped properties, parks, wildlife refuges, golf courses, or other uses that can be depended on to stay open (Activity 420 - Open Space Preservation).

Stormwater Management and Subdivision Ordinance

Development in floodplains is development in harm's way. New construction in the floodplain increases the amount of development exposed to damage and can aggravate flooding on neighboring properties.

Development outside a floodplain can also contribute to flooding problems. Stormwater runoff is increased when natural ground cover is replaced by urban development (see Figure C-3). Development in the watershed that drains to a river can aggravate downstream flooding, overload the community's drainage system, cause erosion, and impair water quality.

Figure C-3 Runoff and Infiltration of Natural and Developed Land



There are three ways to prevent flooding problems caused by stormwater runoff:

- Regulating development in the floodplain to ensure that it will be protected from flooding and that it won't divert floodwaters onto other properties, and
- Regulating all development to ensure that the post-development peak runoff will not be greater than it was under pre-development conditions.
- Set construction standards so buildings are protected from shallow water.

Most communities participate in the NFIP, which sets minimum requirements for regulating development in the floodplain. All new buildings must be protected from the base or 100-year flood (or 1% annual chance flood) and no development can cause an increase in flood heights or velocities.

Stormwater runoff regulations require developers to build retention or detention basins to minimize the increases in the runoff rate caused by impervious surfaces and new drainage systems. Generally, each

development must not let stormwater leave at a rate higher than what existed under pre-development conditions.

Standards for drainage requirements are typical in subdivision regulations. Standards for storm sewers, ditches, culverts, etc., are best set when an area is laid out and developed. Traditionally, the national standard is to require that the local drainage system carry the 10-year storm. Recently, communities are finding that older estimates of the 10-year storm understated the true hazard, so they are addressing larger storms.

One problem with requiring the drainage system to carry water away is that runoff increases with urban development. The runoff equivalent of a 10-year storm occurs more frequently, and from smaller storms. The problem is just sent downstream onto someone else's property.

Accordingly, modern subdivision regulations require new developments to ensure that the post-development peak runoff will not be greater than it was under pre-development conditions. This is usually done by constructing retention or detention basins to hold the runoff for a few hours or days, until flows in the system have subsided and the downstream channels can accept the water without flooding.

If the storm sewers or roadside ditches cannot handle a heavy rain, the standard subdivision design uses the streets to carry excess runoff. If the flows exceed the streets' capacity, adjacent properties will flood. Therefore, the third approach to protecting from stormwater flooding is to make sure new buildings are elevated one or two feet above the street or above adjacent grade.

Local Implementation

Reduce Future Flood Losses

Current practices and tracking mechanisms are seeking to reduce flood risks. Future flood control and stormwater improvements in Tri-City Planning Area will help reduce localized flood risks by improving flood control mechanisms and drainage. In order to reduce future flood losses, the Cities may consider revisiting their stormwater management ordinances.

Current Standards

The cities of Fremont, Newark, and Union City have stormwater management ordinances and programs.

The City of Fremont has a stormwater management program and ordinance that creates a streamlined process for review and approval of stormwater management measures for development projects. Related documents include a Stormwater Control Plan Guidance Manual and Submittal Packets. The City also operates under the [Municipal Regional National Pollutant Discharge Elimination System Stormwater Permit](#) (also known as the MRP), issued by the San Francisco Regional Water Quality Control Board, mandates stormwater pollution prevention activities. The MRP requires 70+ municipalities in the Bay Area, including the City of Fremont, to place conditions on development projects to incorporate site design measures, source controls, treatment measures, and on larger projects, flow duration controls (FDCs).

The [City of Newark's Stormwater Program](#) activities are managed in accordance with National Pollution Discharge Elimination System (NPDES) Permit requirements enforced by the San Francisco Regional Water Quality Control Board. Activities include:

- Illicit Discharge Incident Response/Enforcement
- [Street Sweeping](#)
- Storm Drain Maintenance
- Public Outreach Events
- Education and Information
- Stormwater Controls for Business and Development
- Participation in the [Alameda Countywide Clean Water Program](#)

The City of Newark also has a Green Stormwater Infrastructure (GSI) Plan. The purpose of the GSI Plan is to guide the identification, implementation, tracking, and reporting of green infrastructure projects within the City of Newark in accordance with the Municipal Regional Stormwater Permit (MRP), Order No. R2-2015-0049, adopted by the San Francisco Bay Regional Water Quality Control Board on November 15, 2015. "Green stormwater infrastructure" or "green infrastructure" in this context refers to sustainable systems of constructed softscape features that slow runoff by dispersing it to vegetated areas. Additional benefits to water resource management of GSI include promoting infiltration and evapotranspiration, utilizing bioretention and other low impact development practices to harvest and clean stormwater runoff.

The City of Union City's Environmental Programs Division has an industrial and illicit-discharge inspection program to protect storm drains and waterways from pollution. The City also reviews storm water pollution prevention plans, conducts storm water event inspections of construction sites, and investigates complaints about illicit discharges into public storm drain system. In addition, the Public Works Department is responsible for implementing the California Regional Water District Quality Control Board's San Francisco Bay Region Municipal Regional Stormwater Permit (called the MRP). Public Works make sure that the permits requirements are adhered to and enforced. All new development projects must begin by completing the Impervious Surface Form and the Checklist for Development Projects

Subdivision Regulations

In addition to controlling stormwater runoff as described above, subdivision regulations govern how land will be subdivided and they set construction standards. These standards generally address roads, sidewalks, utilities, storm sewers, and drainage ways. They can include the following flood protection standards:

- Requiring that the final plat show all hazardous areas
- Requiring that each lot be provided with a building site above the flood level
- Requiring that all roadways be no more than one foot below the flood elevation

Local Implementation

The cities of Fremont, Newark and Union City all have subdivision ordinances that regulate the design and improvement

The City of Fremont's subdivision standards work in conjunction with other building and development standards to regulate and control the division of land within the city of Fremont, and to supplement the

provisions of the Map Act concerning the design, improvement and survey data of subdivisions, the form and content of all maps provided for by the Map Act, and the procedure to be followed in securing the official approval of the commission, the city engineer, the planning manager, and council regarding such maps. To accomplish this purpose, the regulations are determined to be necessary for the preservation of the public health, safety, and general welfare; to promote orderly growth and development; to promote conservation, protection, and proper use of land; and to ensure provision for adequate circulation, utilities, and services. The City of Fremont's subdivision standards specifically include provisions to address flood hazards.

The City of Newark's subdivision ordinance is implemented to promote the public health, safety and general welfare; to promote orderly growth and development within the city; to coordinate lot design, street patterns, rights-of-way, traffic circulation, utilities and public facilities with the general plan and any specific plans; to assure that areas dedicated for public purposes will be properly improved initially so as not to be a future burden upon the community; to preserve natural resources and prevent environmental damage; to maintain suitable standards to ensure adequate, safe building sites; and to prevent hazard to life and property.

The City of Union City's subdivision ordinance is implemented to promote and protect the public health, safety, morale, comfort, convenience, and general welfare of the people. It also includes standards to ensure that community facilities will be provided in accordance with the General Plan including police and fire protection, adequate provisions of water supply, sanitary and storm sewers and schools, parks, and recreation areas.

CRS Credit

CRS credit is provided for both higher regulatory standards in the floodplain and stormwater management standards for new developments. Credit is based on how those standards exceed the minimum NFIP requirements.

Conclusions and Recommendations

- The City of Fremont has a floodplain development ordinance that exceeds minimum national standards and will be helpful in preventing flood problems from increasing. The cities of Newark and Union City through adoption of the 2022 Building Code has standards that exceed the minimum standards of the NFIP, but still need to update their local amendments.
- With ongoing improvements to the regions' flood control facilities and any resulting changes in the FEMA DFIRMs, the floodplain regulations for the County and City should be revisited and revised accordingly.
- The cities should continue to implement floodplain management activities to align with the most current CRS Coordinator's Manual. The cities should evaluate their floodplain management ordinances for incorporating additional higher standards.
- The cities should review their zoning and subdivision ordinances for floodplain management and other hazard specific enhancements.
- The cities should continue to enforce stormwater management best management practices to control post development site runoff. Consideration of a unified countywide stormwater ordinance will provide consistent regulations between all communities within the Tri-City planning area.

- Standards in subdivision regulations for public facilities should account for the hazards present at the site. New building sites, streets, and water systems should facilitate access and use by fire and emergency equipment.

C.3.2. Property Protection Measures

Property protection measures are used to modify buildings or property subject to damage. Property protection measures fall under three approaches:

- Modify the site to keep the hazard from reaching the building,
- Modify the building so it can withstand the impacts of the hazard, and
- Insure the property to provide financial relief after the damage occurs.

Property protection measures are normally implemented by the property owner, although in many cases technical and financial assistance can be provided by a government agency.

Keeping the Hazard Away

Generally, natural hazards do not damage vacant areas. As noted earlier, the major impact of hazards is to people and improved property. In some cases, properties can be modified so the hazard does not reach the damage-prone improvements. For example, a berm can be built to prevent floodwaters from reaching a house.

Flooding

There are five common methods to keep a flood from reaching and damaging a building:

- Erect a barrier between the building and the source of the flooding.
- Move the building out of the floodprone area.
- Elevate the building above the flood level.
- Demolish the building.
- Replace the building with a new one that is elevated above the flood level.

Barriers

A flood protection barrier can be built of dirt or soil (a "berm") or concrete or steel (a "floodwall"). Careful design is needed so as not to create flooding or drainage problems on neighboring properties. Depending on how porous the ground is, if floodwaters will stay up for more than an hour or two, the design needs to account for leaks, seepage of water underneath, and rainwater that will fall inside the perimeter. This is usually done with a sump or drain to collect the internal groundwater and surface water and a pump and pipe to pump the internal drainage over the barrier.

Figure C-4 Types of Barriers



Barriers can only be built so high. They can be overtopped by a flood higher than expected. Barriers made of earth are susceptible to erosion from rain and floodwaters if not properly sloped, covered with grass, and properly maintained. A berm can also settle over time, lowering its protection level. A floodwall can crack, weaken, and lose its watertight seal. Therefore, barriers need careful design and maintenance (and insurance on the building, in case of failure).

Relocation

Moving a building to higher ground is the surest and safest way to protect it from flooding. While almost any building can be moved, the cost increases for heavier structures, such as those with exterior brick and stone walls, and for large or irregularly shaped buildings.

In areas subject to flash flooding, deep waters, or other high hazard, relocation is often the only safe approach. Relocation is also preferred for large lots that include buildable areas outside the floodplain or where the owner has a new flood-free lot (or portion of the existing lot) available.

Building Elevation

Raising a building above the flood level can be almost as effective as moving it out of the floodplain. Water flows under the building, causing little or no damage to the structure or its contents. Raising a building

above the flood level is cheaper than moving it and can be less disruptive to a neighborhood. Elevation has proven to be an acceptable and reasonable means of complying with floodplain regulations that require new, substantially improved, and substantially damaged buildings to be elevated above the base flood elevation.

One concern with elevation is that it may expose the structure to greater impacts from other hazards such as wind and groundshaking. If not braced and anchored properly, an elevated building may have less resistance to the shaking of an earthquake and the pressures of high winds.

Demolition

Some buildings, especially heavily damaged or repetitively flooded ones, are not worth the expense to protect them from future damages. It is cheaper to demolish them and either replace them with new, flood protected structures ("pilot reconstruction"), or relocate the occupants to a safer site. Demolition is also appropriate for buildings that are difficult to move - such as larger, slab foundation or masonry structures - and for dilapidated structures that are not worth protecting. Generally, demolition projects are undertaken by a government agency, so the cost is not borne by the property owner, and the land is converted to public open space use, like a park.

Figure C-5 Demolition of Flooded Home



One problem that sometimes results from an acquisition and demolition project is a "checkerboard" pattern in which nonadjacent properties are acquired. This can occur when some owners, especially those who have and prefer a waterfront location, are reluctant to leave their homes. Creating such an acquisition pattern in a community simply adds to the maintenance costs that taxpayers must support.

Pilot Reconstruction

If a building is not in good shape, elevating it may not be worthwhile or it may even be dangerous. An alternative is to demolish the structure and build a new one on the site that meets or exceeds all flood and wind protection codes. This was formerly known as "demo/rebuild." FEMA funding programs refer to this approach as "pilot reconstruction." It is still a pilot program, and not a regularly funded option.

Certain rules must be followed to qualify for federal funds for pilot reconstruction:

- Pilot reconstruction is only possible after it has been shown that acquisition or elevation are not feasible, based on the program's criteria.
- Funds are only available to people who owned the property at the time of the event for which funding is authorized.
- It must be demonstrated that the benefits exceed the costs.
- The new building must be elevated to the advisory base flood elevation.
- The new building must not exceed more than 10% of the old building's square footage.
- The new building must meet all flood and wind protection codes.
- There must be a deed restriction that states the owner will buy and keep a flood insurance policy.
- The maximum federal grant is 75% of the cost, up to \$150,000. FEMA is developing a detailed list of eligible costs to ensure that disaster funds are not used to upgrade homes.

Local Implementation

Within the Tri-City planning area, it is unknown the extent to which acquisition and elevation projects have been implemented. The cities should consider these types of projects for the protection of floodprone structures in the future.

CRS Credit

The CRS provides the most credit points for acquisition and relocation, because this measure permanently removes insurable buildings from the floodplain. The CRS credits barriers and elevating existing buildings (Activity 530 - Flood Protection). Elevating a building above the flood level will also reduce the flood insurance premiums on that individual building. Because barriers are less secure than elevation, not as many points are provided. Higher scores are possible, but they are based on the number of buildings removed compared to the number remaining in the floodplain.

Retrofitting

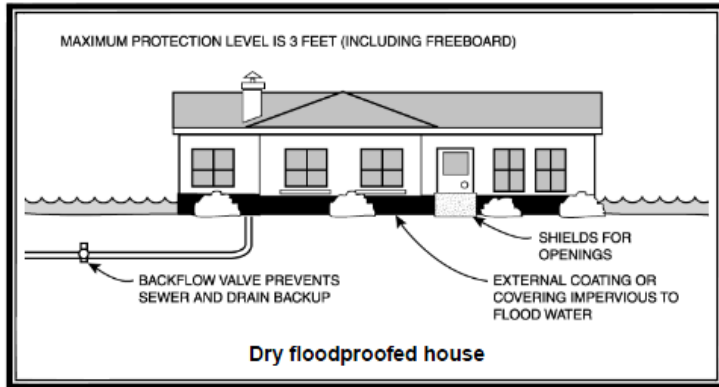
An alternative to keeping the hazard away from a building is to modify or retrofit the site or building to minimize or prevent damage. There are a variety of techniques to do this, as described below.

Dry Floodproofing

Dry floodproofing means making all areas below the flood protection level watertight. Walls are coated with waterproofing compounds or plastic sheeting. Openings, such as doors, windows and vents, are closed, either permanently, with removable shields, or with sandbags. Dry floodproofing of new and existing nonresidential buildings in the regulatory floodplain is permitted under state, FEMA and local regulations.

Dry floodproofing of existing residential buildings in the floodplain is also permitted as long as the building is not substantially damaged or being substantially improved. Owners of buildings located outside the regulatory floodplain can always use dry floodproofing techniques.

Figure C-6 Dry Floodproofing



Dry floodproofing is only effective for shallow flooding, such as repetitive drainage problems. It does not protect from the deep flooding along lakes and larger rivers caused by hurricanes or other storms.

Wet Floodproofing

The alternative to dry floodproofing is wet floodproofing: water is let in and everything that could be damaged by a flood is removed or elevated above the flood level. Structural components below the flood level are replaced with materials that are not subject to water damage. For example, concrete block walls are used instead of wooden studs and gypsum wallboard. The furnace, water heater and laundry facilities are permanently relocated to a higher floor. Where the flooding is not deep, these appliances can be raised on blocks or platforms.

Local Implementation

Area residents have utilized both dry and wet floodproofing techniques for construction of homes in floodprone areas. Floodproofing requirements for new or substantially improved structures are addressed in the communities' Floodplain Management Ordinances.

CRS Credit

Credit for dry and wet floodproofing and sewer backup protection is provided under Activity 530 - Retrofitting. Because these property protection measures are less secure than barriers and elevation, not as many points are provided.

Insurance

Technically, insurance does not mitigate damage caused by a natural hazard. However, it does help the owner repair, rebuild, and hopefully afford to incorporate some of the other property protection measures

in the process. Insurance offers the advantage of protecting the property, as long as the policy is in force, without requiring human intervention for the measure to work.

Private Property

Although most homeowner's insurance policies do not cover a property for flood damage, an owner can insure a building for damage by surface flooding through the NFIP. Flood insurance coverage is provided for buildings and their contents damaged by a "general condition of surface flooding" in the area.

Figure C-7 Flood Insurance Coverage

| Building Exposure | Premium |
|--|----------------|
| In the Special Flood Hazard Area (AE Zone) | |
| Pre-FIRM ("subsidized") rate | \$1,689 |
| Post-FIRM (actuarial) rates | |
| 2 feet above the base flood elevation | \$440 |
| 1 foot above the base flood elevation | \$643 |
| At the base flood elevation | \$1,167 |
| 1 foot below the base flood elevation | \$4,379 |
| Outside the Special Flood Hazard Area | |
| | \$1,029 |
| Premiums are for \$150,000 in building coverage and \$75,000 in contents coverage for a one story house with no basement and a \$500 deductible, using the October 2008 Flood Insurance Manual . Premiums include the 5% Community Rating System discount in unincorporated St. Tammany Parish. Premiums are higher in the municipalities, which are not in the CRS. | |

Most people purchase flood insurance because it is required by the bank when they get a mortgage or home improvement loan. Usually, these policies just cover the building's structure and not the contents. Contents coverage can be purchased separately. Renters can buy contents coverage, even if the owner does not buy structural coverage on the building. Most people don't realize that there is a 30-day waiting period to purchase a flood insurance policy and there are limits on coverage.

Public Property

Governments can purchase commercial insurance policies. Larger local governments often self-insure and absorb the cost of damage to one facility, but if many properties are exposed to damage, self-insurance can drain the government's budget. Communities cannot expect federal disaster assistance to make up the difference after a flood.

Under Section 406(d) of the Stafford Act:

"If an eligible insurable facility damaged by flooding is located in a [mapped floodplain] ... and the facility is not covered (or is underinsured) by flood insurance on the date of such flooding, FEMA is required to reduce Federal disaster assistance by the maximum amount of insurance proceeds that would have been received had the buildings and contents been fully covered under a National Flood Insurance Program (NFIP) standard

flood insurance policy. [Generally, the maximum amount of proceeds for a non-residential property is \$500,000.]

[Communities] Need to:

- Identify all insurable facilities, and the type and amount of coverage (including deductibles and policy limits) for each. The anticipated insurance proceeds will be deducted from the total eligible damages to the facilities.
- Identify all facilities that have previously received Federal disaster assistance for which insurance was required. Determine if insurance has been maintained. A failure to maintain the required insurance for the hazard that caused the disaster will render ineligible for Public Assistance funding...
- [Communities] must obtain and maintain insurance to cover [their] facility - buildings, equipment, contents and vehicles - for the hazard that caused the damage in order to receive Public Assistance funding. Such coverage must, at a minimum, be in the amount of the eligible project costs. FEMA will not provide assistance for that facility in future disasters if the requirement to purchase insurance is not met. - FEMA Response and Recovery Directorate Policy No. 9580.3, August 23, 2000

In other words, the law expects public agencies to be fully insured as a condition of receiving federal disaster assistance.

Local Implementation

Flood insurance is available in the cities of Fremont, Newark and Union City. Information on flood insurance policies and claims are included in the jurisdictional annexes to this LHMP. Flood insurance promotion by the cities is a component of their floodplain management programs.

CRS Credit

There is no credit for purchasing flood insurance, but the CRS does provide credit for local public information programs that explain flood insurance to property owners. The CRS also reduces the premiums for those people who do buy NFIP coverage.

The Government's Role

Property protection measures are usually considered the responsibility of the property owner. However, local governments should be involved in all strategies that can reduce flood losses, especially acquisition and conversion of a site to public open space. There are various roles a municipality can play in encouraging and supporting implementation of these measures.

One of the first duties of a local government is to protect its own facilities. Fire stations, water treatment plants and other critical facilities should be a high priority for retrofitting projects and insurance coverage. Often public agencies discover after the disaster that their "all-hazard" insurance policies do not cover the property for the type of damage incurred. Flood insurance is even more important as a mitigation measure because of certain Stafford Act provisions.

Providing basic information to property owners is the first step in supporting property protection measures. Owners need general information on what can be done. They need to see examples, preferably from nearby.

Communities can help owners by helping to pay for a retrofitting project. Financial assistance can range from full funding of a project to helping residents find money from other programs. Some communities assume responsibility for sewer backups, street flooding, and other problems that arise from an inadequate public sewer or public drainage system. Less expensive community programs include low interest loans, forgivable low interest loans and rebates. A forgivable loan is one that does not need to be repaid if the owner does not sell the house for a specified period, such as five years. These approaches don't fully fund the project, but they cost the community less and they increase the owner's commitment to the flood protection project. Often, small amounts of money act as a catalyst to pique the owner's interest to get a self-protection project moving.

The more common outside funding sources are listed below. Unfortunately, some of these are only available after a disaster, not before, when damage could be prevented.

Pre-disaster funding sources:

- FEMA's Building Resilient Infrastructure and Communities (BRIC) grants
- FEMA's Flood Mitigation Assistance (FMA) grants
- Community Development Block Grants
- Conservation organizations, although generally these organizations prefer to purchase vacant land in natural areas, not properties with buildings on them.

Post-disaster funding sources:

- Insurance claims
- The NFIP's Increased Cost of Compliance. This provision increases a flood insurance claim payment to help pay for a flood protection project required by code as a condition to rebuild the flooded building. It can also be used to help pay the non-federal cost-share of an elevation project.

Post-disaster funding sources, federal disaster declaration needed:

- FEMA's disaster assistance (for public properties). However, after a flood, the amount of assistance will be reduced by the amount of flood insurance that the public agency should be carrying on the property.
- Small Business Administration disaster loans (for non-governmental properties)
- FEMA's Hazard Mitigation Grant Program

Acquisition Agent

The community can be the focal point in an acquisition project. Most funding programs require a local public agency to sponsor the project. The local government could process the funding application, work with the owners, and provide some, or all, of the local share. In some cases, the local government would be the ultimate owner of the property, but in other cases another public agency could assume ownership and the attendant maintenance responsibilities.

Mandates

Mandates are considered a last resort if information and incentives are insufficient to convince a property owner to take protective actions. An example of a retrofitting mandate is the requirement that communities have to disconnect downspouts from the sanitary sewer line.

There is a mandate for improvements or repairs made to a building in the mapped floodplain. If the project equals or exceeds 50% of the value of the original building, it is considered a "substantial improvement." The building must then be elevated or otherwise brought up to current flood protection codes.

Another possible mandate is to require less expensive hazard protection steps as a condition of a building permit. For example, many communities require upgraded electrical service as a condition of a home improvement project. If a person were to apply for a permit for electrical work, the community could require that the service box be moved above the base flood elevation or the installation of a separate ground fault interrupter circuits in the basement.

Local Implementation

As previously described, cities have floodplain ordinances which require flood protection measures be implemented as part of the permit requirements for structures within the special flood hazard areas.

CRS Credit

Except for public information programs, the CRS does not provide credit for efforts to fund, provide incentives, or mandate property protection measures. CRS credits are provided for the actual projects after they are completed. However, to participate in CRS, a community must certify that it has adequate flood insurance on all properties that have been required to be insured. The minimum requirement is to insure those properties in the mapped floodplain that have received federal aid, as specified by the Flood Disaster Protection Act of 1973.

Repetitive Loss Properties and Analysis

Repetitive loss properties deserve special attention because they are more prone to damage by natural hazards than any other properties in the Tri-City planning area. Further, protecting repetitive loss buildings is a priority with FEMA mitigation funding programs.

According to FEMA's NFIP records as of July 2, 2023, the cities of Fremont and Newark do not have any repetitive loss (RL) buildings. In Union City, NFIP data indicates that there are 10 RL and 0 severe repetitive loss (SRL) buildings. These 10 RL properties have 15 RL losses and are located outside of the 1% and 0.2% annual chance flood zone, in the B,C, and X zones.

Conclusions and Recommendations

- There are several ways to protect individual properties from damage by natural hazards. The advantages and disadvantages of each should be examined for each situation.

- Property protection measures can protect some of the most damage-prone buildings in the Tri-City planning area including repetitive loss properties.
- Flood insurance promotion efforts should be enhanced in the three cities.
- Property owners can implement some property protection measures at little cost, especially for sites in areas of low hazards (e.g., shallow flooding, sewer backup, and thunderstorms). For other measures, such as relocation and elevation, the owners may need financial assistance.
- Local government agencies can promote and support property protection measures through several activities, ranging from public information to financial incentives to full funding.
- Government properties, including critical facilities, should be evaluated to determine the extent to which they are protected from flooding.
- Because properties in floodplains are likely to be damaged at some point, efforts should continue to provide information and advice to floodplain property owners. Special attention should be given to repetitive loss and high hazard areas.
- Public education materials can be developed/enhanced to explain property protection measures that can help owners reduce their exposure to damage by floods and the various types of insurance that are available.
- All property protection projects should be voluntary to be most effective. Other than state and federally mandated regulations, local incentives should be positive as much as possible, such as providing financial assistance.
- A FEMA Hazard Mitigation Assistance (HMA) Grant workshop focused on private firms and citizens could be conducted annually to showcase the assistance that FEMA (HMGP, PDM, FMA, RFC and SRL) provides and to encourage public participation.
- A standard checklist could be developed to evaluate a property's exposure to damage from floods. It should include a review of insurance coverage and identify where more information can be found on appropriate property protection measures. The checklist should be provided to each agency participating in this planning process and made available to the public.
- The three cities should evaluate their own properties using the standard checklist. A priority should be placed on determining critical facilities' vulnerability to damage and whether public properties are adequately insured.
- The three cities should protect their own publicly owned facilities with appropriate mitigation measures.

C.3.3. Natural Resource Protection

Resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. These activities enable the naturally beneficial functions of fields, floodplains, wetlands, and other natural lands to operate more effectively. Natural and beneficial functions of watersheds, floodplains and wetlands include:

- Reduction in runoff from rainwater and snow melt in pervious areas
- Infiltration that absorbs overland flood flow
- Removal and filtering of excess nutrients, pollutants and sediments
- Storage of floodwaters
- Absorption of flood energy and reduction in flood scour
- Water quality improvement
- Groundwater recharge
- Habitat for flora and fauna
- Recreational and aesthetic opportunities

As development occurs, many of the above benefits can be achieved through regulatory steps for protecting natural areas or natural functions. This Appendix C covers the resource protection programs and standards

that can help mitigate the impact of natural hazards, while they improve the overall environment. Seven areas are reviewed:

- Wetland protection
- Erosion and sedimentation control
- River restoration
- Best management practices
- Dumping regulations
- Urban forestry
- Farmland protection

Wetland Protection

Wetlands are often found in floodplains and depressional areas of a watershed. Many wetlands receive and store floodwaters, thus slowing and reducing downstream flows. They also serve as a natural filter, which helps to improve water quality, and they provide habitat for many species of fish, wildlife and plants.

Wetlands that are determined to be part of the waters of the United States are regulated by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency (US EPA) under Section 404 of the Clean Water Act. Before a "404" permit is issued, the plans are reviewed by several agencies, including the Corps and the U.S. Fish and Wildlife Service. Each of these agencies must sign off on individual permits.

There are also nationwide permits that allow small projects that meet certain criteria to proceed without individual permits. Wetlands not included in the Corps' jurisdiction or that are addressed by a nationwide permit may be regulated against by local authorities.

If a permit is issued by the Corps, County, or one of the cities, the impact of the development is typically required to be mitigated. Wetland mitigation can include creation, restoration, enhancement or preservation of wetlands elsewhere. Wetland mitigation is often accomplished within the development site, however, mitigation is allowed off-site and sometimes in another watershed. The appropriate type of mitigation is addressed in each permit.

Some developers and government agencies have accomplished the required mitigation by buying into a wetland bank. Wetland banks are large wetlands created for the purpose of mitigation. The banks accept money to reimburse the owner for setting the land aside from development.

When a wetland is mitigated at a separate site there are drawbacks to consider. First, it takes many years for a new wetland to approach the same quality as an existing one. Second, a new wetland in a different location (especially if it is in a different watershed) will not have the same flood damage reduction benefits as the original one did.

Local Implementation

The three cities should ensure they have adequate ordinances that provide parameters for developing near wetlands. These include requirements for restricting grading and soil disturbances in wetlands, drainage ways, stream environment zones, or water bodies.

CRS Credit

The CRS focuses on activities that directly affect flood damage to insurable buildings. While there is no credit for relying on the Corps of Engineers' 404 regulations, there is credit for preserving open space in its natural condition or restored to a state approximating its natural condition. The credit is based on the percentage of the floodplain that can be documented as wetlands protected from development by ownership or local regulations. Likewise, there is credit for maintaining water quality buffers that protect streams, rivers, lakes and shorelines in their natural condition or restoring them to an approximate natural state. Credit is also available for an approved habitat conservation plan.

Erosion and Sedimentation Control

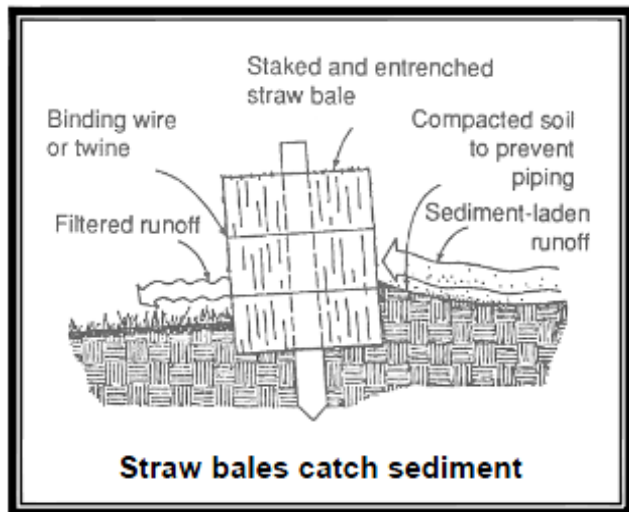
Farmlands and construction sites typically contain large areas of bare exposed soil. Surface water runoff can erode soil from these sites, sending sediment into downstream waterways. Erosion also occurs along stream banks and shorelines as the volume and velocity of flow or wave action destabilize and wash away the soil.

Sediment suspended in the water tends to settle out where flowing water slows down. This can clog storm drains, drain tiles, culverts and ditches and reduce the water transport and storage capacity of river and stream channels, lakes and wetlands. When channels are constricted and flooding cannot deposit sediment in the bottomlands, even more sediment is left in the channels. The result is either clogged streams or increased dredging costs.

Not only are the drainage channels less able to perform their job, but the sediment in the water reduces light, oxygen and water quality, and often carries chemicals, heavy metals and other pollutants. Sediment has been identified by the US EPA as the nation's number one nonpoint source pollutant for aquatic life.

There are two principal strategies to address these problems: minimize erosion and control sedimentation. Techniques to minimize erosion include phased construction, minimal land clearing, and stabilizing bare ground as soon as possible with vegetation and other soil stabilizing practices.

Figure C-8 Erosion Control



If erosion occurs, other measures are used to capture sediment before it leaves the site. Silt fences, sediment traps and vegetated filter strips are commonly used to control sediment transport. Runoff from the site can be slowed down by terraces, contour strip farming, no-till farm practices, hay or straw bales, constructed wetlands, and impoundments (e.g., sediment basins and farm ponds). Slowing surface water runoff on the way to a drainage channel increases infiltration into the soil and reduces the volume of topsoil eroded from the site.

Erosion and sedimentation control regulations mandate that these types of practices be incorporated into construction plans. The most common approach is to require applicants for permits to submit an erosion and sediment control plan for the construction project. This allows the applicant to determine the best practices for the site.

Local Implementation

The three cities have Stormwater Quality Programs and Erosion and Sediment Control Programs which include ordinances and practices for erosion and sedimentation control.

CRS Credit

Local governments whose ordinances include erosion and sedimentation control provisions can qualify for up to 45 points for this measure.

River Restoration

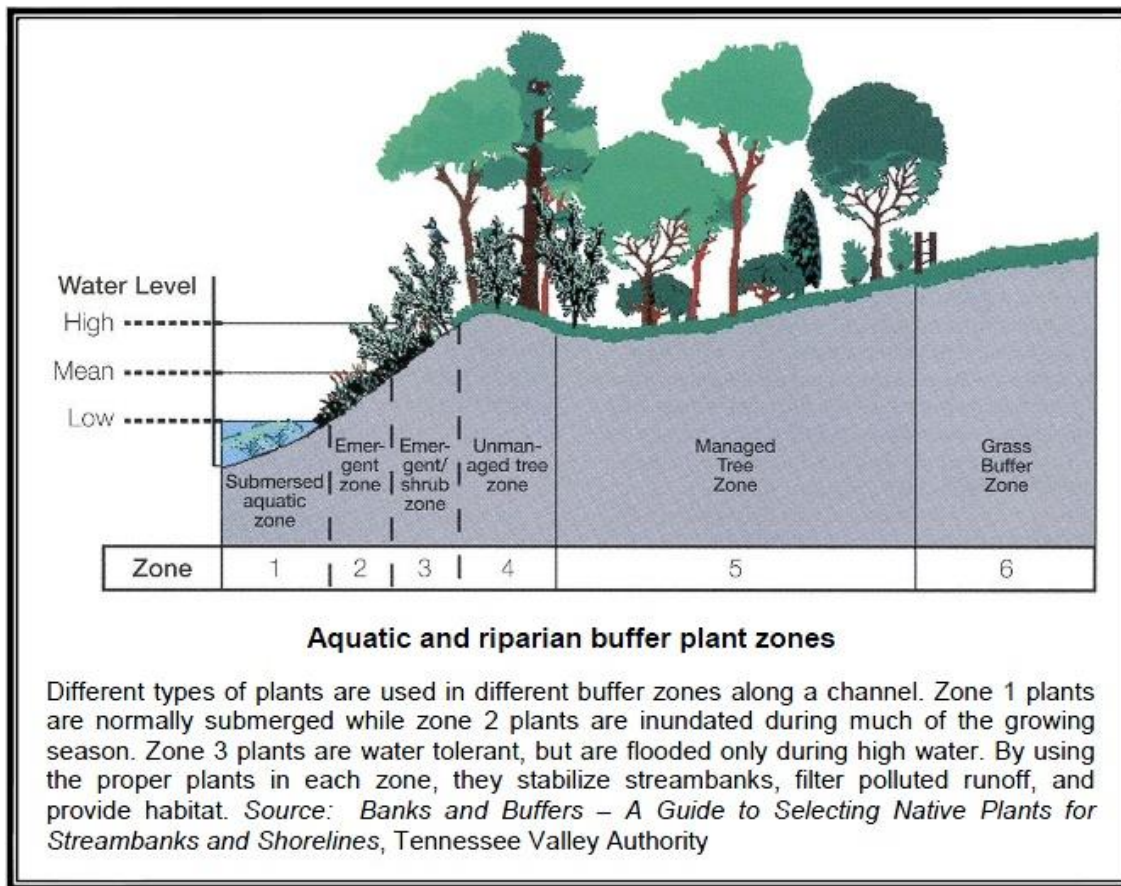
There is a growing movement that has several names, such as "stream conservation," "bioengineering," or "riparian corridor restoration." The objective of these approaches is to return streams, stream banks and adjacent land to a more natural condition, including the natural meanders. Another term is "ecological restoration," which restores native indigenous plants and animals to an area.

A key component of these efforts is to use appropriate native plantings along the banks that resist erosion. This may involve retrofitting the shoreline with willow cuttings, wetland plants, or rolls of landscape material covered with a natural fabric that decomposes after the banks are stabilized with plant roots.

In all, restoring the right vegetation to a stream has the following advantages:

- Reduces the amount of sediment and pollutants entering the water
- Enhances aquatic habitat by cooling water temperature
- Provides food and shelter for both aquatic and terrestrial wildlife
- Can reduce flood damage by slowing the velocity of water
- Increases the beauty of the land and its property value
- Prevents property loss due to erosion
- Provides recreational opportunities, such as hunting, fishing and bird watching
- Reduces long-term maintenance costs

Figure C-9 River Restoration Zones



Local Implementation

The three cities implement a variety of these activities for water quality and floodplain management purposes under many of their existing programs.

CRS Credit

The CRS provides credits for preserving open space in its natural condition or restored to a state approximating its natural condition. There are also credits for channel setbacks, buffers and protecting shorelines. Credit is also provided for open space land that is deed restricted.

Best Management Practices

Point source pollutants come from pipes such as the outfall of a municipal wastewater treatment plant. They are regulated by the US EPA and the California Department of Water Resources. Nonpoint source pollutants come from non-specific locations and harder to regulate. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, other 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.

The term "best management practices" (BMPs) refers to design, construction and maintenance practices and criteria that minimize the impact of stormwater runoff rates and volumes, prevent erosion, protect natural resources and capture nonpoint source pollutants (including sediment). They can prevent increases in downstream flooding by attenuating runoff and enhancing infiltration of stormwater. They also minimize water quality degradation, preserve beneficial natural features onsite, maintain natural base flows, minimize habitat loss, and provide multiple usages of drainage and storage facilities.

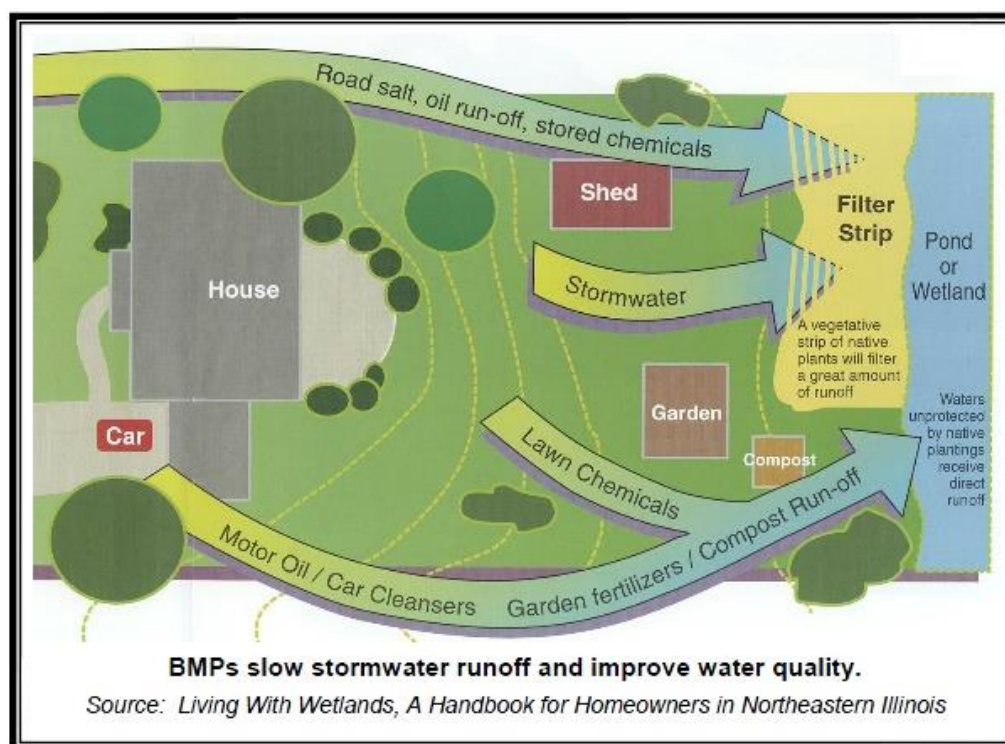
Local Implementation

The three cities participate in the National Pollutant Discharge Elimination System permitting program and require BMPs to minimize stormwater impacts.

CRS Credit

A community can receive CRS points if regulations require new developments to include in the design of their permanent stormwater management facilities appropriate BMPs that will improve the quality of surface waters.

Figure C-10 Stormwater Best Management Practices



Dumping Regulations

BMPs usually address pollutants that are liquids or are suspended in water that are washed into a lake or stream. Dumping regulations address solid matter, such as shopping carts, appliances and landscape waste that can be accidentally or intentionally thrown into channels or wetlands. Such materials may not pollute the water, but they can obstruct even low flows and reduce the channels' and wetlands' abilities to convey or clean stormwater.

Many communities have nuisance ordinances that prohibit dumping garbage or other "objectionable waste" on public or private property. Waterway dumping regulations need to also apply to "non-objectionable" materials, such as grass clippings or tree branches, which can kill ground cover or cause obstructions in channels. Regular inspections to catch violations should be scheduled.

Many people do not realize the consequences of their actions. They may, for example, fill in the ditch in their front yard without realizing that is needed to drain street runoff. They may not understand how regarding their yard, filling a wetland, or discarding leaves or branches in a watercourse can cause a problem to themselves and others. Therefore, a dumping enforcement program should include public information materials that explain the reasons for the rules as well as the penalties.

Local Implementation

The three cities should ensure they have adequate language in place in their local ordinances making it unlawful for anyone to deposit waste, trash, or debris into a waterway. Ordinances should also prohibit the placing of any obstruction in a floodway, including buildings, fill, or fencing. They should also make illegal to dump or discharge hazardous materials, trash, or other pollutants into the storm drains. Even grass, leaves and yard clippings that are repeatedly swept into catch basins can clog the drain, causing flooding and the potential for becoming a breeding ground for rodents and insects. Additionally, when grass and leaves decompose, they encourage excessive growth of algae which can deprive fish of adequate oxygen.

The cities should publicize this information on their local websites and through other outreach mechanisms.

CRS Credit

The CRS provides credit for enforcing and publicizing a regulation that prohibits dumping in the drainage system.

Farmland Protection

Farmland protection is quickly becoming an important piece of comprehensive planning and zoning throughout the United States. The purpose of farmland protection is to provide mechanisms for prime, unique, or important agricultural land to remain as such, and to be protected from conversion to nonagricultural uses.

Frequently, farm owners sell their land to residential or commercial developers and the property is converted to non-agricultural land uses. With development comes more buildings, roads and other infrastructure. Urban sprawl occurs, which can lead to additional stormwater runoff and emergency management difficulties.

Figure C-11 Floodplain Damages to Farmland



Farms on the edge of cities are often appraised based on the price they could be sold for to urban developers. This may drive farmers to sell to developers because their marginal farm operations cannot afford to be taxed as urban land. The Farmland Protection Program in the United States Department of Agriculture's 2002 Farm Bill (Part 519) allows for funds to go to state, tribal, and local governments as well as nonprofit organizations to help purchase easements on agricultural land to protect against the development of the land. Eligible land includes cropland, rangeland, grassland, pastureland, or forest land that is part of an agricultural operation. Certain lands within historical or archaeological resources are also included.

The hazard mitigation benefits of farmland protection are similar to those of open space preservation:

- Farmland is preserved for future generations,
- Farmland in the floodplain keeps damageable structures out of harm's way,
- Farmland keeps more stormwater on site and lets less stormwater runoff downstream,
- Rural economic stability and development is sustained,
- Ecosystems are maintain, restored or enhanced, and
- The rural character and scenic beauty of the area is maintained.

Local Implementation

The three cities participate in open space preservation programs that protect Hillside and Shoreline areas. The three cities do not participate in open space incentive programs based on agricultural uses.

CRS Credit

Credit is given for preserving open space in the floodplain, regardless of why it is being preserved. Credit is also provided for density zoning of floodprone areas.

Conclusions and Recommendations

- A hazard mitigation program can use resource protection programs to support protecting areas and natural features that can mitigate the impacts of natural hazards.
- The three cities should update and enforce regulations that prohibit illicit discharges into public sewers or onto public or private property and should consider publicizing their illicit discharge rules more widely.
- The public and decision makers should be informed about the hazard mitigation benefits of restoring rivers, wetlands and other natural areas. Restoration and protection techniques should be explained.
- Public outreach activities should include informing the public about the need to protect streams and wetlands from dumping and inappropriate development and the relevant codes and regulations.

C.3.4. Emergency Services Measures

Emergency services measures protect people during and after a disaster. A good emergency management program addresses all hazards, and it involves all local government departments. At the state level, emergency services programs are coordinated by the California Office of Emergency Services (Cal OES). Locally, emergency services are coordinated by the Alameda County Office of Emergency Services Offices of Emergency Services for the cities of Fremont, Newark, and Union City.

This section reviews emergency services measures following a chronological order of responding to an emergency. It starts with identifying an impending problem (threat recognition) and continues through post-disaster activities.

Threat Recognition

The first step in responding to a flood, storm, or other natural hazard is to know when weather conditions are such that an event could occur. With a proper and timely threat recognition system, adequate warnings can be disseminated.

Routine Monitoring for Alerts, Watches and Warnings

Emergency officials constantly monitor events and the environment to identify specific threats that may affect their jurisdiction and increase awareness levels of emergency personnel and the community when a threat is approaching or imminent.

The National Weather Service (NWS) is the prime agency for detecting meteorological threats, such as tornadoes, thunderstorms and winter storms. Severe weather warnings are transmitted through NOAA's Weather Radio System. Federal agencies can only look at the large scale, e.g., whether conditions are appropriate for the formation of a thunderstorm. Local emergency managers can provide more site-specific and timely recognition by sending out NWS trained spotters to watch the skies when the Weather Service issues a watch or a warning.

A flood threat recognition system predicts the time and height of a flood crest. This can be done by measuring rainfall, soil moisture, and stream flows upstream of the community and calculating the subsequent flood levels.

On larger rivers, this measuring and calculating is performed by the NWS, a part of the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA). Support for NOAA's efforts is provided by cooperating partners from state and local agencies. Forecasts of expected river stages are made through the Advanced Hydrologic Prediction Service (AHPS) of the National Weather Service. Flood threat predictions are disseminated on the NOAA Weather Wire or NOAA Weather Radio. NOAA Weather Radio is considered by the federal government as the official source for weather information.

On smaller rivers, locally established rainfall and river gauges are needed to establish a flood threat recognition system. The NWS may issue a "flash flood watch." This is issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain nor imminent. These events are so localized and so rapid that a "flash flood warning" may not be issued, especially if no remote threat recognition equipment is available. In the absence of a gauging system on small streams, the best threat recognition system is to have local personnel monitor rainfall and stream conditions. While specific flood crests and times will not be predicted, this approach will provide advance notice of potential local or flash flooding.

Local Implementation

The Emergency Operations Plan's (EOP) for the three cities, include limited information on procedures for threat identification. The cities work closely with the Alameda County OES and the NWS for issuing an Emergency Alert.

Increased Readiness & Pre-Impact

Early threat identification and sufficient warning provides the opportunity for response agencies to increase readiness, which are actions designed to increase an agency's ability to effectively respond once the emergency occurs. This includes steps to brief key officials, disseminating information to the community, and through activation of EOCs, as necessary.

Community Preparedness and Awareness

Emergency public information is a priority during emergencies and disasters. County and City governments have a primary responsibility to provide accurate and timely information to the public regarding conditions, threats, and protective measures. Emergency information is best communicated when centralized and coordinated among all involved jurisdictions, agencies, and organizations.

The public's response to any emergency is based on an understanding of the nature of the emergency, the potential hazards, the likely response of emergency services, and knowledge of what individuals and groups should do to increase their chances of survival and recovery. Effective public awareness and education prior to an emergency or a disaster will directly affect the three cities' emergency operations response and recovery efforts.

CRS Credit

Credit can be received for using river flood stage predictions for the NWS's gages. The actual score is based on how much of the community's floodplain is affected by these systems. Potential CRS credit is possible under Activity 610 - Flood Warning Program and Response.

Notifications and Warning Systems

Once a disaster is imminent, action is taken to control the situation, save lives, protect property, and minimize the effects of the disaster. During this phase, warning systems are activated; resources and first responders notified and mobilized; and evacuations begin.

After a threat recognition system tells the emergency services office that a flood, severe weather or other hazard is coming, the next step is to notify the public and staff of other agencies and critical facilities. Providing adequate and timely notification to the public is the greatest challenge, especially with sudden or no-notice events. The earlier and more specific the warning, the greater the number of people that can implement protection measures.

As previously described, the NWS issues notices to the public using two levels of notification:

- **Watch.** Conditions are right for flooding, thunderstorms, or other hazard event.
- **Warning.** A flood or other event has started or been observed.

A more specific warning may be disseminated by the community in a variety of ways. The following are the more common methods:

- Commercial or public radio or TV stations
- The Weather Channel
- Cable TV emergency news inserts
- Telephone trees/mass telephone notification
- NOAA Weather Radio
- Tone activated receivers in key facilities
- Outdoor warning sirens
- Sirens on public safety vehicles
- Door-to-door contact
- Mobile public address systems
- Email notifications

Multiple or redundant systems are most effective - if people do not hear one warning, they may still get the message from another part of the system. Each has advantages and disadvantages:

- Radio and television provide a lot of information, but people have to know when to turn them on. They are most appropriate for hazards that develop over more than a day, such as a tropical storm, hurricane, or winter storm.
- NOAA Weather Radio can provide short messages of any impending weather hazard or emergency and advise people to turn on their televisions for more information, but not everyone has a Weather Radio.
- Outdoor warning sirens can reach many people quickly as long as they are outdoors. They do not reach people in tightly-insulated buildings or those around loud noise, such as at a factory, during a thunderstorm, or in air conditioned homes. They do not explain what hazard is coming, but people should know to turn on a radio or television when they hear the siren.
- Automated telephone notification services are also fast, but can be expensive and do not work when phone lines are down. Nor do they work for unlisted numbers, call screening services, or cellular service, unless people sign up for notifications.
- Where a threat has a longer lead time, going door-to-door and manual telephone trees can be effective.

Just as important as issuing a warning is telling people what to do in case of an emergency. A warning program should have a public information aspect. Citizens should know the difference between a tornado warning (when they should seek shelter in a low spot), a flood warning (when they should stay out of low areas), and other appropriate warnings and responses.

StormReady

The National Weather Service established the StormReady program to help local governments improve the timeliness and effectiveness of hazardous weather related warnings for the public. To be officially StormReady, a community must:

- Establish a 24-hour warning point and emergency operations center,
- Have more than one way to receive severe weather warnings and forecasts and to alert the public,
- Create a system that monitors weather conditions locally,

- Promote the importance of public readiness through community seminars, and
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

Being designated a StormReady community by the National Weather Service is a good measure of a community's emergency warning program for weather hazards. It is also credited by the CRS.

Local Implementation

In coordination with established public safety warning protocols, the activated EOCs for the cities will manage the dissemination of timely and adequate warnings to threatened populations in the most direct and effective means possible.

Neither of the three cities are StormReady certified, but all are considering StormReady certification.

CRS Credit

Community Rating System points are based on the number and types of warning media that can reach the community's flood prone population. Depending on the location, communities can receive credit for the telephone calling system and more points if there are additional measures, like telephone trees. Being designated as a StormReady community can provide additional points. These credits are in Activity 610 - Flood Warning Program and Response.

Response

The protection of life and property is the most important task of emergency responders. Concurrent with threat recognition and issuing warnings, a community should respond with actions that can prevent or reduce damage and injuries. Typical actions and responding parties include the following:

- Activating the emergency operations center (emergency preparedness),
- Closing streets or bridges (police or public works),
- Shutting off power to threatened areas (utility company),
- Passing out sand and sandbags (public works),
- Holding children at school or releasing children from school (school superintendent),
- Opening evacuation shelters (the American Red Cross),
- Monitoring water levels (public works), and
- Establishing security and other protection measures (police).

An emergency action plan ensures that all bases are covered and that the response activities are appropriate for the expected threat. These plans are developed in coordination with the agencies or offices that are given various responsibilities.

A flood stage forecast map shows areas that will be under water at various flood stages. Different flood levels are shown as color coded areas, so the emergency manager can quickly see what will be affected. Emergency management staff can identify the number of properties flooded, which roads will be under water, which critical facilities will be affected, and who to warn. With this information, an advance plan

can be prepared that shows problem sites and determines what resources will be needed to respond to the predicted flood level.

Emergency response plans should be updated annually to keep contact names and telephone numbers current and to ensure that supplies and equipment that will be needed are still available. They should be critiqued and revised after disasters and exercises to take advantage of the lessons learned and of changing conditions. The end result is a coordinated effort implemented by people who have experience working together so that available resources will be used in the most efficient manner possible.

Local Implementation

As part of this LHMP Update, the three cities are evaluating improvements to their flood warning system based on CRS Activity 610, Flood Warning and Response.

CRS Credit

The CRS program provides credit under Activity 610- Flood Warning for a warning system that effectively notifies residents of a flood and has procedures for testing and monitoring the system.

Evacuation and Shelter

According to Emergency Management: Principles and Practice, the principle of evacuation is to move citizens from a place of relative danger to a place of relative safety, via a route that does not pose significant danger. There are six key components to a successful evacuation:

- Adequate warning
- Adequate routes
- Proper timing to ensure the routes are clear
- Traffic control
- Knowledgeable travelers
- Care for special populations (e.g., the handicapped, prisoners, hospital patients, and schoolchildren)

Those who cannot get out of harm's way need shelter. Typically, the American Red Cross will staff a shelter and ensure that there is adequate food, bedding, and wash facilities. Shelter management is a specialized skill. Managers must deal with problems like scared children, families that want to bring in their pets, and the potential for an overcrowded facility.

Local Implementation

The EOPs for the three cities address sheltering during a hazard event or disaster to provide people affected by a disaster with a safe, temporary place to be housed during or immediately after a disaster until they can either return to their homes or be relocated to other housing facilities. Comprehensive evacuation planning in the Tri-City planning area should be considered.

CRS Credit

Because it is primarily concerned with protecting insurable buildings, the CRS does not provide any special credit for evacuation or sheltering of people (minimal credit is given in Activity 510 - Floodplain Management for evacuation policies and procedures). It is assumed that the emergency response plan would include all necessary actions in response to a flood.

Post-Disaster Recovery and Mitigation

After a disaster, communities should undertake activities to protect public health and safety and facilitate recovery. Appropriate measures include:

- Patrolling evacuated areas to prevent looting,
- Providing safe drinking water,
- Monitoring for diseases,
- Vaccinating residents for tetanus and other diseases,
- Clearing streets, and
- Cleaning up debris and garbage.

Throughout the recovery phase, everyone wants to get "back to normal." The problem is that "normal" means the way they were before the disaster, exposed to repeated damage from future disasters. There should be an effort to help prepare people and property for the next disaster. Such an effort would include:

- Public information activities to advise residents about mitigation measures they can incorporate into their reconstruction work,
- Evaluating damaged public facilities to identify mitigation measures that can be included during repairs,
- Identifying other mitigation measures that can lessen the impact of the next disaster,
- Acquiring substantially or repeatedly damaged properties from willing sellers,
- Planning for long-term mitigation activities, and
- Applying for post-disaster mitigation funds.

Regulating Reconstruction

Requiring permits for building repairs and conducting inspections are vital activities to ensure that damaged structures are safe for people to reenter and repair. There is a special requirement to do this in floodplains, regardless of the type of disaster or the cause of damage. The NFIP requires that local officials enforce the substantial damage regulations. These rules require that if the cost to repair a building in the mapped floodplain equals or exceeds 50% of the building's market value, the building must be retrofitted to meet the standards of a new building in the floodplain. In most cases, this means that a substantially damaged building must be elevated above the base flood elevation.

This requirement can be very difficult for understaffed and overworked offices following a disaster. However, if these activities are not carried out properly, not only does the community miss a tremendous opportunity to redevelop or clear out a hazardous area, it may be violating its obligations under the NFIP. In some areas, mutual aid agreements have been established so building inspectors from a community not affected by the disaster can work in the communities that were hit the hardest.

Local Implementation

The three cities should consider the development of comprehensive post-disaster recovery policies in place for the communities. The EOPs are intended to facilitate multi-agency and multi-jurisdictional coordination during emergencies including hazard events. Through its policies and procedures the EOPs seek to mitigate the effects of hazards, prepare for measures to be taken which will preserve life and minimize damage, enhance response during emergencies and provide necessary assistance, and establish a recovery system in order to return the community to their normal state of affairs.

CRS Credit

The CRS does credit post-disaster mitigation procedures if the policies and procedures are incorporated into a flood mitigation or multi-hazard plan through Activity 510 - Floodplain Management Planning.

Conclusions and Recommendations

- There are several threat recognitions systems that can provide the three cities with advance notice of an impending emergency.
- Emergency management guidance could be very helpful when things happen quickly and for hazards that have predictable impacts, such as flooding.
- The three cities should update and exercise their EOPs on a regular basis.
- The three cities should work together to protect people before and after a disaster including an outreach program to promote each community's warning system.

C.3.5. Flood Control Measures

Four general types of flood control projects are reviewed here: levees, reservoirs, diversions, and dredging. These projects have three advantages not provided by other mitigation measures:

- They can stop most flooding, protecting streets and landscaping in addition to buildings,
- Many projects can be built without disrupting citizens' homes and businesses, and
- They are constructed and maintained by a government agency, a more dependable long-term management arrangement than depending on many individual private property owners.

However, as shown below, structural measures can have shortcomings. The appropriateness of using flood control depends on individual project area circumstances.

Pros and Cons of Structural Flood Control Projects

- Advantages
 - ✓ They may provide the greatest amount of protection for land area used.
 - ✓ Because of land limitations, they may be the only practical solution in some circumstances.
 - ✓ They can incorporate other benefits into structural project design, such as water supply and recreational uses.
 - ✓ Regional detention may be more cost-efficient and effective than requiring numerous small detention basins.

- Disadvantages
 - ✓ They can disturb the land and disrupt the natural water flows, often destroying wildlife habitat.
 - ✓ They require regular maintenance, which if neglected can have disastrous consequences.
 - ✓ They are built to a certain flood protection level that can be exceeded by larger floods, causing extensive damage.
 - ✓ They can create a false sense of security, as people protected by a project often believe no flood can ever reach them.
 - ✓ Although it may be unintended, in many circumstances they promote more intensive land use and development in the floodplain.

Levees and Floodwalls

Probably the best known flood control measure is a barrier of earth (levee) or concrete (floodwall) erected between the watercourse and the property to be protected. Levees and floodwalls confine water to the stream channel by raising its banks. They must be well designed to account for large floods, underground seepage, pumping of internal drainage, and erosion and scour. Key considerations when evaluating the use of a levee include:

- Design and permitting costs,
- Right of way acquisition,
- Removal of fill to compensate for the floodwater storage that will be displaced by the levee,
- Internal drainage of surface flows from the area inside the levee,
- Cost of construction,
- Cost of maintenance,
- Mitigation of adverse impacts to wetlands and other habitats,
- Loss of river access and views, and
- Creating a false sense of security, because while levees may reduce flood damage for smaller more frequent rain events, they may also overtop or breach in extreme flood events and subsequently create more flood damage than would have occurred without the levee.

Levees placed along the river or stream edge can degrade the aquatic habitat and water quality of the stream. They also are more likely to push floodwater onto other properties upstream or downstream. To reduce environmental impacts and provide multiple use benefits, a setback levee is often the best project design. The area inside a setback levee can provide open space for recreational purposes and provide access sites to the river or stream.

Floodwalls perform like levees except they are vertical-sided structures that require less surface area for construction. Floodwalls are constructed of steel sheet pile or reinforced concrete, which makes the expense of installation cost prohibitive in many circumstances. Floodwalls also can degrade adjacent habitat and can displace erosive energy to unprotected areas of shoreline downstream.

Reservoirs and Detention

Reservoirs reduce flooding by temporarily storing flood waters behind dams or in storage or detention basins. Reservoirs lower flood heights by holding back, or detaining, runoff before it can flow downstream. Flood waters are detained until the flood has subsided, and then the water in the reservoir or detention basin is released or pumped out slowly at a rate that the river can accommodate downstream.

Reservoirs can be dry and remain idle until a large rain event occurs. Or they may be designed so that a lake or pond is created. The lake may provide recreational benefits or water supply (which could also help mitigate a drought).

Flood control reservoirs are most commonly built for one of two purposes. Large reservoirs are constructed to protect property from existing flood problems. Smaller reservoirs, or detention basins, are built to protect property from the stormwater runoff impacts of new development.

Figure C-12 Retention Pond



Regardless of size, reservoirs protect the development that is downstream from the reservoir site. Unlike levees and channel modifications, they do not have to be built close to or disrupt the area to be protected. Reservoirs are most efficient in deeper valleys where there is more room to store water, or on smaller rivers where there is less water to be stored.

In urban areas, some reservoirs are simply manmade holes, excavated to store floodwaters. Reservoirs in urban areas are typically constructed adjacent to streams (though usually outside of the floodplain). When built in the ground, there is no dam for these retention and detention basins and no dam failure hazard. Wet or dry basins can also serve multiple uses by doubling as parks or other open space uses.

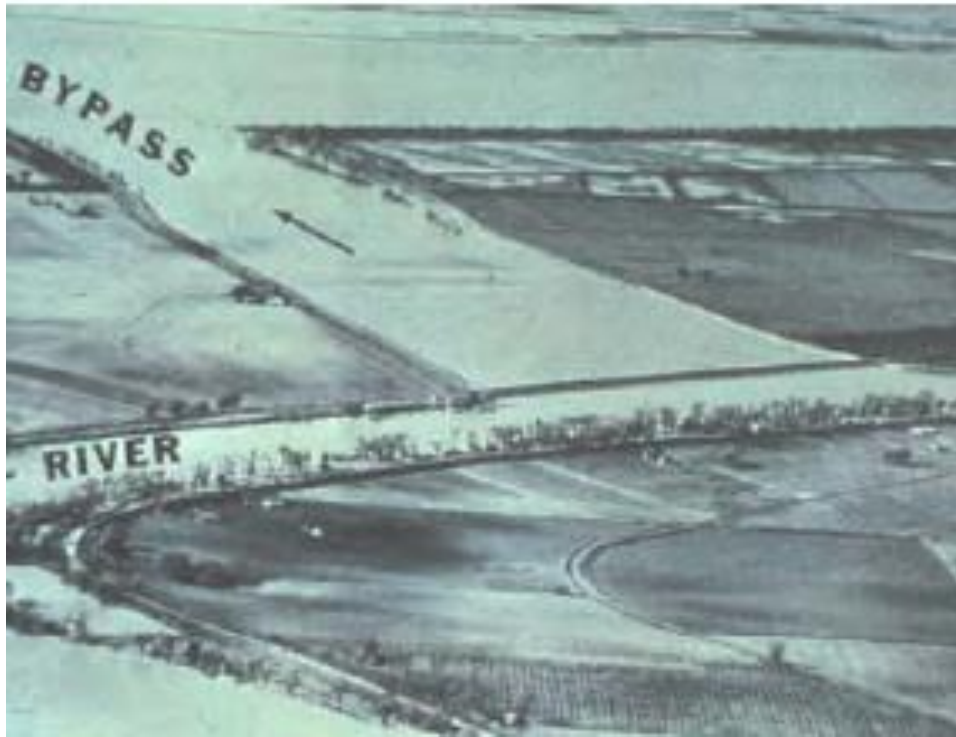
There are several considerations when evaluating the use of reservoirs and detention:

- There is the threat of flooding the protected area should the reservoir's dam fail,
- There is a constant expense for the management and maintenance of the facility,
- They may fail to prevent floods that exceed their design levels,
- Sediment deposition may occur and reduce the storage capacity over time,
- They can impact water quality as they are known to affect temperature, dissolved oxygen and nitrogen, and nutrient levels, and
- If not designed correctly, in-stream reservoirs may cause backwater flooding problems upstream

Diversion

A diversion is a new channel that sends floodwaters to a different location, thereby reducing flooding along an existing watercourse. Diversions can be surface channels, overflow weirs, or tunnels. During normal flows, the water stays in the old channel. During floods, the floodwaters spill over to the diversion channel or tunnel, which carries the excess water to a receiving lake or river.

Figure C-13 Diversion



Diversions are limited by topography; they will not work in some areas. Unless the receiving water body is relatively close to the floodprone stream and the land in between is low and vacant, the cost of creating a diversion can be prohibitive.

Dredging

Dredging is often viewed as a form of conveyance improvement. However, it has the following problems:

- Given the large volume of water that comes downstream during a flood, removing a foot or two from the bottom of the channel will have little effect on flood heights.
- Dredging is often cost prohibitive because the dredged material must be disposed of somewhere.
- Unless in-stream or tributary erosion is corrected upstream, the dredged areas usually fill back in within a few years, and the process and the expense have to be repeated.
- If the channel has not been disturbed for many years, dredging will destroy the habitat that has developed.

Figure C-14 Dredging Activity



To protect the natural values of the stream, federal law requires a U.S. Army Corps of Engineers permit before dredging can proceed. This can be a lengthy process that requires a lot of advance planning and many safeguards to protect habitats, which adds to the cost of the project.

CRS Credit

Structural flood control projects that provide flood protection against the 1% annual chance flood and that result in revisions to the Flood Insurance Rate Map are not credited by the CRS in order to avoid duplicating the larger premium reduction provided by removing properties from the mapped floodplain.

The CRS credits smaller flood control projects that meet the following criteria:

- They must provide protection to at least the 25-year flood,
- They must meet certain environmental protection criteria,
- They must meet federal, state and local regulations, such as the Corps of Engineers' 404 permit and California Division of Dam Safety for dam safety rules, and
- They must meet certain maintenance requirements.

These criteria ensure that credited projects are well-planned and permitted. Any of the measures reviewed in this section would be recognized under Activity 530 - Flood Protection, although it would be very hard to qualify a dredging project. Credit points are based on the type of project, how many buildings are protected, and the level of flood protection provided.

Local Implementation

Area of the Tri-City planning area are dependent on levees and other flood control structures to prevent flooding as previously described in this LHMP. Most of these are owned and maintained by the Alameda

County Flood Control and Water Conservation District (ACFCD). The ACFCD is also responsible for the implementation of new flood control facilities as well as improvements to existing facilities.

Conclusions and Recommendations

- The three cities, working closely with the ACFCD should continue to evaluate and implement flood control and drainage improvement project to reduce the potential from future flooding.

C.3.6. Public Information Measures

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

Information can bring about voluntary mitigation activities at little or no cost to the government. Property owners mitigated their flooding problems long before government funding programs existed. The typical approach to delivering information involves two levels of activity. The first is to broadcast a short and simple version of the message to everyone potentially affected. The second level provides more detailed information to those who respond and want to learn more.

This section starts with activities that reach out to people and tell them to be advised of the hazards and some of the things they can do. It then covers additional sources of information for those who want to learn more. It ends with a general public information strategy.

Outreach Projects

Outreach projects are the first step in the process of orienting property owners to the hazards they face and to the concept of property protection. They are designed to encourage people to seek out more information in order to take steps to protect themselves and their properties.

Research has shown that outreach projects work. However, awareness of the hazard is not enough; people need to be told what they can do about the hazard. Thus, projects should include information on safety, health and property protection measures. Research has also shown that a properly run local information program is more effective than national advertising or publicity campaigns. Therefore, outreach projects should be locally designed and tailored to meet local conditions.

Community newsletters/direct mailings: One of the more effective types of outreach projects include mailings or distributions to everyone in the community. In the case of floods, they may be sent only to floodplain property owners.

News media: Local newspapers can be strong allies in efforts to inform the public. Press releases and story ideas may be all that's needed to gain their interest. After a flood in another community, people and the media become interested in their flood hazard and how to protect themselves and their property. Local radio stations and cable TV channels can also help. These media offer interview formats and cable TV may be willing to broadcast videos on the hazards.

Other approaches: Examples of other outreach projects include:

- Presentations at meetings of neighborhood, civic or business groups,
- Displays in public buildings or shopping malls,
- Signs in parks, along trails and on waterfronts that explain the natural features (such as the river) and their relation to the hazards (such as floods),
- Social Media broadcasts,
- Brochures available in municipal buildings and libraries, and
- Special meetings, workshops and seminars.

Local Implementation

The City of Fremont maintains a flood information website that provides information on their flood management program. The cities of Newark and Union City have websites that include information on flood awareness and preparedness. Flood materials are also included a local libraries.

CRS Credit

The Community Rating System provides credit for outreach projects which cover six flood-related topics. Credit is also available for producing flood response materials. Another way to achieve credit for outreach is for producing a PPI. A 40% bonus is applied to outreach credits which are included in a PPI.

Real Estate Disclosure

Many times after a flood or other natural disaster, people say they would have taken steps to protect themselves if they had known they had purchased a property exposed to a hazard. There are some federal and state requirements about such disclosures, but they have their limits.

Federal law: Federally regulated lending institutions must advise applicants for a mortgage or other loan that is to be secured by an insurable building whether the property is in a floodplain as shown on the Flood Insurance Rate Map. If so, flood insurance is required for buildings located within the floodplain if the mortgage or loan is federally insured. However, because this requirement has to be met only 10 days before closing, the applicant is often already committed to purchasing the property when he or she first learns of the flood hazard.

State law: State laws set standards for real estate sales and licensing of agents and brokers.

Local Implementation

The State of California regulations require the disclosure of flood hazards. The City of Fremont anticipates to receive 15 CRS credits for this Activity.

CRS Credit

Communities in areas that have additional disclosure requirements are eligible for five points under the "Other disclosure requirements" as well as 10 points for the "Disclosure of other hazards."

Libraries and Websites

The two previous activities tell people that they are exposed to a hazard. The next step is to provide information to those who want to know more. The community library and local websites are obvious places for residents to seek information on hazards, hazard protection, and protecting natural resources.

Books and pamphlets on hazard mitigation can be given to libraries, and many of these can be obtained for free from state and federal agencies. Libraries also have their own public information campaigns with displays, lectures and other projects, which can augment the activities of the local government. Today, websites are commonly used as research tools. They provide fast access to a wealth of public and private sites for information. Through links to other websites, there is almost no limit to the amount of up to date information that can be accessed on the Internet.

In addition to online floodplain maps, websites can link to information for homeowners on how to retrofit for tornadoes and floods or a website about floods for children. The "FEMA for Kids" website teaches children how to protect their home and what to have in a family disaster kit.

Local Implementation

The City of Fremont provides a variety of flood materials placed in the reference section of the Alameda County Fremont main library.

CRS Credit

The Community Rating System provides credit for having a variety of flood references in the local public library and additional credits for similar material included on municipal websites (Activity 350 - Flood Protection Information).

Technical Assistance

Hazard Information

Many benefits stem from providing map information to inquirers. Residents and business owners that are aware of the potential hazards can take steps to avoid problems or reduce their exposure to flooding. Real estate agents and house hunters can find out if a property is floodprone and whether flood insurance may be required.

Communities can easily provide map information from FEMA's DFIRMs and Flood Insurance Studies. They may also assist residents in submitting requests for map amendments and revisions when they are needed to show that a building is located outside the mapped floodplain.

Some communities supplement what is shown on the DFIRM with information on additional hazards, flooding outside mapped areas and zoning. When the map information is provided, community staff can explain insurance, property protection measures and mitigation options that are available to property owners. They should also remind inquirers that being outside the mapped floodplain is no guarantee that a property will never get wet.

Property Protection Assistance

While general information provided by outreach projects or the library is beneficial, most property owners do not feel ready to retrofit their buildings without more specific guidance. Local building department staffs are experts in construction. They can provide free advice, not necessarily to design a protection measure, but to steer the owner onto the right track:

- Building or public works department staffs can provide the following types of assistance:
- Visit properties and offer protection suggestions,
- Recommend or identify qualified or licensed contractors,
- Inspect homes for anchoring of roofing and the home to the foundation,
- Provide advice on protecting windows and garage doors from high winds, and
- Explain when building permits are needed for home improvements.

There is a concern that a local official might provide the wrong information and the community would be sued if a project failed. To counter this, there are guidelines for local programs and training on how to identify the right measures. FEMA conducts a free week-long course at its Emergency Management Institute on property protection measures for flooding. FEMA and the Corps of Engineers periodically conduct one- or two-day retrofitting workshops.

Local Implementation

FEMA floodplain maps are available on local websites for the City of Fremont. Fremont also respond to requests on whether a property is located in a Special Flood Hazard Area. Fremont also maintain elevation certificates for many existing home within or near the SFHA. The cities of Newark and Union City provide links on their websites to FEMA flood maps.

CRS Credit

The Community Rating System provides points for providing map information to inquirers. Points are available for providing one-on-one flood protection assistance to residents and businesses and for making site visits. Both services must be publicized.

Public Information Program Strategy

A public information program strategy is a document that receives CRS credit. It is a review of local conditions, local public information needs, and a recommended plan of activities. A strategy consists of the following parts, which are incorporated into this plan:

- The local flood hazard (discussed in Chapter 4)
- The property protection measures appropriate for the flood hazard (discussed in Chapters 4 and 5)
- Flood safety measures appropriate for the local situation (discussed in Chapters 4 and 5)
- The public information activities currently being implemented within the community, including those being carried out by non-government agencies (discussed in Chapter 4 and jurisdictional annexes)
- Goals for the community's public information program (discussed in Chapters 4 and 5)
- The outreach projects that will be done each year to reach the goals (discussed in Chapters 4 and 5)
- The process that will be followed to monitor and evaluate the projects (discussed in Chapter 7)

Figure C-15 illustrates several flood safety tips that can be used in an outreach campaign to better inform the public of the hazards associated with flooding.

Figure C-15 Flood Safety Tips for Outreach Campaign

Flood Safety

Pay attention to evacuation orders. Listen to local radio or TV stations for forecasts and emergency warnings. Know about evacuation routes and nearby shelters and have plans for all family members on how to evacuate and where to meet if you're split up during an emergency.

Do not drive through a flooded area. During a flood, more people drown in their cars than anywhere else. Don't drive around road barriers; the road or bridge may be washed out.

Do not walk through flowing water. Flash flooding is the leading cause of weather-related deaths in the U.S. Currents can be deceptive; 6 inches of moving water can knock you off your feet in a strong current. If you walk in standing water, use a stick to help you locate the ground.

Stay away from power lines and electrical wires. Electrical currents can travel through water. Report downed power lines to the police or sheriff by calling 911.

Have the power company turn off your electricity. Some appliances, like TV sets, keep electrical charges even after they've been unplugged. Don't use appliances or motors that have gotten wet unless they have been taken apart, cleaned and dried.

Look before you step. After a flood, the ground and floors are covered with debris like broken bottles and nails. Floors and stairs that are covered with mud can also be slippery.

Be alert for gas leaks. Use a flashlight to inspect damage. Don't smoke or use candles, lanterns, or open flames unless you know the gas has been shut off and the area has been ventilated.

Look out for animals that may have been flooded out of their homes and who may seek shelter in yours. Use a pole or stick to turn things over and scare away small animals.

Look before you step. After a flood, the ground and floors are covered with debris. Floors and stairs that have been covered with mud will be very slippery.

Carbon monoxide exhaust kills. Use a generator or other gasoline-powered machine outdoors. The same goes for camping stoves. Charcoal fumes are especially deadly – cook with charcoal outdoors.

Clean everything that got wet in the flood. Floodwaters have picked up sewage and chemicals from roads, farms, factories, and storage buildings. Spoiled food, and flooded cosmetics and medicines can be health hazards. When in doubt, throw it out.

Take care of yourself. Recovering from a flood is a big job. It is tough on both the body and the spirit and the effects a disaster has on you and your family may last a long time.

CRS Credit

The CRS provides up to 350 points for a Program for Public Information (PPI).

Conclusions and Recommendations

- There are many ways that public information can be used so that people and businesses will be more aware of the hazards they face and how they can protect themselves.
- Libraries and websites are currently being used as public information tools for the three cities.
- The most important topics to cover in public information activities are:

- ✓ Safety precautions for all types of hazards, but especially floods, earthquakes, thunder storms, winter storms, wildfires, and tornadoes.
- ✓ Knowing where emergency evacuation shelters are located.
- ✓ Flood protection measures, including rules for new construction and insurance.
- ✓ Keeping drainage ways clear and protection from local drainage problems.
- ✓ Family and emergency preparedness measures.
- ✓ What the cities are doing and sources of assistance.
- ✓ Protecting water quality and wetlands and the benefits of open space.
- The most appropriate ways to spread this information are:
 - ✓ Websites and social media
 - ✓ Mailings to everyone, in utility bills or otherwise
 - ✓ News releases or newspaper articles
 - ✓ Newsletters
 - ✓ Displays, particularly at special events
 - ✓ Handouts, flyers and other materials, which can be distributed at special events and presentations
- City staff should continue to reach out to residents, civic organizations and other organizations to help spread the word about flood hazards, flood protection, and safety measures.