Upper Berryessa Creek Floodplain Management Plan

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Prepared for: Santa Clara Valley Water District

Final Draft – Spring 2022

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I. Definitions

Annual chance exceedance	The chance, or probability, for which a given condition is anticipated to be met or exceeded in any given year.
Base flood	A flood having a 1% probability of being equaled or exceeded in any given year. Also known as the 100-year flood.
Community Rating System	A program developed by FEMA to provide incentives for those communities in the Regular Program that have gone beyond the minimum floodplain management requirements to develop extra measures to provide protection from flooding.
Comprehensive plan	A comprehensive plan, also known as a general plan, master plan or land-use plan, is a document designed to guide the future actions of a community. It presents a vision for the future, with long-range goals and objectives for all activities that affect the local government.
Emergency action plan	A written procedure detailing the appropriate response to various types of emergencies.
Emergency operations plan	Emergency operations plans describe a government-level approach to emergency operations. A jurisdiction's EOP is a document that: Assigns responsibility to organizations and individuals for carrying out specific actions that exceed routine responsibility at projected times and places during an emergency; sets forth lines of authority and organizational relationships and shows how all actions will be coordinated; describes how people (including unaccompanied minors, individuals with disabilities, others with access and functional needs, and individuals with limited English proficiency) and property are protected; identifies personnel, equipment, facilities, supplies, and other resources available within the jurisdiction or by agreement with other jurisdictions; and reconciles requirements with other jurisdictions.

Federal disaster declaration	Authorized by the Stafford Act, a Federal disaster declaration authorizes the President to provide supplemental federal disaster assistance. The President can issue a Major Disaster Declaration for any natural event, including any hurricane, tornado, storm, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought, or, regardless of cause, fire, flood, or explosion, that the President believes has caused damage of such severity that it is beyond the combined capabilities of state and local governments to respond. A major disaster declaration provides a wide range of federal assistance programs for individuals and public infrastructure, including funds for both emergency and permanent work.
FEMA 100-year floodplain	The area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood or 100-year flood.
FIRM (Flood Insurance Rate Map)	An official map of a community, on which FEMA has delineated both the SFHAs and the risk premium zones applicable to the community.
Flood risk	Flood risk is a combination of the probability (likelihood or chance) of an event happening and the consequences (impact) if it occurred.
Flood risk management	Flood risk management is the process of identifying, evaluating, selecting, implementing, monitoring, and modifying actions taken to reduce and manage risk through shared responsibilities.
Flooding	Flooding is defined by the National Flood Insurance Program (NFIP) as a general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or two or more properties (at least one of which is your property) from: overflow of inland waters, unusual and rapid accumulation or runoff of surface waters from any source, and mudflows.
Floodplain	Lowland areas adjacent to lakes, wetlands, and rivers/streams that are susceptible to inundation by water.
Floodplain management	The operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to, emergency preparedness plans, flood control works, and floodplain management regulations.
Floodplain management plan	A floodplain management plan (FMP) is a written description of the flood risks and actions a community has taken and will take to address how to mitigate those flood hazards.

Floodwall	Flood barrier constructed of manmade materials, such as concrete or masonry.
Full build-out	Full build-out means the maximum allowable development of an area based on local plans, zoning regulations, and anticipated development.
Functional downtime	The time period during which services are lost when a natural hazard event affects a business. It is the duration of time the business cannot operate post-disaster, whether due to damages or access issues to the building, damage or loss of inventory, and/or a lack of power or human resources needed to operate.
General plan	See 'comprehensive plan,' above.
Hazus	FEMA's Hazus program is a nationally standardized risk modeling methodology. It is distributed as free GIS-based desktop software with a collection of inventory databases for every U.S. state and territory. Hazus identifies areas with high risk for natural hazards and estimates physical, economic, and social impacts of earthquakes, hurricanes, floods, and tsunamis.
Impervious cover	Surfaces composed of any material that significantly impedes or prevents natural infiltration of water into the soil. Impervious surfaces include, but are not limited to, roofs, buildings, streets, parking areas, and any concrete, asphalt, or compacted gravel surface.
Land use plan	Land use plans are developed by jurisdictions to guide future residential and non-residential growth in a coordinated and managed approach, considering new areas for redevelopment and/or revitalization as well as developable vacant parcels.
Letter of Map Revision	An official amendment to the currently effective FIRM. It is issued by FEMA and changes flood zones, delineations, and elevations.
Level of protection	The recurrence interval (such as a flood frequency risk) or physical extent to which a mitigation project offers protection.
Master plan	See 'comprehensive plan,' above
Mitigation	Sustained action to reduce or eliminate risk to people and property from hazards and their effects.
Natural floodplain values	Natural and beneficial function of the floodplain.

Non-federal partner	A non-federal sponsor of a USACE project may be a state, a political sub-part of a state or group of states, a Native American (Indian) nation, quasi-public organizations chartered under state laws (e.g., a port authority, flood control district or conservation district), an interstate agency or non-profit organizations. Project sponsorship is formalized by legal agreements between the sponsor and the U.S. Government that outline legal responsibilities. The sponsor must have the legal and financial capability to fulfill the requirements of cost sharing and local cooperation. The sponsor generally must agree to provide all lands, easements, rights-of-way, relocations and disposal areas necessary for construction, operation and maintenance of a project, including provision of all necessary access routes and utility relocations; provide cash or work-in-kind contributions to meet the cost-share requirements; long term project operation and maintenance.
Overbank flooding	Flooding that occurs when stream flow cannot be constrained within the confines of a channel and flows over the banks into the floodplain.
Plan maintenance phase	The window of time after a plan is adopted during which it is implemented and maintained before a subsequent plan update.
Residual risk	Some types of mitigation projects do not eliminate all of the flood damages. Residual risk is the flood risk that remains after a flood damage reduction project is implemented. Residual risk includes the consequences of capacity exceedance as well.
Resilience	Disaster resilience is the ability of individuals, communities, organizations, and states to plan for, absorb, adapt to, and recover from adverse events such as natural hazards.
Riparian areas	Riparian areas are long strips of vegetation adjacent to streams, rivers, lakes, reservoirs, and other inland aquatic systems that affect or are affected by the presence of water. This vegetation contributes to unique ecosystems that perform a large variety of ecological functions.
Riparian vegetation	Plant habitats and communities along the river margins and banks, characterized by hydrophilic plants growing in the transitional zone between aquatic and terrestrial environments.
Risk	Risk is the potential for loss, damage, or destruction of an asset as a result of a threat exploiting a vulnerability. It is a combination of the probability that an event will occur, and the consequences of its occurrence.

Riverine flooding	Flooding that occurs along a river, stream, or other non-coastal watercourse.
Sediment management measures	The management of sediment in river basins and waterways to address problem sediment accumulation.
Special Flood Hazard Area	Portion of the floodplain subject to inundation by the base flood, designated Zone A, AE, A1 - A30, AH, AO, AR, V, VE, or V1 - V30 on a FIRM.
Stormwater flooding	Flooding caused by stormwater runoff (rainfall on impervious surfaces).
Stream gages	A stream gage is a metal structure containing instruments that measure and record the amount of water flowing in a river or stream, or its discharge.
Substantial damage	Damage of any origin whereby the cost of restoring the building to its condition before damage would equal or exceed 50% of the market value of the building before the damage occurred.
Substantial improvement	Any reconstruction, rehabilitation, addition, or other improvement, the cost of which equals or exceeds 50% of the market value of the building before the "start of construction" of the improvement.
Tax incentive	Tax incentives are ways of reducing taxes for businesses and individuals in exchange for specific desirable actions or investments on their parts. Their purpose is to encourage those businesses and individuals to engage in behavior that is socially responsible and/or benefits the community.
Vulnerability	Vulnerability is susceptibility to physical injury, harm, damage, or economic loss. It depends on an asset's construction, contents, and economic value of its functions. Vulnerability assessment provides the extent of injury and damages that may result from a hazard event of a given intensity in a given area.
Watershed	A watershed is an area of land that drains into a lake, stream, or other body of water.
Wetlands	Wetlands are areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.
0.002 ACE	1 in 500 annual chance exceedance probability events (500-year), or 0.2% annual chance of occurrence.

0.01 ACE	1 in 100 annual chance exceedance probability events (100-year), or 1% annual chance of occurrence.
100-year flood	A flood having a 1% probability of being equaled or exceeded in any given year. Also known as the base flood.
100-year floodplain	The land that is predicted to flood during a 100-year storm.
100-year storm	A rainfall event that has a 1% chance of occurring in any given year.
500-year flood	A flood having a 0.2% probability of being equaled or exceeded in any given year.

List of Acronyms

BART	Bay Area Rapid Transit
Cal OES	California Governor's Office of Emergency Services
CRS	Community Rating System
DDR	Design Documentation Report
EIS	Environmental Impact Statement
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
ESA	Emergency Services Act
FEMA	Federal Emergency Management Agency
FIA	Federal Insurance Administration
FIRM	Flood Insurance Rate Map
FPMP	Floodplain Management Plan
GRR	General Reevaluation Report
LOMR	Letter of Map Revision
NPDES	National Pollution Discharge Elimination System
O&M	Operation and Maintenance
OA	Operational Area
OEM	Office of Emergency Management
PGL	Policy Guidance Letter
SD	Substantial Damage
SFHA	Special Flood Hazard Area
SI	Substantial Improvement
USACE	United States Army Corps of Engineers
WRDA	Water Resources Development Act

II. Introduction

The areas susceptible to flooding discussed in this plan are located in Santa Clara County, in the San Francisco Bay area of northern California along a 2.2 mile stretch of the Upper Berryessa Creek in the Cities of Milpitas and San Jose (see Figure 1). The project area lies within California's Silicon Valley, a region of the state that is home to many of the world's largest high-tech corporations and industries.

Berryessa Creek originates in the largely undeveloped, rolling hills of the Diablo Range, east of Milpitas and San Jose. When the creek reaches the flat Santa Clara Valley below, it flows through urban developments in the Cities of San Jose and Milpitas in what is largely an artificial channel built in the 1950's with little to no riparian vegetation. Berryessa Creek then joins Lower Penitencia Creek, a tributary to Coyote Creek, which flows into the San Francisco Bay.

Flooding has occurred regularly in the Berryessa Creek floodplain, with recent major events in the project area in 1982, 1983, and 1998. Flooding can put people in harm's way and result in millions of dollars in damage to homes, businesses, critical facilities, transportation systems, utilities, and other infrastructure, with associated service disruptions and functional downtime.

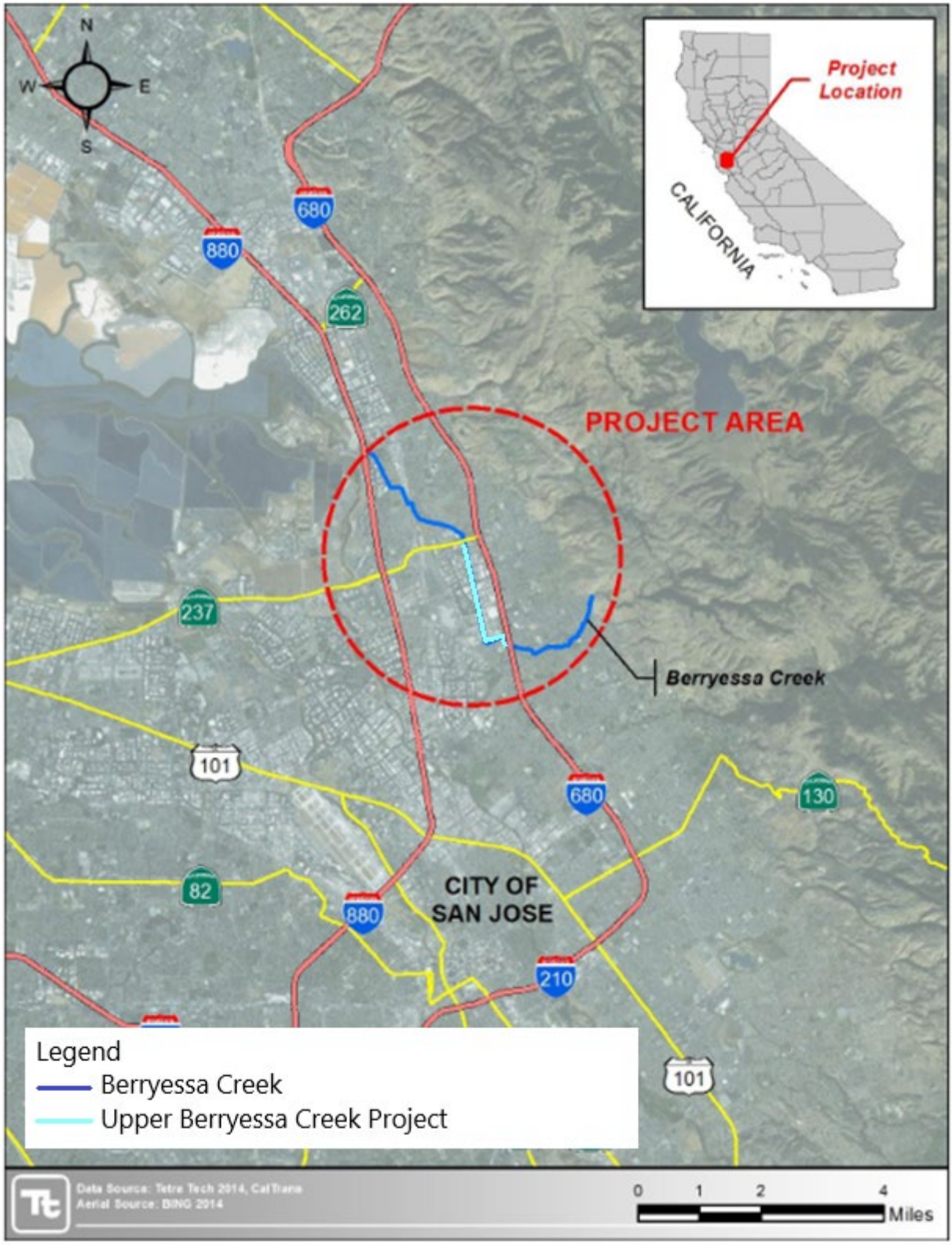
The Upper Berryessa Creek Flood Risk Management Project (Project) is a partnership between the US Army Corps of Engineers (USACE) and the Santa Clara Valley Water District (Valley Water) to provide critical flood protection for the segment of Berryessa Creek extending from Interstate Highway 680 (I-680) downstream to Calaveras Boulevard. The Project, as described in the Final General Reevaluation Report (GRR) and Environmental Impact Statement (EIS) consists of: (1) improvements to and regrading of the earthen channel of the creek for improved conveyance and additional capacity, with free-standing concrete floodwalls constructed as needed due to right-of-way constraints, and in-channel access roads constructed where suitable; (2) replacement of a railroad trestle (Montague Bridge) with a double cell reinforced concrete box culvert; and (3) mitigation plantings along the channel banks.

Together, these project features provide the necessary capacity for the channel to convey a median 0.01 exceedance probability discharge as referenced in the USACE documents for this project (in other words, the discharge with a one percent chance of occurring in any given year). For simplicity, the remainder of this plan will refer to the USACE's median 0.01 exceedance probability discharge as the "100-year flood." In addition to providing flood damage reduction benefits, the Project reduces erosion and sedimentation, improves water quality, and provides long-term benefits to stream ecology and environmental habitat. The major features of the Project were completed in 2019, followed by the establishment period for mitigation plantings, which extends for an additional three years to 2022. The USACE's hydrologic inputs, as presented in the GRR, assumed no federal or local future improvements would be constructed on the Berryessa Creek system upstream of I-680.

The development of a Floodplain Management Plan (FPMP) is required for all flood risk management projects receiving USACE funding, including the Upper Berryessa Creek Flood Risk Management Project.

The purpose of this FPMP is to address potential measures, practices and policies that will reduce the impacts of future residual flooding, help preserve levels of protection provided by the Project, and preserve and enhance natural flood plain values.

This FPMP has been prepared by Valley Water, with input from members of an advisory committee, the general public, and other stakeholders. The FPMP adoption resolution is included in Appendix A. Several existing plans, studies, reports, and technical information have been reviewed and incorporated into this document. Data sources are indicated throughout the text and summarized in Section IX-References.



Source: USACE Design Documentation Report, 2016

Figure 1 – Location Map

II.a. Authority

Pursuant to Section 402 of the Water Resources Development Act (WRDA) of 1986, as amended by Section 202 (c) of WRDA 1996, any community signing an agreement for construction of a cost shared project must prepare a FPMP. It states, in part:

> *"SEC. 402. FLOODPLAIN MANAGEMENT REQUIREMENTS.*
>
> *a) Compliance With Floodplain Management and Insurance Programs. -- Before construction of any project for local flood protection, or any project for hurricane or storm damage reduction, that involves Federal assistance from the Secretary, the non-federal interest shall agree to participate in and comply with applicable Federal floodplain management and flood insurance programs.*
>
> *b) Flood Plain Management Plans. --Within 1 year after the date of signing a project cooperation agreement for construction of a project to which subsection a) applies, the non-federal interest shall prepare a flood plain management plan designed to reduce the impacts of future flood events in the project area. Such plan shall be implemented by the non-Federal interest not later than 1 year after completion of construction of the project."*

USACE Policy Guidance Letter (PGL) No. 52, Flood Plain Management Plans provides policy guidance on Section 202 (c) of WRDA 1996. It reads, in part:

> *"A non-Federal sponsor's FPMP should implement measures, practices, and policies to reduce loss of life, injuries, damages to property and facilities, public expenditures, and other adverse impacts associated with flooding, and to preserve and enhance natural flood plain values and should also address measures which will help preserve levels of protection provided by the Corps flood damage reduction or hurricane or storm damage reduction project."*

In accordance with this requirement and as reiterated in the Project's GRR, Valley Water (as the Project's non-federal sponsor) has developed this FPMP for the Upper Berryessa Flood Risk Management Project. The Project is co-sponsored by the USACE, Valley Water, and the Cities of Milpitas and San Jose, California.

II.b. Purpose of the Floodplain Management Plan

The purpose of this FPMP is to address potential measures, practices, and policies that will reduce the impacts of future residual flooding, help preserve levels of protection provided by the Upper Berryessa Creek Flood Risk Management Project, and preserve and enhance natural flood plain values.

This FPMP is based on post-project floodplain conditions, and identifies measures, practices, and policies to reduce loss of life, injuries, damages to property and facilities, public expenditures, and other adverse

impacts associated with flooding, and to preserve and enhance natural flood plain values and should also address measures which will help preserve levels of protection provided by the Project.

The FPMP documents ways to: (1) minimize residual risk to the project area and ensure that major storms will not continue to inflict significant flood damages that compromise the safety and health of the public; and (2) manage land within the project area, and in areas upstream, in such a manner that protects the integrity of the constructed Project and the federal investment.

The FPMP provides: (1) documentation of the process used to develop the FPMP, (2) a listing of the goals and objectives, (3) a listing of the strategies and tools considered and reasons for inclusion or rejection, and (4) a detailed action plan for implementation of the activities selected for inclusion in the FPMP.

II.c. Description of the Project Area

The Berryessa Creek drainage basin is located within in the larger Coyote Watershed, which is the largest of Santa Clara County's five watersheds covering about 322 square miles from the urbanized valley floor upward to the vast natural areas of Mt. Hamilton within the Diablo Range. Sixteen major creeks drain the watershed, with Coyote Creek serving as its main waterway and as the longest creek in Santa Clara County. The Coyote Watershed is shown in Figure 2.

The Berryessa Creek drainage basin covers 22.4 square miles in northeastern Santa Clara County, south of San Francisco Bay. Berryessa Creek flows westerly from its origin in Mt. Hamilton of the Diablo Range through the Cities of San Jose and Milpitas. It then turns north and discharges into Lower Penitencia Creek, which then discharges to Coyote Creek that flows into San Francisco Bay. Berryessa Creek flows through an urbanized alluvial plain[1] that includes a diverse mix of residential, commercial, industrial, and public land uses. The area is part of the Bay Area's Silicon Valley, with many computer, biotech and hi-tech firms located in the area. According to the U.S. Census Bureau, the total population of Santa Clara County is 1.9 million.[2] The Berryessa Creek drainage basin is shown in Figure 3**.**

The project area extends along Berryessa Creek for approximately 2.2 miles, from I-680 downstream to Calaveras Boulevard. The vast majority of the project area falls within the City of Milpitas, while a small portion near I-680 falls within the City of San Jose. The project area is shown in Figure 4.

Note that in Figures 2, 3, and 4 the red line represents the extent along the channel covered by construction work completed in 2019 for the Project.

[1] An alluvial plain is a largely flat landform created by the deposition of sediment over a long period of time by one or more rivers coming from highland regions, from which alluvial soil forms. A floodplain is part of the process, being the smaller area over which the rivers flood at a particular period of time, whereas the alluvial plain is the larger area representing the region over which the floodplains have shifted over geological time.

[2] Source: U.S. Census Bureau (2020). Decennial Census. Retrieved from https://data.census.gov/cedsci/table?q=santa%20clara%20county&tid=DECENNIALPL2020.P1.

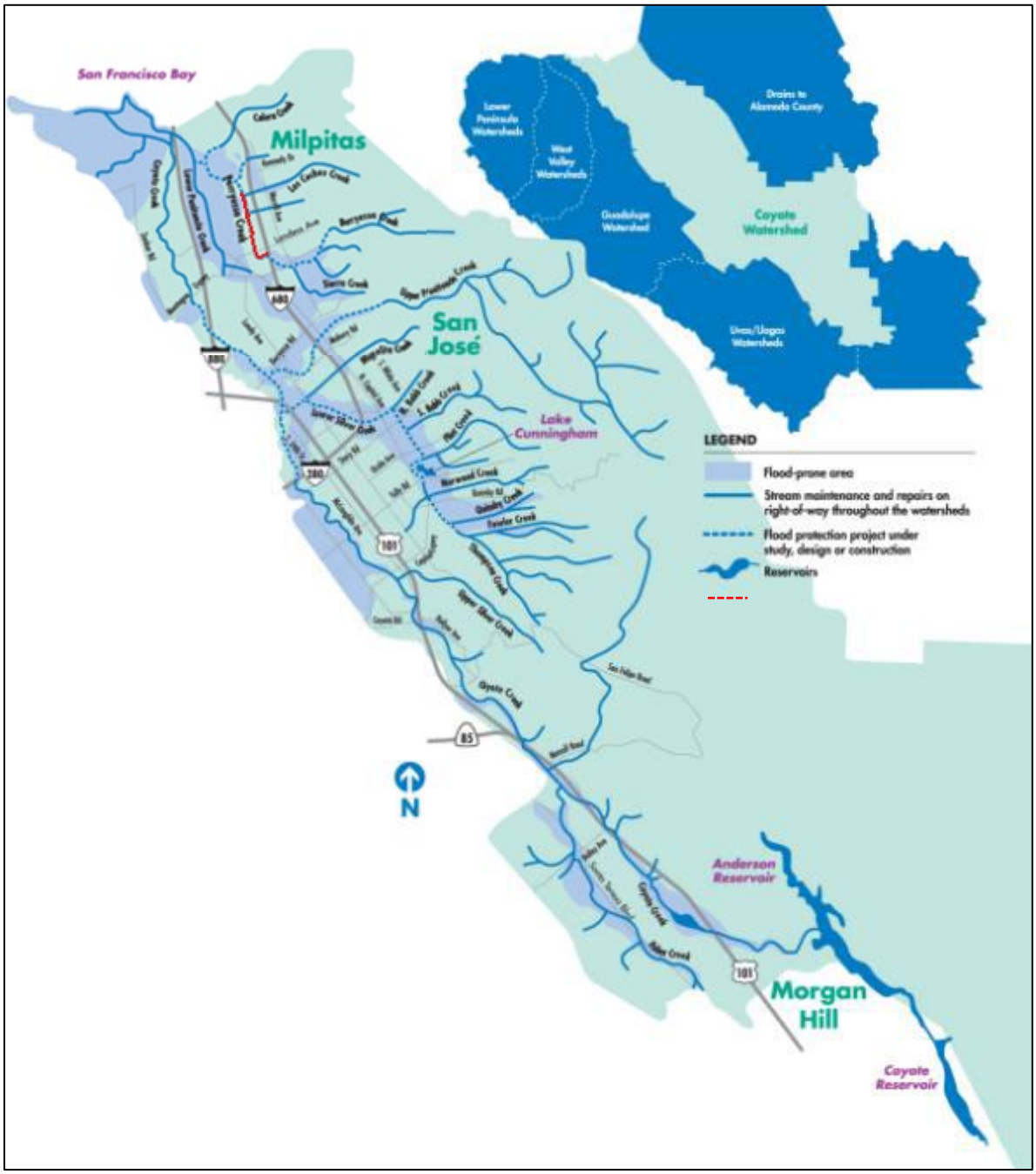
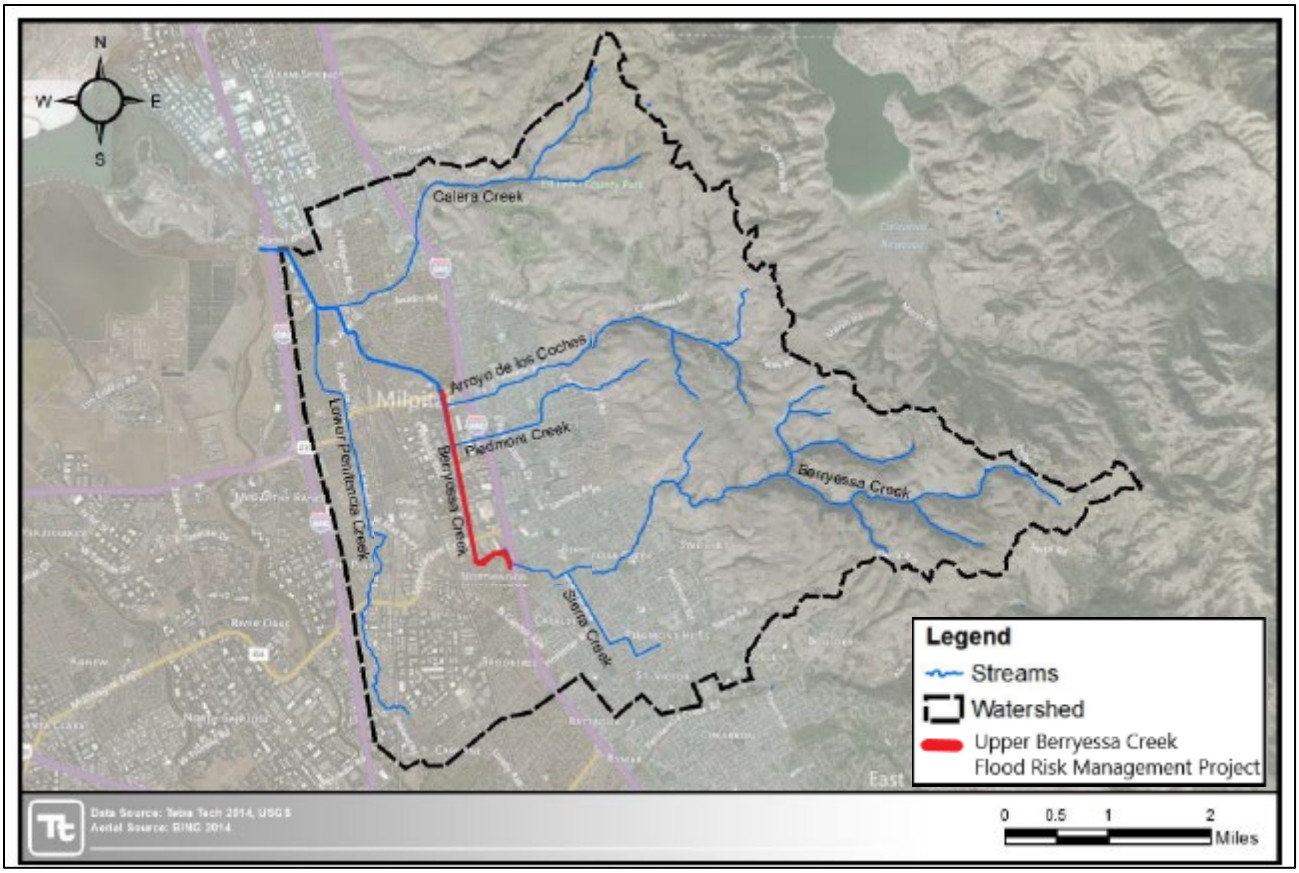


Figure 2 – Coyote Watershed



Source: USACE Design Documentation Report, 2016

Figure 3 – Berryessa Creek Drainage Basin

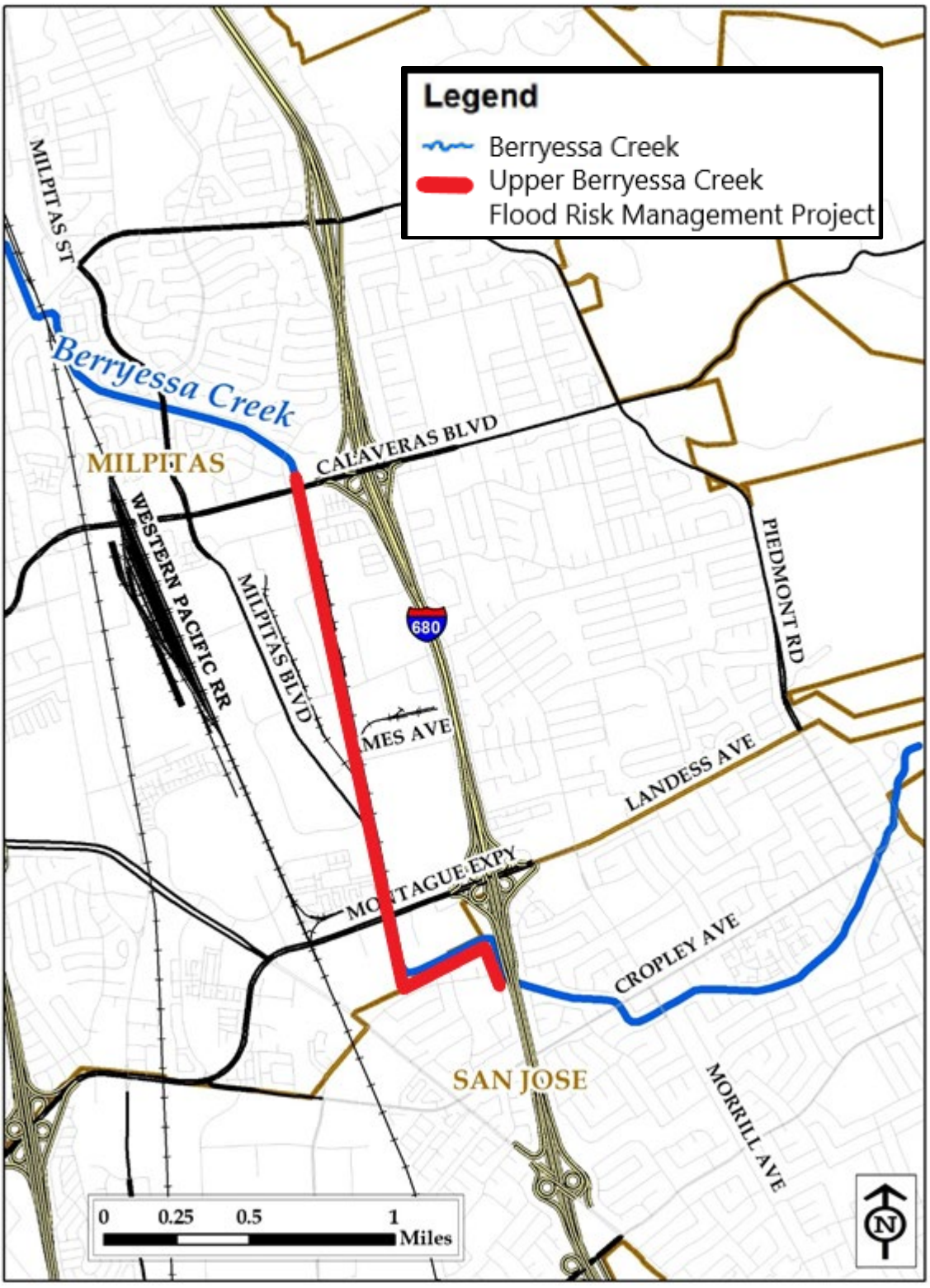


Figure 4 – Project Area

(Berryessa Creek, from I-680 north to Calaveras Boulevard)

II.d. Overview of the Flood Risk Management Project

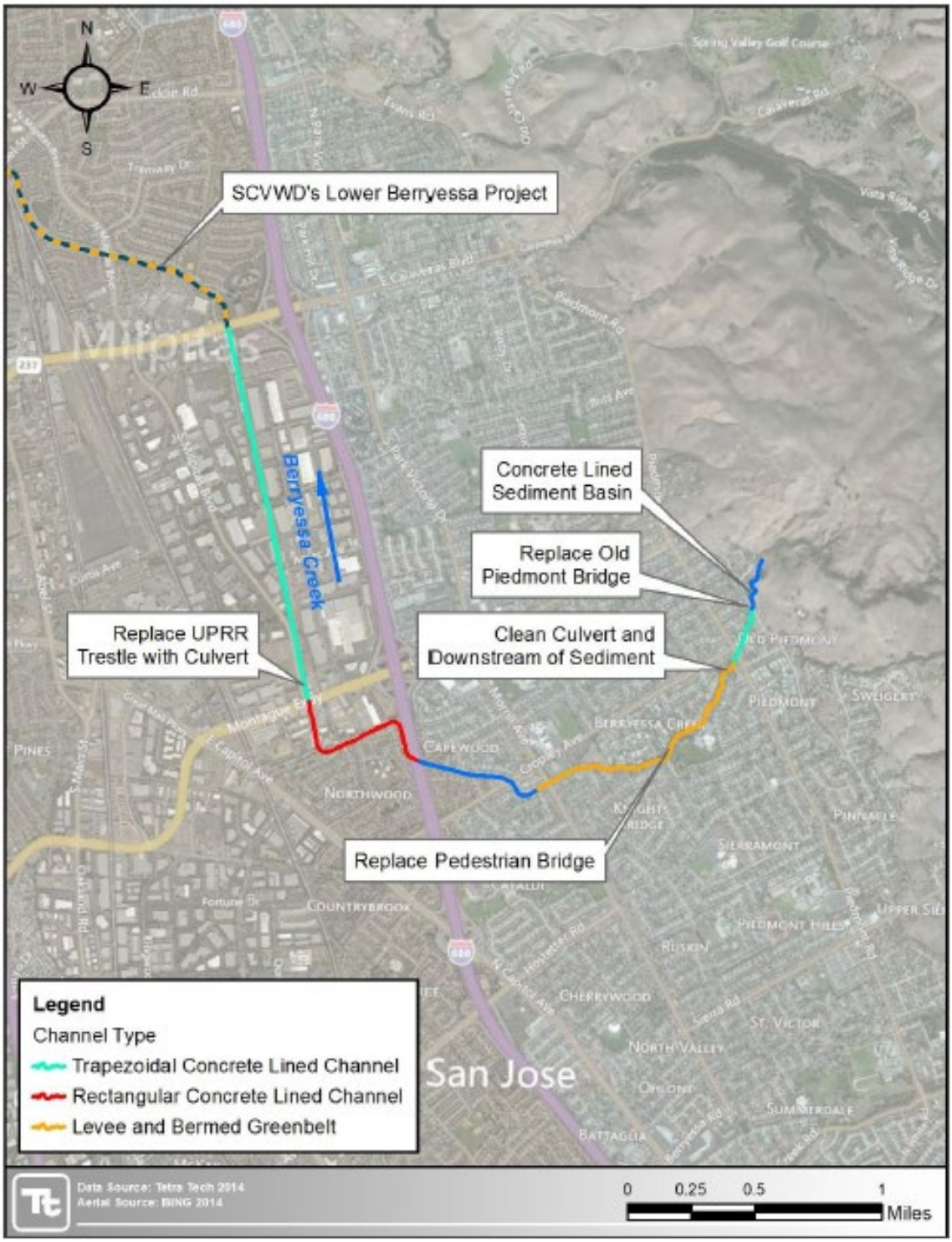
The USACE Design Documentation Report (DDR) describes the flood risk management project, as it was originally authorized in 1990, as extending along approximately 4.5 miles of Berryessa Creek, from 500 feet upstream of the upstream face of Old Piedmont Road to 50 feet downstream of Calaveras Boulevard Bridge (Figure 5). The originally authorized project consisted of three main segments, as follows:

- Upstream of I-680, the original authorized project included various features, including a concrete lined sediment basin, replacement of Old Piedmont Bridge, trapezoidal concrete lined channel, levee and bermed greenbelt, sediment removal, and replacement of a pedestrian bridge.
- From I-680 downstream to Calaveras Boulevard, features included a rectangular concrete lined channel, a trapezoidal concrete lined channel, and replacement of a railroad trestle bridge, located downstream of Montague Expressway, with a culvert.
- Downstream of Calaveras Boulevard, Valley Water was projected to continue with separate flood risk reduction measures for the Lower Berryessa Creek Flood Protection Project.

Later, as part of the USACE's general reevaluation study completed in 2014, the authorized project reach was separated in two distinct geographic areas: upstream of I-680 and downstream of I-680. The outcome of the general reevaluation study indicated that the flood risk management alternative upstream of I-680 was not economically justified and lacked wide community support. Therefore, only the reach downstream of I-680 was proposed for implementation as a stand-alone element of the authorized project.

The selected project alignment for the Upper Berryessa Creek Flood Risk Management Project (Project) extends along a 2.2-mile segment of Berryessa Creek from I-680 downstream to Calaveras Boulevard, as shown in Figure 6. The Project, which was fully constructed by the end of 2019, consists of an earthen trapezoidal channel section with varying bottom widths and 2 to 1 (horizontal to vertical) side slopes to provide capacity to convey a 100-year flood. Free-standing concrete floodwalls were constructed as needed due to right-of-way constraints with in-channel access roads constructed where suitable. The existing railroad trestle was replaced with a double cell reinforced concrete box culvert. Construction of selected plan alignment features were completed in 2019, followed by the establishment period for mitigation plantings, which extends for an additional three years to 2022. While the Project has been designed and constructed to constrain a 100-year flood[3] to the confines of the Berryessa Creek channel, overbank flooding remains a possibility for events in excess of design standards or in the case of system degradation and/or failure (such as what would occur with lack of proper operation and maintenance). This FPMP has been prepared to minimize these residual risks and to protect project features.

[3] Specifically, a median 0.01 exceedance probability discharge.



Source: USACE Design Documentation Report, 2016

Figure 5 – Originally Authorized Project, 1990

Figure 6 – Selected Project Alignment, Earthen Trapezoidal Channel, Completed 2019

II.e. Plan Use

This FPMP is intended to be used by Valley Water, Milpitas, and San Jose to ensure that the Federal flood risk management project is protected and maintained, that land use decisions in the project area do not adversely affect the project, and to outline a process whereby stakeholders in the project area have an understanding of post-project residual risks.

The FPMP is organized into ten (10) sections, as follows:

- Section I provides a general overview of the flood risk management project; the project area; and the authority for, and purpose of the FPMP.
- Section II describes the floodplain hazard and risks, and how this plan was developed.
- Section III sets forth the goals and objectives of the plan.
- Section IV evaluates a series of possible strategies and tools to assess their viability for inclusion in the action plan.
- Section V presents the action plan, including how each action aligns with the stated goals and objectives, who will undertake the activity, its priority, and a targeted implementation timeline.
- Section VI discusses procedures for plan monitoring, evaluation, and updates.
- Section VII provides readers with details of where they can go for more information.
- Section VIII summarizes reference documents used in the development of this plan.
- Section IX provides definitions to key terms used.
- Section X includes plan appendices.

III. Development Process of the Floodplain Management Plan

This section includes the documentation of the process used to develop the floodplain management plan. The process begins with an assessment of flood hazards and risks, land use and development trends, and a summary of existing regulations. This is followed by a summary of meetings held throughout the process and public/stakeholder engagement activities.

Various reports and studies have been prepared over the years by the USACE and other entities describing the flood hazards and risks along the Upper Berryessa Creek. These sources are cited in the References section (Section IX). The subsections below summarize the findings of these preexisting documents.

III.a. Hazard Description

Flooding can be described as a temporary condition of partial or complete inundation of water on land that is normally dry. The type of flooding that occurs in the project area is known as riverine flooding. Riverine flooding is the most common flood type. Riverine flooding occurs along inland channels - ground features that carry water through and out of a watershed. The channels may be called rivers, creeks, streams, or ditches. When a channel receives too much water, the excess water flows over its banks (overbank flooding) and inundates low-lying areas.

A floodplain is defined as the land adjoining the channel of a river, stream, ocean, lake, or other watercourse or water body that becomes inundated with water during a flood. Most often floodplains are referred to as 100-year floodplains. A 100-year floodplain is not the flood that will occur once every 100 years, rather it is the flood that has a one-percent chance of being equaled or exceeded in any given year (a one-percent annual chance flood). This one percent annual chance flood is now the standard used by most Federal and State agencies, including but not limited to, the USACE and the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP).

Berryessa Creek originates in the largely undeveloped, rolling hills of the Diablo Range, east of Milpitas and San Jose. The tributary channels in the upper basin wind through gently rolling grass-covered hills. The upper basin is characterized by slopes of five to six percent (0.05 to 0.06 ft/ft) with minimal impervious cover. The soils are shallow with high clay content. Stream channels are commonly flanked by brush and deciduous trees. The width of the riparian zone along these channels varies from several hundred yards in the channels of Berryessa Creek and Arroyo de Los Coches to a few yards on the smaller tributaries.

When the creek reaches the flat Santa Clara Valley below, it flows through urban developments in the Cities of San Jose and Milpitas, in what is largely an artificial channel built in the 1950's with little to no riparian vegetation. Berryessa Creek then joins Lower Penitencia Creek, a tributary to Coyote Creek that flows into the San Francisco Bay.

Flooding has occurred regularly in the Berryessa Creek floodplain, with recent major events in the project area in 1982, 1983, and 1998. Flooding can put people in harm's way and result in millions of dollars in damage to homes, businesses, critical facilities, transportation systems, utilities, and other infrastructure, with associated service disruptions and functional downtime.

While there are dams and reservoirs throughout Valley Water's service area, none are located upstream along the Berryessa Creek and the GRR indicates that there are no major reservoirs in the Berryessa Creek watershed; therefore, dam failure flooding is not applicable to the project area.

Similarly, sea level rise was also not deemed to be applicable to the project area after reviewing the GRR. The GRR states, "It is also assumed that the project will not be affected by a potential rise in sea level. A sensitivity analysis was conducted based on the highest possible sea level increase of 2.13 feet calculated for the South San Francisco Bay Shoreline Study. When that value is added to the downstream boundary in the hydraulic model downstream of the Berryessa project, the increase tapers off up to less than 0.5 feet downstream of Calaveras. The Calaveras crossing[4] effectively resets flow conditions for the design event, so the slight increase for the maximum sea level rise scenario is not carried further upstream."

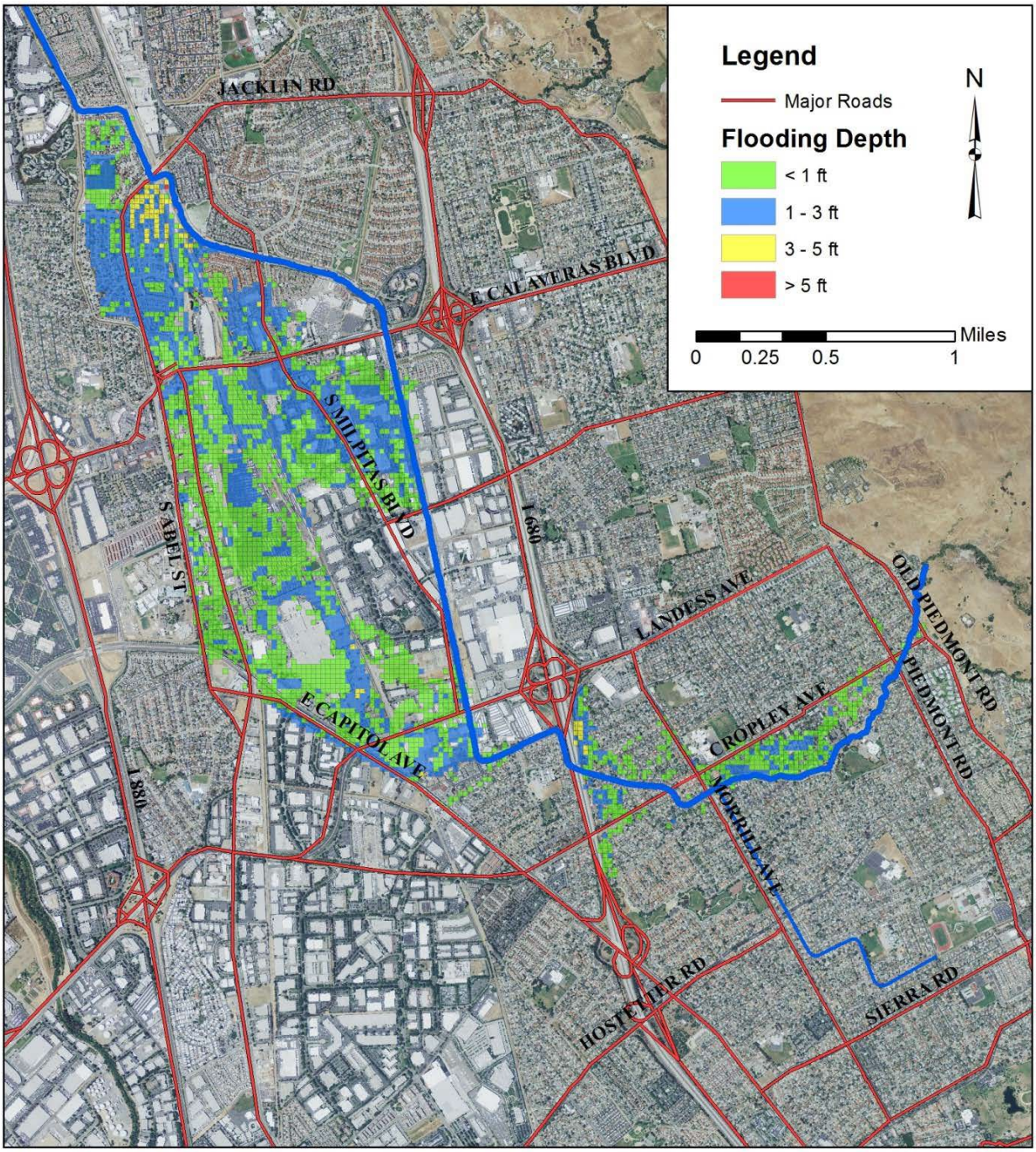
III.b. Location and Extent

Before the Upper Berryessa Creek Flood Risk Management Project was implemented, the 100-year flood was estimated to inundate the project area at depths ranging from trace amounts to as much as three feet above grade. Now that the Project is completed, the 100-year flood is estimated to be constrained within the improved channel, with proper system maintenance. Improper maintenance and/or flows greater than the 100-year flood still have the potential to cause overbank flooding in the project area.

The location of the historic 100-year floodplain (before the Project was constructed, and as depicted in the USACE GRR as the "without-project condition") is shown in Figure 7. There are notable differences between what is shown in Figure 7 and the regulatory floodway (FEMA's mapped 100-year floodplain). The GRR's comparison between the two is presented in Figure 8.

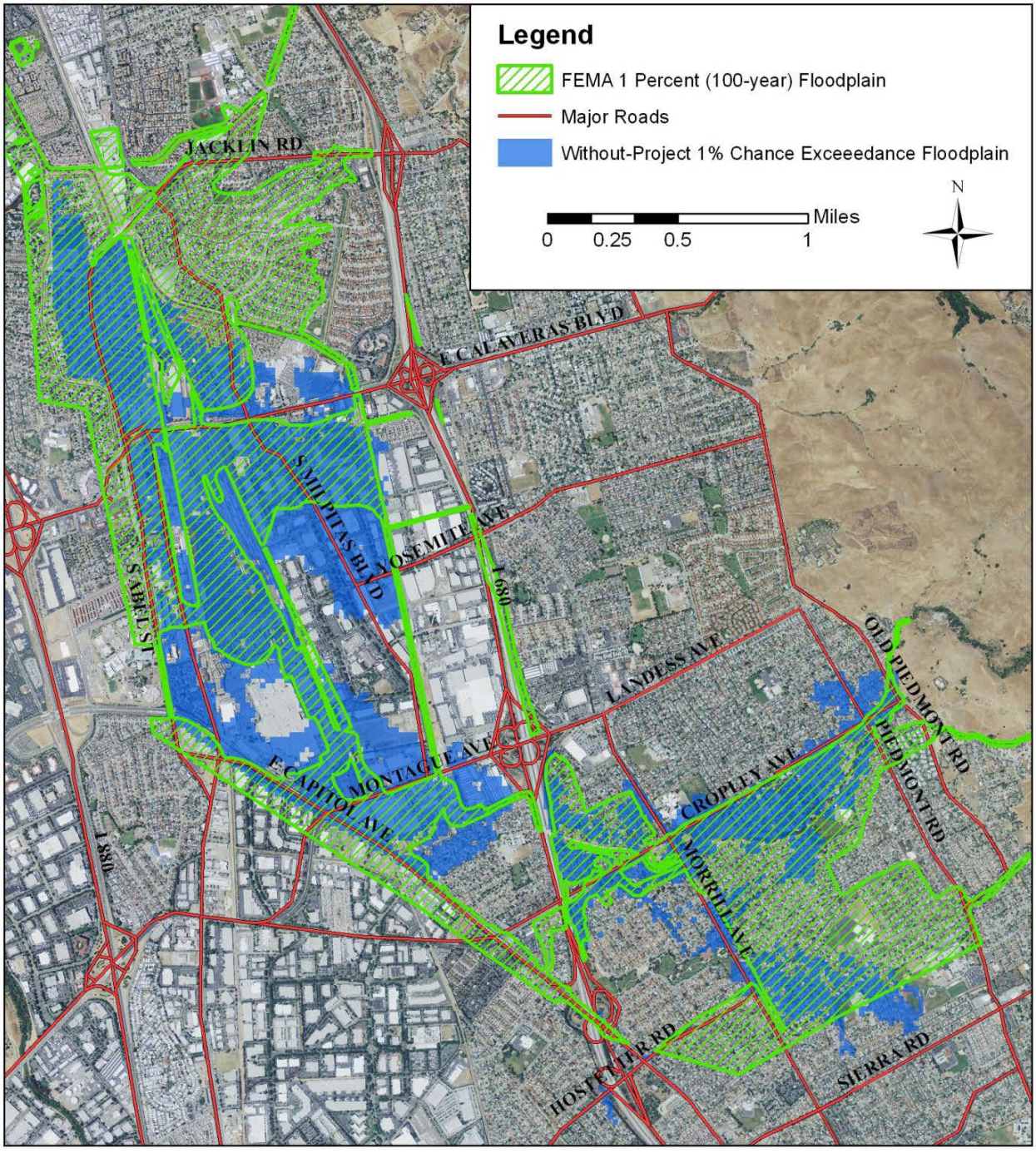
The floodplain delineation as part of the GRR is significantly smaller than the currently effective FEMA regulatory floodplain. This will be resolved through the NFIP's Letter of Map Revision (LOMR) process that Valley Water plans to submit after the Lower Penitencia Creek and Lower Calera Creek elements are constructed. After a LOMR is approved by FEMA, it is anticipated that the future regulatory floodplain would be more closely aligned with the GRR's mapping of the with-project condition floodplain.

[4] Calaveras Boulevard is a major arterial route. The GRR describes Calaveras crossing (the Calaveras Boulevard Bridge over Berryessa Creek) as an eight-lane divided roadway, with a deck elevation of 33 feet NGVD.



Source: USACE General Reevaluation Report, December 2013

Figure 7 – Historic 100-year (USACE 0.01 Exceedance Probability) Floodplain



Source: USACE General Reevaluation Report, December 2013

Figure 8 – Comparison of the Historic USACE 100-year (0.01 Exceedance Probability) Floodplain with the FEMA Regulatory 100-Year Floodplain

III.c. Historical Flooding

Before the USACE implemented its flood risk management project for the Upper Berryessa Creek, weather events caused frequent flooding in the project area, resulting in significant damages.

The GRR reported that the pre-project Berryessa Creek channel had insufficient capacity to convey flows from storm events greater than approximately a 5-year recurrence interval. The flood risk management project now in place provides essential mitigation, constraining present day 100-year flood flows (the 0.01 exceedance probability discharge) to the confines of the channel, assuming proper maintenance of the system.

The Project Operation and Maintenance (O&M) Manual developed by the USACE indicates that recording of peak flows along Berryessa Creek began in 1970. The GRR reported that stormwater flooding of streets and yards occurred roughly once every four years; and overflow channel flooding of structures, infrastructure, etc. occurred on the average of once every 10 to 20 years.

Notable historic flood occurrences highlighted in the GRR and O&M manual are listed in Table 1. The GRR Economics Appendix (2014) indicates that no non-residential structure losses were reported from these events. The O&M manual indicates that the Project would have contained all five of these significant flood events.

Table 1 – Notable Historic Flood Occurrences

Date	Estimated Peak Flow (cfs)	Event Description	Reported Damages
February 1980	1,022	Maximum flow observed since recording began in 1970.	Not Reported
March 31, 1982	870	Berryessa Creek overflowed its banks approximately 1,000 feet upstream of Calaveras Boulevard. The estimated peak flow for Berryessa Creek above Calaveras Boulevard was 870 cfs, which is approximately a 2-year event.	No specific damages were reported.
January 22, 1983	1,045	Debris and sediment suspended in the floodwaters was deposited at the culvert at Old Piedmont Road, causing overbank and extensive street flooding. Overbank flooding also occurred immediately upstream and downstream of Montague Expressway and between Yosemite Drive and Calaveras Boulevard in Milpitas. Floodwaters eventually made their way westerly and flooded the streets and parking lots in the vicinity of Abel and Marylinn Streets in Milpitas. Berryessa Creek peak flows above Calaveras Boulevard were estimated to be 1,045 cfs. This exceeded the historical peak flow recorded since the records began in 1970.	Property damages were reported in both Milpitas and San Jose. At least six businesses suffered water and sediment damage from flooding in this commercial/industrial area.

Table 1 – Notable Historic Flood Occurrences			
Date	**Estimated Peak Flow (cfs)**	**Event Description**	**Reported Damages**
February 5-8, 1983	210		
February 23-March 4, 1983	300		
February 3, 1998	~2,000	The GRR reports that this storm had about a 10-year return frequency. During high tide in San Francisco Bay, water from Berryessa Creek backed up into Calera Creek and overflowed through a low point in the levee adjacent to the Union Pacific Railroad tracks.	Water from this levee breach and a coincident failure of a stormwater pump station caused flooding of up to four feet in the California Landing area of Milpitas. USACE O&M manual reports that this storm was estimated to have roughly a ten-year return period, making it the largest peak flow estimated to date. The USACE Economics Appendix (2014) indicates that this event caused minor damages to homes and automobiles but that dollar losses were not documented.

The most recent major flood events from Berryessa Creek occurred in March 1982, January 1983, and February 1998. It was reported that the 1998 event caused minor damages to homes and automobiles, but dollar losses were not documented. No non-residential structure losses were reported from these events. Specific frequency was not identified for floods within the study area, but each noted event was believed to be smaller than the 100-year flow (0.010 exceedance probability discharge).

The GRR estimates the following pre-project channel capacities and 100-year flood flows (measured in cubic feet per second or cfs) for each of the four study reaches in the project area; see Table 2. The USACE estimates of pre-project flood depths ranged from zero to up to three feet in some areas.

Table 2 – GRR Study Reach 100-Year Flows and Pre-Project Channel Capacities (I-680 Downstream to Calaveras Boulevard)				
GRR Study Reach	**Description**	**100-Year Flow (cfs)**	**Channel Capacity (cfs)**	**Average Channel Capacity (cfs)**
4	Montague Expressway to I-680	2,140	830 - 3,140	2,000
3	Ames Avenue to Montague Expressway	2,780	1,350 - 3,500	2,500
3	Piedmont Creek to Ames Avenue	2,780	1,350 - 3,500	1,500
2	Los Coches Street to Piedmont Creek	3,880	840 - 2,250	1,500
1	Calaveras Boulevard to Los Coches Street	4,990	1,600 - 2,550	1,600

Figure 8 serves to graphically illustrate the extent of the pre-project regulated flood hazard area in this large and intensely developed portion of the Cities of Milpitas and San Jose, which have experienced recurrent losses prior to the construction of the Project in this area.

The GRR Economic Appendix reports expected annual damages in excess of $11 million for the without-project condition, as shown in Table 3.

Table 3 – Expected Annual Damages, Without Project Condition, October 2013 Price, 3.50% Interest Rate, 50 Year Period of Analysis[5]	
Damage Category	**Expected Annual Damages**
Single-Family Residential	$990,000
Multi-Family Residential	$518,000
Commercial	$1,744,000
Industrial	$7,863,000
Public	$284,000
Automobile	$251,000
Emergency	$43,000
Total Expected Annual Damages	**$11,693,000**

III.d. Post-Project Future Condition Flows and Residual Risk

Estimated flood hazard areas are based on best available data for conditions at a point in time. Factors include basin development, stormwater runoff, increases in impervious surfaces, river morphology, and

[5] **Impact Areas E and F.** For economic evaluation and project performance purposes, the GRR divided the study area into six economic impact areas, referred to as Impact Areas A through F. The impact areas were established to address changes in hydrology, hydraulics, and economic conditions throughout the study area. Impact Areas A through D are upstream of the project area, running from Old Piedmont Road west to Interstate-680. Impact Areas E and F are within the project area. Impact Area E beings just west of I-680 and is bounded by Capitol Avenue, Abel Street, and Berryessa Creek. It includes the Midtown region in Milpitas and includes residential, commercial, public, and industrial land uses. Impact Area F runs along a short section of the left bank of Berryessa Creek from Yosemite Drive to near Los Coches Street and east of the Union Pacific railroad line. This impact area is highly industrial with many hi-tech firms in addition to some commercial and limited residential uses. Some parcels may have more than one physical structure and some structures, such as condominiums, may be represented by multiple parcels.

flood protection measures such as stormwater detention, retention, drainage systems, and so on. Future condition flood models attempt to account for this.

The GRR Economic Appendix reports that the year 2020 would represent full build-out for the Milpitas Midtown area. It also indicates that future hydrology was evaluated in hydrology and hydraulic studies, which concluded that the change in flow would be insignificant.

The Upper Berryessa Creek Flood Risk Management Project O&M manual (O&M manual) indicates that the Project was designed and built to contain a peak flow of 1,545 cfs at its upstream end (I-680 Bridge) and 4,100 cfs at its downstream end (Highway 237/Calaveras Boulevard Bridge) with 76% confidence (roughly a one in four chance of flooding if the peak flow occurs). The manual indicates that these peak flows have a 1% annual chance of exceedance.

Residual risks are those risks that remain after a flood mitigation project has been implemented. This is because projects cannot be designed for every possible future scenario that could occur. In this case, the post-Project residual risk for the Project Area on the Upper Berryessa Creek is related to two potential future possibilities: (1) flood flows greater than the Project's design level, and (2) potential future degradation of the channel capacity due to operation and maintenance that does not align with procedures set forth in the Project's O&M manual. The GRR defines residual risk as what might happen when a flood event occurs that is larger than a design event, and notes that there is always a risk of residual flooding regardless of how large a project is built. The O&M manual goes on to say that the Project cannot protect against all potential future floods. The Project is estimated to contain flood flows within the confines of the channel for flood events less than or equal to the project design performance, assuming proper maintenance of the system. However, flooding is still possible for flood events approximately equal to the project design performance if not maintained properly. Additionally, residual flood risk exists for events exceeding the project design performance, regardless of the manner of system maintenance.

Areas of residual risk, as described and depicted in the O&M manual, and as specifically related to the Project, are shown in Figure 9.

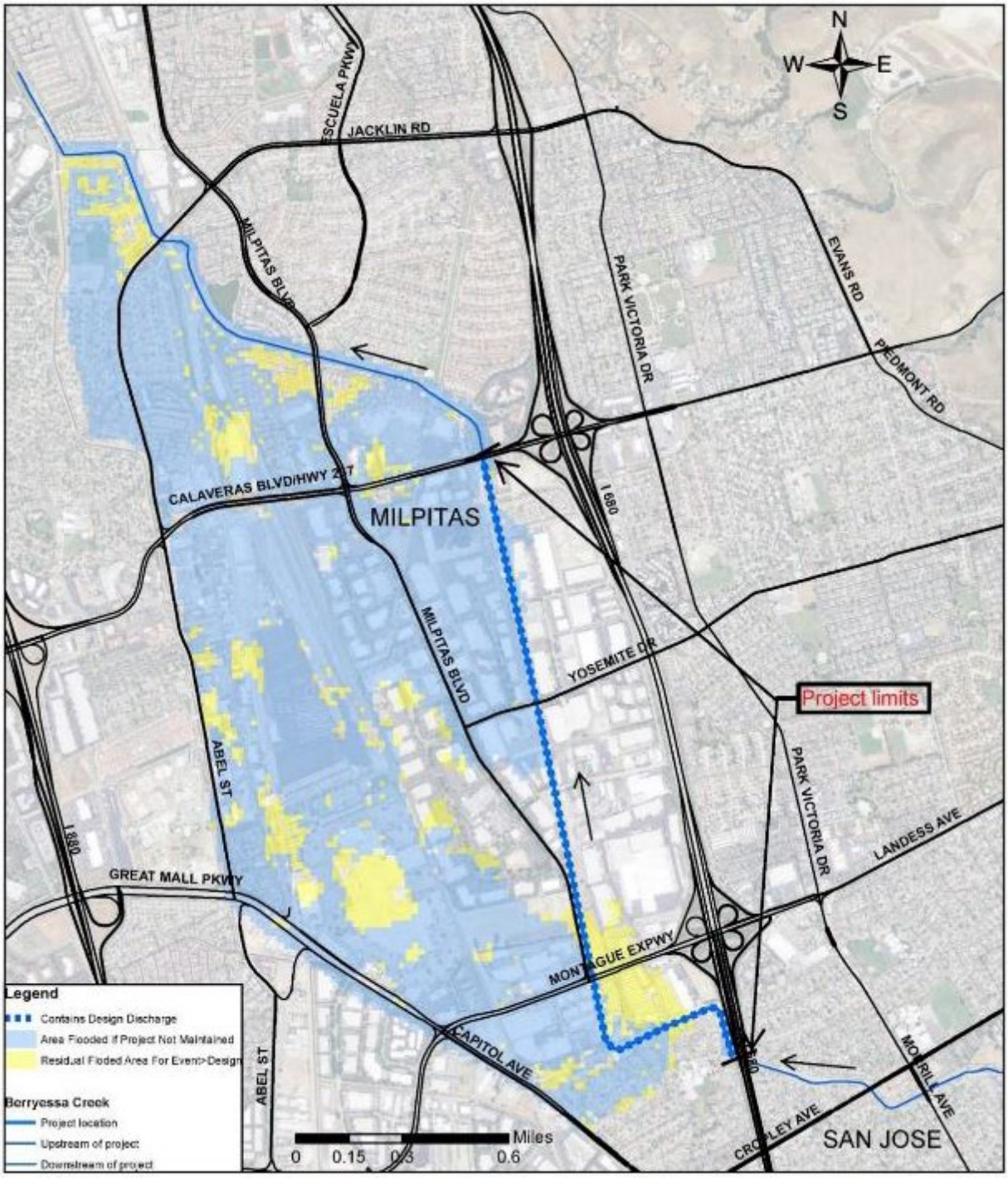
- The dotted solid blue line shows the location of the channel, which will contain flood events less than or equal to the project design performance, as long as the Project is properly maintained.
- The light blue areas show locations that could potentially flood for flood events approximately equal to the project design performance if the Project is not properly maintained.
- The yellow and light blue areas combined show locations that will potentially flood for events exceeding the project design performance, regardless of how well the Project is maintained.

The O&M manual notes that when the project performance is exceeded, potentially over 30,000 people and 2,400 structures will be exposed to flooding. It states that the extent and depth of flooding will be dependent on the nature and size of the flood. People living or working in the blue and yellow shaded areas should be made aware of the residual flood risk hazard and of evacuation plans should a flood occur that exceeds the project's 100-year design level.

The GRR indicates that approximately 370 structural parcels (out of more than 1,100) will experience flooding at the 500-year event. It states that flooding will cause property damage to slightly more than

200 of these parcels. About 100 residential structures will be damaged by flooding. The average depth of flooded parcels is slightly below 0.4 feet with flood depths ranging from 0.01 feet to 2.17 feet.

The GRR also concluded that the project will not be affected by a potential rise in sea level for the future without-project condition.



Source: Upper Berryessa Creek Flood Risk Management Project O&M Manual

Figure 9 – Project Performance Map: Areas of Residual Risk[6]

[6] Note: Blue and yellow shaded areas of Figure 9 represent areas that could be flooded for events greater than the 100-year flood.

III.e. Existing Land Use and Structure Inventory

Existing Land Use

The GRR presents an overview of land use in the study area. Key points from that report are recapped here.

Existing land use types in the Berryessa Creek study area include agricultural, residential, industrial, and commercial. Under existing conditions, the higher elevation portions of the Berryessa Creek basin (the foothills area east of Old Piedmont Road) are either undeveloped or sparsely developed agricultural land used for cattle grazing. When the creek reaches the flat Santa Clara Valley below, it flows through urban developments in the Cities of San Jose and Milpitas, home to Silicon Valley and many of the world's largest high-tech corporations and industries.

The San Jose area adjacent to Berryessa Creek is fully developed as a medium density residential community from Old Piedmont Road to I-680.

The creek flows through a rapidly expanding light industrial and commercial section of the City of Milpitas from the Montague Expressway to the Project boundary at Calaveras Boulevard.

Structure Inventory

The USACE economics analysis used for the GRR (Economics Appendix 2014) indicates that 1,824 parcels with structures are located in the 100-year floodplain and 2,034 parcels with structures are located in the 500-year floodplain (see Table 4). The GRR also states that 1,000 more units were at risk than what was shown in the USACE Feasibility Report (1987), 27 years prior, being primarily reflective of an increase in multi-family residences during that time frame.

Table 4 - Number of Parcels with Structures within the 500-year and 100- year Floodplains by Land Use[7]

Floodplain*	Single Family Residential	Multiple Family Residential Units	Commercial	Industrial		Public	Total Parcels with Structures
				General	Tech		
500-year	724	1,110	109	30	42	19	2,034
100-year	590	1,050	96	30	41	17	1,824

* 500-year floodplain = 0.002 median exceedance probability discharge; 100-year floodplain = 0.01 median exceedance probability discharge

The same report summarizes the value of damageable property, comprised of the structural and content values described for parcels within the 500-year floodplain (Table 5). In total, the study area has approximately $2.3 billion dollars of damageable property at risk of flooding in the event that either the USACE project design parameters are exceeded, or the project is not maintained properly. Factors such as additional structures and general increases in valuation from 1986 to 2013 noted in the USACE Economics Appendix have increased the value found in the 1987 Feasibility Study. Improvements in existing structures and increases in labor and construction costs in the area have also contributed to the increase in property value. A value update factor derived from the Consumer Price Index was applied to

[7] Impact Areas E and F. See also footnote 7.

the 2013 property values to calculate total values for 2021. Table 5 presents January 2021 property values within the 500-year floodplain.

Table 5 – Value of Damageable Property Within the 500-year Floodplain, Value in $ Millions, January 2021 Prices

Structure Category	Total
SFR – Structure	$138.5
SFR – Content	$69.3
MFR – Structure	$251.5
MFR – Content	$125.8
Commercial – Structure	$289.1
Commercial – Content	$308.1
Industrial – General Structure	$117.6
Industrial – Tech Structure	$272.7
Industrial – General Content	$154.0
Industrial – Tech Content	$510.0
Public – Structure	$49.8
Public – Content	$22.4
Total Value	**$2,308.**

Critical Facilities

Critical facilities typically comprise all public and private facilities deemed by a community to be essential for the delivery of vital services, protection of special populations, and the provision of other services of importance. These can include, but are not limited to, facilities such as schools, health care facilities, fire stations, police stations, emergency operations centers, and hazardous materials sites.

Hazus is FEMA's nationally applicable software program that estimates potential building and infrastructure losses from earthquakes, riverine and coastal floods, and hurricanes. The software contains a wealth of nationwide datasets regarding assets at risk in hazard areas. For this FPMP, critical facilities were identified using a Hazus query of the study area. Datasets queried included schools, health care facilities, fire stations, police stations, emergency operations centers, and hazardous materials sites within the mapped residual risk area shown in Figure 9. The Hazus data was queried in January 2021 using Hazus 4.2, which updated the critical facilities building information in 2018.

As shown in Table 6 and Figure 10, six critical facilities were identified in the Project area following a query of best readily available data in Hazus. All six sites identified were within the City of Milpitas.

Table 6 – Critical Facilities		
Facility Name	**Address**	**Facility Type**
Seagate Tech., Inc.	311 Turquoise Street, Milpitas	Hazardous Materials/Nickel
Read Rite Corp.	345 Los Coches, Milpitas	Hazardous Material/ N-METHYL-2-PYRROLIDO
Solectron-California Bldg.	727 Gibraltar Drive, Milpitas	Hazardous Materials/ Lead Compounds
St. John the Baptist Catholic School	360 South Abel Street, Milpitas	School - primary
Kindercare Learning Center	400 South Abel Street, Milpitas	School - daycare
Milpitas Fire Department Station 1	777 South Main Street, Milpitas	Fire station
Great Western Chemical Company	954 South Milpitas Blvd., Milpitas	Hazardous Materials/ NITRIC ACID

While transportation centers were not in the Hazus database, it should be noted that the Milpitas Bay Area Rapid Transit (BART) station is also located in the protected area of the Project.

Figure 10 – Hazus Critical Facilities

(Highlighted facilities are located in residual risk areas)

Emergency Services

The emergency services for the project area involves three levels of government: state, county, and municipalities. It begins with the California Governor's Office of Emergency Services (Cal OES). All levels of government work together during flood emergencies.

State. Cal OES is responsible for the coordination of overall state agency response to disasters. The State of California Emergency Plan describes the system for emergency response in California. The plan is a requirement of the California Emergency Services Act (ESA), and describes methods and processes for conducting emergency operations, mutual aid, emergency services of government agencies, resource mobilization, public information, continuity of government, hazard mitigation, preparedness, and recovery. Operational Areas (OAs), consisting of a county and all political subdivisions therein, serve as a link between the state government and local municipalities. The Santa Clara County Office of Emergency Management (OEM) maintains readiness to support disaster response, recovery, and mitigation.

County and Municipalities. All local governments with a certified disaster council are required to develop an Emergency Operations Plan (EOP) that meets state and federal requirements and is in accordance with Cal OES Local Planning Guidance. In turn, cities and counties have ordinances that establish an emergency organization and local disaster council and provide for the development of an emergency plan.

- **Santa Clara County**. The Santa Clara County Emergency Operations Plan establishes the County's incident management organization that supports first responders, facilitates public information and interagency communication, and maintains continuity of government.
    - **Valley Water.** Valley Water provides flood management services for Santa Clara County. During severe storm events and high flows in the flood prone creeks, Valley Water implements emergency actions to protect life, property, and the environment. To do this, Valley Water works closely with partner agencies, landowners, and other stakeholders to ensure a coordinated approach during emergency events. To improve the response to potential or actual flooding events, Emergency Action Plans have been developed that provide guidance on how Valley Water will prepare and respond to severe storm and high flow events. The plans describe five basic steps taken in response to storms and flood events: event detection, condition level determination, notification and communications, actions and responsibilities, termination, and follow-up. A key component of these plans is to create an easy-to-understand and easy-to-communicate classification system for setting a condition level based on flood risk and flood severity. With an event's risk and severity established, the responsible agencies can best coordinate to provide a comprehensive response specific to the event. Valley Water operates different types of sensors (stream, reservoir, and rain gauges) throughout its operational area in order to collect surface water data as part of its ALERT system. Two stream sensors are located on Berryessa Creek. On the downstream end of the project area, Stream Sensor 5064 is located on Berryessa Creek above Calaveras Boulevard. Upstream of the project area, Stream Sensor 5136 is located on Berryessa Creek at Cropley Avenue. Using Valley Water's new Surface Water Data Portal (presently in beta), users can navigate to particular gages where information is available for flow/stage data, impact information for various stages, and forecasts. Valley Water's ALERT

webpages, operated in parallel to the new Surface Water Data Portal, allow for query of the same type of information (just not in a map viewer type of a platform). Valley Water also operates a Flood Watch Tool[8] that shows all stream and reservoir gauges, with color coding to indicate gauge flood status (normal, action, minor, moderate, or major).

From Valley Water's website, residents can sign up for emergency alerts through:

- AlertSCC, the Santa Clara County emergency alert system - a free, easy, and confidential way for anyone who lives or works in Santa Clara County to get emergency warnings sent directly to their cell phone, mobile device, e-mail, or landline.
- ReadySCC, Santa Clara County's emergency preparedness app which allows users to set a meeting point for their family, list emergency contacts in and out of town, assign a caretaker for their pet, and send status updates to their loved ones during an emergency.
- The American Red Cross Flood app**,** which can be downloaded for free to a smartphone to get flood and flash flood watches and warning alerts for users' locations, based information from the National Oceanic Atmospheric Administration and the National Weather Service.

- **City of Milpitas**. The City of Milpitas EOP was completed in 2012. The EOP's hazard assessment demonstrates core threats facing the City; sets forth a guide for City response efforts during large-scale or complex incidents. The EOP also provides a basis for which training serves to build organizational capacity. In 2018, the City has drafted a more recent update to the 2012 EOP document; however, the updated draft has not been adopted by City Council. The City of Milpitas Emergency Management Program Assessment and Implementation Plan provided an independent assessment of the City's emergency management program including an evaluation of the City's EOP. The City's EOP was determined to be missing numerous critical elements to effectively guide Emergency Operations Center (EOC) staff and incident responders in disaster operations.
- **City of San Jose**. The City of San Jose Emergency Operations Plan provides a programmatic framework that outlines the City's intended approach to preventing, preparing for, responding to, recovering from, and mitigating against the impacts of natural and man-made disasters and emergencies.

Evacuation Routes

The Valley Water Hazard Mitigation Plan (HMP) (2017) indicates that four highways within its service area can serve as primary evacuation routes, including U.S. 101, Interstate 280 (I-280), I-680, and Interstate 880 (I-880). Of these evacuation routes, only I-680 is within the limits of the Project area. I-680 runs from San Jose north to Solano County and the plan notes that it is a major evacuation route for

[8] Note: The Flood Watch Tool feature will be hosted at alert.valleywater.org, as part of the updated website. The flood watch mode can be toggled on at the website page. The Flood Watch Tool is tentatively planned to be available for another year or two, then will be decommissioned by Valley Water.

Milpitas and northern San Jose. Running along the eastern side of the Project area, I-680 is shown outside the area of potential residual risk, as shown in the GRR's Project Performance Map.

III.f. Development Trends

At the time of preparation of the Project's GRR, future development was evaluated by the USACE to occur through the full build out (year 2020). Future hydrology was evaluated and the USACE determined that the change in flow associated with full buildout would be insignificant. The remainder of this subsection presents an overview of the development trends and future growth that can be expected to impact risk in the project area over time.

Development Trends Upstream of the Project Area

Berryessa Creek Headwaters – Los Buellis Hills. The Berryessa Creek originates in the mountains and foothills of northern Santa Clara County; specifically, the Los Buellis Hills of the Diablo Range. This area lies within unincorporated Santa Clara County. The County Land Use Plan shows the headwaters of the Berryessa Creek as a mapped Resource Conservation Area (Hillsides)[9]. The County's General Plan defines Hillside areas as mountainous lands and foothills unsuitable and/or unplanned for annexation and urban development. The Plan indicates that areas designated as Hillsides shall be preserved in order to: support and enhance rural character; protect and promote wise management of natural resources; avoid risks associated with the natural hazards characteristic of those areas; and protect the quality of reservoir watersheds critical to the region's water supply[10]. In turn, it would appear to be unlikely that the study area would experience a rise in flood elevations from future development in the Berryessa Creek headwaters region because the land is designated for preservation. Any potential future new development or redevelopment in the Berryessa Creek Headwaters could result in an increase in population exposed to the flood hazard, and associated increase in vulnerability. Climate change is expected to increase the frequency and severity of storm events, and this would result in an increase in vulnerability.

City of San Jose. When Berryessa Creek reaches the bottom of the undeveloped range/hillside lands, it flows through a small portion of the City of San Jose before reaching the project area. This part of San Jose is already built out, and any potential future new development or redevelopment would be governed by the City's floodplain management ordinance which requires new land developments and remodels of existing buildings to conform to rules that minimize flood damage. The San Jose General Plan specifies that protection from a 100-year flood (0.01 exceedance probability flood) should be achieved in accordance with the National Flood Insurance Program design standards. Any potential future new development or redevelopment in the City of San Jose near Berryessa Creek could result in an increase in population exposed to the residual flood hazard, and associated increase in vulnerability. Climate change is expected to increase the frequency and severity of storm events, and this would increase vulnerability.

[9] https://www.sccgov.org/sites/dpd/DocsForms/Documents/landuse_plan_map.pdf
[10] https://www.sccgov.org/sites/dpd/DocsForms/Documents/GP_Book_B.pdf

Development Trends in the Project Area

City of Milpitas. The GRR's economic appendix (2013) indicates that the City of Milpitas has a redevelopment plan for the Midtown area, with a good portion of the Midtown area land lying within this Project's impact area. Along the South Main and Abel Street corridors, the plan calls for renovation of many of the existing buildings and new high density residential and commercial construction on existing vacant acres near light rail and proposed BART stations. This area is the only portion of the study floodplain identified for future growth. At the time of the GRR, development was projected to be complete by 2020. The City of Milpitas Master Plan includes recreational and aesthetic values along the creek. Projections for future development in the Berryessa Creek study area include light manufacturing/industrial park and retail development. The City of Milpitas' Transit Area Specific Plan (TASP) redevelopment plan is located adjacent to the study area along Montague Expressway. This area would be redeveloped into mixed use, urban, and high-density residential. Any potential future new development or redevelopment in the City of Milpitas near Berryessa Creek could result in an increase in population exposed to the residual flood hazard, and associated increase in vulnerability. Climate change is expected to increase the frequency and severity of storm events, and this would result in an increase in vulnerability.

The Milpitas Train Center and BART Station opened in June 2020. The GRR main text indicates that BART stations are required to be protected from the 500-year flood for sensitive facilities, while all other station features, such as walkways, are to be protected from the 100-year flood. The Milpitas BART Station will implement additional flood risk management measures, such as ensuring that raised walkways are constructed above the current 100-year regulatory flood plain.

Vacant Acres and Proposed Land Use

Vacant land proposed for future development can be a driver of a community's overall flood risk, particularly if large, undeveloped regions are proposed for future high-density, high-occupancy development. As described below, in contributory upstream areas of the Project, large swaths of vacant land are expected to remain undeveloped while smaller parcels of vacant land in Milpitas and San Jose could be infilled or developed. Additionally, new development - or redevelopment in a manner that would put higher value, higher density development in the floodplain - could increase a community's overall exposure to flood risk. This risk could be minimized through enforcement of existing ordinances, codes, and standards related to flood protection.

East of Old Piedmont Road. Most of the vacant land in or upstream of the Project area is located east (upstream) of Old Piedmont Road, in the Los Buellis Hills of the Diablo Range in a very large, unincorporated and undeveloped region mapped as Resource Conservation Area (Hillsides) in the Santa Clara County Land Use Plan Map[11]. The County's General Plan defines Hillside areas as mountainous lands and foothills unsuitable and/or unplanned for annexation and urban development. These vacant, undeveloped lands are largely used for agriculture and grazing and are expected to remain undeveloped in the future and used for the same purpose.

West of Old Piedmont Road in the City of San Jose and City of Milpitas. West (downstream) of Old Piedmont Road, the Cities of San Jose and Milpitas are almost fully developed. Vacant land is fairly

[11] See footnote 11.

minimal in size and vacant parcels are largely disconnected from one another. Some infill development and redevelopment can be expected to occur, largely in alignment with existing land use maps and in accordance with FEMA's NFIP requirements for development in the floodplain and local ordinances.

Summary. The Project has been designed to protect against flooding during a 100-year flood (0.01 exceedance probability discharge event), and regulations exist to protect new development and substantial improvements from the impacts of flooding. Future development or redevelopment in the City of Milpitas or City of San Jose near Berryessa Creek could result in an increase in population exposed to the residual flood hazard, and associated increase in vulnerability. Additionally, climate change is expected to increase the frequency and severity of storm events, and this would result in an increase in vulnerability.

III.g. Expected Annual Damage

The Upper Berryessa Creek Flood Risk Management Project was designed to provide protection during a 100-year flood (0.01 exceedance probability discharge) event, with floodwaters constrained to the confines of the channel and no damages. Residual risks exist for floods in excess of the 100-year event, or if the creek is not properly maintained.

III.h. Existing Mitigation Measures – Regulations

In accordance with USACE guidance (reference ER-1105-2-100 paragraph E-19j), no structural damages were estimated for future development from the 100-year flood event in the GRR Economic Analysis. The analysis assumes that all construction would have ground elevations raised one foot above the 100-year water surface elevation and typical construction would occur over this elevation for commercial and residential structures in compliance with this guidance.

As noted in the introduction, the purpose of this floodplain management plan is to develop and implement programs and regulations that will maintain the Project's level of flood protection. There are several federal, state, and local agencies that have existing regulations that work to achieve this goal through mitigation of residual risk.

The following sections summarize the applicable regulations that govern floodplains in the area of the Upper Berryessa Creek Flood Risk Management Project and serve as existing mitigation measures.

US Army Corps of Engineers Regulations

USACE PGL No. 52, Floodplain Management Plans (Dec 8, 1997) defines USACE policy on Section 202 (c) of WRDA 1996. It states that the non-federal partner of the project should develop a FPMP that: (1) implements measures, practices, and policies which will reduce loss of life, injuries, damages to property and facilities, public expenditures, and other adverse impacts associated with flooding; (2) preserves and enhances natural floodplain values; and (3) addresses measures which will help preserve levels of protection provided by the flood damage reduction or hurricane or storm damage reduction project.

Enclosures to PGL No. 52 include "Guidance on the Development of Floodplain Management Plans (Nov 7, 1997)," which provides further clarification on the development of an FPMP in accordance with Section 202 (c) of WRDA 1996. It states that the primary focus of the plan should be to address potential measures (both structural and non-structural), practices, and policies which will reduce the impacts of

future residual flooding, help preserve levels of protection provided by the project, and preserve and enhance natural floodplain values. An element of the plan will include provisions related to post-storm activities following a catastrophic event.

USACE further requires communities receiving funding for flood protection projects to prepare an FPMP following procedures similar to the NFIP minimum standards. Communities participating in the NFIP must adopt certain land use regulations for flood hazard areas. In exchange for adopting these regulations, the federal government makes flood insurance available to those communities. Also, as a minimum, the FPMP prepared and implemented by the non-federal partner must include the following activities:

(a) The non-federal partner must maintain and provide public access to the most current flood hazard maps and related information.

(b) On an annual basis, the non-federal partner must provide information to owners and residents of flood prone property within its jurisdiction concerning the residual flood risk and availability of flood insurance.

FEMA's NFIP Floodplain Management Regulations

FEMA's NFIP regulations on Floodplain Management are located in the Code of Federal Regulations, Chapter 4 Parts 59 & 60. The NFIP is primarily concerned with the Special Flood Hazard Area (SFHA), which is the area of land that would be inundated by a 100-year flood. The base flood constitutes a reasonable compromise between the need for building restrictions to minimize potential loss of life and property and the economic benefits to be derived from floodplain development. Development may take place within the flood hazard area provided that development complies with local floodplain management ordinances, which must meet the minimum federal requirements.

When a final flood elevation for a flood hazard area has been determined, the community shall require that all new construction and substantial improvements of residential structures within certain zones elevate the lowest floor (including basement) at or above the base flood level. For the same zones, all new construction and substantial improvements of non-residential structures shall either elevate the lowest floor (including basement) at or above the base flood level, or together with attendant utility and sanitary facilities be designed so that the structure is watertight below the base flood level. All designs must be certified by a registered professional engineer or architect.

State of California Regulations

The California State HMP (2018) identifies the following State regulations and legal mandates related to community planning and flood hazard mitigation:

- ***"Assembly Bill (AB) 162***. *AB 162 (2007) requires that land use, conservation, safety, and housing elements of local general plans include provisions and flood hazard inundation mapping that will reduce the risk from floods and flood-related issues. Each of the requirements for the elements specified in this bill must be fulfilled before the next revision of the housing element of the local jurisdiction's general plan. Land use elements are required to include flood maps that are produced by the Federal Emergency Management Agency (FEMA) or the California Department of Water Resources (DWR). These must be*

updated each year. In addition, the determination of land available for urban development may exclude land that is not adequately protected by flood management infrastructure. The Department of Water Resources has prepared user guidelines for implementation, in coordination with OPR[12], Cal OES, and other agencies. Conservation elements must contain detailed information about the floodplain, such as the rivers, creeks, and streams that contribute to it. In addition, information on flood corridors, riparian corridors, and land capable of sustaining floodwater must be identified. This information should be used to inform conservation element policies addressing groundwater recharge and storm water management. AB 162 also adds requirements for addressing floods in the safety element. Source information includes historical data and flood hazard zone mapping. The safety element (and all elements of a general plan, whether mandatory or optional, must be consistent with one another) must include policies and goals that state how flooding risks for existing and planned development will be reduced, including strategies for deciding how new development can be placed in flood hazard zones, if at all. New development in these areas may be subject to design requirements that reduce the risk from flooding. In addition, the safety element must include policies for protecting public facilities from the risks of flooding and ensuring their continuity during flood events. The schedules for requirements under AB 162 (2007) and companion bill SB 5 (2007), specifically related to the Central Valley, were extended by the legislature through approval of SB 1278 in 2012. This extension was intended to allow city and county local general plans as well as zoning in the Central Valley to be made consistent with the Central Valley Flood Protection Plan adopted in 2012.

- ***Assembly Bill 70**. AB 70 (2007) addresses increased risk to floods as a result of new development in a community. If a city or county approves new development that increases the flood risk to the state, then the city or county must be responsible for a reasonable amount of the liability it has increased. This requirement applies to land that was previously undeveloped and protected by a state flood control project.*

- ***Senate Bill 5**. Under SB 5 (2007), cities and counties within the Sacramento-San Joaquin Valley are required to include information from the Central Valley Flood Protection Plan (CVFPP) to be adopted by the Central Valley Flood Protection Board. Within 24 months of flood protection plan adoption, each local jurisdiction must include these amendments in its general plan. Each jurisdiction is also required to develop goals and policies in its general plan for protecting people and property from floods and flood-related issues.*

- ***Senate Bill 27**. SB 27, also known as the Sacramento-San Joaquin Delta Emergency Preparedness Act, was passed in 2008. The act provided direction for the creation of a report outlining specific recommendations to be made to the Legislature and Governor to support the following items: a Delta interagency unified command system, an emergency preparedness and response strategy, and a supporting exercise/training plan. The act directed Cal OES to establish a Sacramento San Joaquin Delta Multi-Hazard Coordination Task Force consisting of representatives from the Delta Protection Commission, California Department of Water Resources, FEMA, and a representative from each of the Delta*

[12] OPR = Office of Planning and Research

counties. The Task Force met and developed the Sacramento-San Joaquin Delta Multi-Hazard Coordination Task Force Report, which it provided to the Legislature and Governor in early 2012. One of the Task Force recommendations was to develop a Delta catastrophic flood incident plan. The 2018 Northern California Catastrophic Flood Response Plan (NCCFRP) supports the emergency preparedness and response strategy outlined in the Task Force Report. The NCCFRP provides a framework outlining how local, state, and federal governments will respond and coordinate in anticipation of and immediately following a catastrophic flood affecting Northern California, with emphasis on impacts to the Delta.

- ***Related Flood Mitigation Laws.*** *The CVFPP was adopted in July 2012. In related actions, the Legislature passed SB 1278 (2012) and AB 1965 (2012) extending the time originally provided by SB 5 (2007) for localities to make their general plans consistent with the CVFPP. Among other things, these bills established a July 2013 deadline for DWR to complete 200-year floodplain mapping within this area, allowed cities and counties in this area to take up to two years after July 2013 to amend their general plans to be consistent with the CVFPP, added a year beyond that to amend their zoning, required amended city and county general plans to include data and analysis contained in the CVFPP and other flood hazard zones mapping, and required cities and counties after July 2016 to make findings related to urban flood protections levels using criteria developed by DWR."*

Additionally, Government Code Section 65300[13] requires that every City and County in the State of California must adopt a general plan (also known as a comprehensive plan or master plan) to guide a community's long-term growth and development. General plan guidelines are developed, and regularly updated, by OPR. Key elements of the Code, as related to flood hazards and as described in the State HMP, are:

- **Safety Element** – The Safety Element must address flood hazards, including hazard identification and strategies to reduce risk. AB 2140 (2006) authorizes local governments to adopt their Local Hazard Mitigation Plans (LHMP) into the safety elements of their general plans. While not required, the State is authorized to use available California Disaster Assistance Act funds to cover local shares of the 25 percent non-federal portion of grant-funded post-disaster projects for communities that have opted to do so.
- **Land Use Element** – Areas subject to flooding must be identified and mapped in the Land Use Element. Land use elements can contain policies to keep high-value land uses out of hazard areas.
- **Circulation Element** – Circulation Elements can include policies on where future transportation routes are located, and how they are built. This could address flooding by siting roadways and evacuation routes outside of flood hazard areas, and/or constructing these routes such that they are wide enough for emergency response vehicles to pass during a disaster without causing traffic backups; and/or multiple access/egress points for new development.

[13] https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=65302.&lawCode=GOV

- **Housing Element** – The Housing Element is the only General Plan element requiring periodic review by the State of California Department of Housing and Community Development, with five-year updates. Housing elements address housing supply needs for projected future populations and market conditions. AB 162 requires local governments to add the latest flood hazard information to their housing elements.
- **Conservation Element** – Conservation Elements address a jurisdiction's natural resources, as well as responsible development and utilization of natural resources. AB 162 requires conservation elements to include information on waterways that contribute to or support floodplains.

County Regulations

The project is located in Santa Clara County. Santa Clara County participates in FEMA's NFIP and regulates development in SFHAs within the unincorporated territory of Santa Clara County through their Floodplain Ordinance.[14] The Director of the Department of Planning and Development, or his or her designee, is appointed to administer, implement, and enforce the County's floodplain management ordinance, and is authorized to grant or deny development permits in accordance with the provisions of the ordinance.

Santa Clara County entered the NFIP in August 1982. On April 18, 2009, the Santa Clara County Floodplain Ordinance was revised to require flood protection to a level two feet above the Base Flood Elevation, which is one foot higher than previous requirements.

In addition, Santa Clara County also participates in the NFIP's Community Rating System (CRS). The CRS is a voluntary program for communities participating in the NFIP whereby policy premium discounts can be realized as a community develops and executes extra measures, beyond minimum floodplain management requirements of the NFIP, to provide protection from flooding. A community's eligibility for the CRS depends upon participating in the NFIP Regular Program and maintaining full compliance with the NFIP. CRS flood insurance policy premium discounts range from 0 percent to 45 percent depending on the community's floodplain management measures and activities.

Santa Clara County was accepted into the CRS program in May 2004. As of April 2021, FEMA lists the County as a CRS Class 10 community whose status has been rescinded, with policyholders not eligible to receive discounts on their flood insurance premiums[15].

Santa Clara County Building Inspection Office maintains copies of FEMA Flood Insurance Rate Maps (FIRMs), Flood Boundary and Floodway Maps, and/or a Flood Insurance Studies.

Development in SFHAs is regulated by the Santa Clara County Department of Planning and Development, which is responsible for issuing permits. In most cases, a Building or Grading Permit is required for all development in a floodplain. Regulated development includes, but is not limited to:

[14] The Santa Clara County Floodplain Ordinance can be found online at: https://library.municode.com/ca/santa_clara_county/codes/code_of_ordinances?nodeId=TITCCODELAUS_DIVC12SULADE_CHVIIFLMA The ordinance is described further at: https://www.sccgov.org/sites/dpd/OrdinancesCodes/FloodPlain/Pages/FloodPlain.aspx#:~:text=On%20April%2018%202009%2C%20the,foot%20higher%20than%20previous%20requirements

[15] https://www.fema.gov/sites/default/files/documents/fema_april-2021-eligible-crs-communities.pdf

- the construction, reconstruction, renovation, repair, expansion, or alteration of buildings, accessory structures, or other structures;
- the placement of manufactured homes;
- mining;
- dredging;
- bridges, streets, and other paving;
- docks;
- utilities;
- filling, grading, and excavation;
- drilling operations;
- storage of equipment or materials; and
- installation of manufactured home, recreational vehicle, or trailer parks.

Non-building floodplain development (i.e., site improvements) should use techniques to reduce the potential for flood damage, and not result in physical damage to any other property.

Development should be protected from flood damage to a level of two feet above the Base Flood Elevation (100-year flood height) or two feet above the flood elevation calculated by a professional engineer if no Base Flood Elevation is available.

Permits are also required when existing structures in a floodplain are modified (including any reconstruction, renovation, addition, repair, expansion, or alteration of an existing building). Renovations, repairs, or additions to post-FIRM structures are regulated as new construction.

Until a regulatory floodway is adopted, no new construction, substantial development, or other development (including fill) shall be permitted within Zones A1–30 and AE, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other development, will not increase the water surface elevation of the base flood more than one foot at any point within Santa Clara County.

Within an adopted regulatory floodway, the County shall prohibit encroachments, including fill, new construction, substantial improvements, and other development, unless certification by a registered civil engineer is provided demonstrating that the proposed encroachment shall not result in any increase above 0.00 ft in flood levels during the occurrence of the base flood discharge[16].

Municipal Regulations

The City of Milpitas and the City of San Jose each participate in FEMA's NFIP and have adopted flood damage prevention ordinances that embody the NFIP floodplain management regulations.

[16] A Conditional Letter of Map Revision (CLOMR) from FEMA is the agency's comment on a proposed project that would, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective Base Flood Elevations (BFEs), or the SFHA. The letter does not revise an effective FIRM, it indicates whether the project, if built as proposed, would be recognized by FEMA. FEMA charges a fee for processing a CLOMR to recover the costs associated with the review. Building permits cannot be issued based on a CLOMR, because a CLOMR does not change the FIRM. Once a project has been completed, the community must request a revision to the FIRM to reflect the project. "As-built" certification and other data must be submitted to support the revision request. More information can be found in National Flood Insurance Program Requirements in part 65.8 - Review of proposed projects and part 72 - Procedures and fees for processing map changes.

In addition, the Cities of Milpitas and San Jose also participate in the NFIP's CRS, entering the program in October 1991. As of April 2021, FEMA indicates that both cities are currently CRS Class 7 communities, with policyholders in SFHAs receiving a 15% discount on their flood insurance premiums, and those outside of mapped SFHAs receiving a 5% premium discount.[17]

The remainder of this section describes floodplain management regulations within the incorporated areas of the City of Milpitas, and the City of San Jose.

City of Milpitas

The City of Milpitas floodplain management regulations are found in their Code of Ordinances, Title XI – Zoning, Planning, and Annexation; Chapter 15[18]. This ordinance regulates the areas of special flood hazard identified by the Federal Insurance Administration (FIA) of the FEMA in the Flood Insurance Study (FIS) dated July 4, 1988, and accompanying FIRMs dated July 4, 1988, and all subsequent amendments and/or revisions. The City's FIS and FIRMs are on file at 455 East Calaveras Boulevard, City Hall, Department of Community Development. The City Manager is designated as the Local Floodplain Administrator. A development permit is required before any construction or other development begins within any area of special flood hazard.

New Construction. New buildings in the SFHA must have their lowest floor elevation (excluding garage) flood-proofed or raised a minimum of one foot above the base flood (100-year) elevation.

Substantial Improvements. Substantially improved structures in the SFHA must meet the same floodplain construction requirements as new buildings. A Substantial Improvement (SI) is defined as any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 49% of the fair market value of the structure before the start of the new construction. Improvements to any structure within the SFHA are cumulatively tracked for 10 years.

Substantial Damage. All substantially damaged (SD) structures in the SFHA must also meet the same floodplain construction requirements as new buildings. An SD structure is defined as damaged by flood, fire, or earthquake, so that the cost of repairs equals or exceeds 49% of the structure's value before it was damaged.

City of San Jose

The City of San Jose's floodplain management regulations can be found in the City's Code of Ordinances, Title 17 – Buildings and Construction, Chapter 17.08 – Special Flood Hazard Area Regulations. The ordinance designates the City's deputy director of public works (and his or her designee) to administer, implement and enforce the ordinance by granting or denying development permits in accordance with its provisions. Any development within mapped SFHAs requires a permit.

New Construction. New buildings in the SFHA must be elevated to or above the Base Flood Elevation specified on the FIRM.

Substantial Improvements. Substantially improved structures in the SFHA must meet the same floodplain construction requirements as new buildings. An SI is defined as any reconstruction,

[17] See footnote 17.
[18] https://library.municode.com/ca/milpitas/codes/code_of_ordinances?nodeId=TITXIZOPLAN_CH15FLMARE

rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 49% of the fair market value of the structure before the start of the new construction. Improvements to any structure within the SFHA are cumulatively tracked for 10 years.

Substantial Damage. All substantially damaged structures in the SFHA must also meet the same floodplain construction requirements as new buildings. An SD structure is defined as damaged by flood, fire, or earthquake, so that the cost of repairs equals or exceeds 49 percent of the structure's value before it was damaged.

III.i. Public Involvement

Public Involvement Process – Plan Development Phase

During the development of the FPMP, a postcard was mailed to residents in the project area that included information about the project and links to Valley Water's website. The postcard also included a link to an online survey about flood preparedness and awareness, and requesting comments on the draft FPMP, available for review on Valley Water's website. The survey was promoted on Nextdoor and Valley Water's social media accounts.

In addition, key stakeholders from the cities of Milpitas and San Jose and Santa Clara County were consulted during the development of the FPMP. The stakeholder group reviewed the draft plan and provided input.

Public Involvement Planned for Future

Valley Water's Project Manager and Public Information Officer for the Upper Berryessa Creek Flood Risk Management Project will take the lead on future public involvement activities after the plan is approved and adopted. Per PGL 52 and its implementing guidance, at a minimum, future public involvement activities must include:

1. The non-federal partner must maintain and provide public access to the most current flood hazard maps and related information.

2. On an annual basis, the non-federal partner must provide information to owners and residents of flood prone property within its jurisdiction concerning the residual flood risk and availability of flood insurance.

These two activities are specifically included in the Action Plan in Section V.

Additionally, Valley Water maintains an extensive public outreach and engagement program. This program is employed on a daily basis for all ongoing projects. Valley Water's website, www.valleywater.org, contains information about the agency and its leadership; as well as its projects, plans, and many outreach and education programs. The public can visit the website to learn about public events and view Valley Water's newsletter, learning center, and its social media pages. Valley Water also maintains a specific page on its website for the Upper Berryessa Creek Flood Risk Management Project, https://www.valleywater.org/project-updates/upper-berryessa-creek-flood-protection. All of these tools would be used to keep the public and other stakeholders informed during

the FPMP maintenance phase (that is, in the years between the plan's adoption and its next formal update).

IV. Goals and Objectives

Mitigation goals are general guidelines that explain what a community hopes to achieve in terms of floodplain management, flood hazard mitigation, and loss prevention. Objectives define strategies or steps to achieve the goals that have been set.

The goals and objectives of this floodplain management plan were prepared to align with the following:

- **USACE PGL No. 52**, Floodplain Management Plans, which state that a non-federal partner's FPMP "should implement measures, practices, and policies to reduce loss of life, injuries, damages to property and facilities, public expenditures, and other adverse impacts associated with flooding, and to preserve and enhance natural flood plain values and should also address measures which will help preserve levels of protection provided by the Corps flood damage reduction or hurricane or storm damage reduction project."

- **Valley Water's Mission and Vision**. Founded in 1929, Valley Water provides safe, clean water; flood protection; and stewardship of streams. Their mission is to provide Silicon Valley safe, clean water for a healthy life, environment, and economy. Valley Water's vision is to be nationally recognized as a leading water resources management agency.

- **Valley Water's Local Hazard Mitigation Plan.** Valley Water's LHMP was evaluated to inform the development of goals and objectives for this floodplain management plan. The LHMP's goals were:
    - Protection of life and safety
    - Continued coordination with key stakeholders and other agencies
    - A flexible and engaging public outreach campaign
    - Foster better communication and coordination within Santa Clara County and surrounding communities
    - Reduce risk of loss and damage from hazard events
    - Address aging infrastructure issues to reduce/minimize future hazards and disasters

The goals and objectives of this Upper Berryessa Creek Floodplain Management Plan are shown in Table 7.

Table 6 – Goals and Objectives of the Upper Berryessa Creek Floodplain Management Plan	
Goals	**Objectives**
Goal 1: Proactively Manage and Reduce Flood Risk to Protect Lives and Property	1.a Preserve the level of protection provided by the Upper Berryessa Creek Flood Risk Management Project.
	1.b Address potential measures (structural and nonstructural), practices, and policies that will reduce the impacts of future flooding in the residual risk area of the Upper Berryessa Creek Flood Risk Management Project.
Goal 2: Obtain a Balance Between Development Pressures and Floodplain Management	2.a Preserve and enhance the natural and beneficial functions of the floodplain through protection and restoration of the riparian environment.
	2.b Manage development in floodplain areas through enforcing building codes, development standards, land use regulations, and floodplain management ordinances.
Goal 3: Foster Communication and Coordination as a Path to Risk Reduction	3.a Improve the general public's understanding of the flood risks.
	3.b Foster better communication and coordination with key stakeholders, including but not limited to, other agencies and surrounding communities.

V. Evaluation of Strategies and Tools

The Federal Interagency Floodplain Management Task Force recommends a strong approach using the menu of common strategies and tools for doing flood risk management shown in Table 8. Strategies considered are based on USACE Frequently Asked Questions on FPMPs, and fall under the following categories:

1. Modifying human susceptibility to flood hazards.
2. Modifying the impact of flooding
3. Preserving and Restoring the Environmental Beneficial Functions of Floodplains
4. Strategy 4 - Modifying Floodwaters

The following four terms are used to assess the viability of each tool for Valley Water, Santa Clara County, and the Cities of Milpitas and San Jose:

- **Not Recommended.** The tool was evaluated and not found to be appropriate for the community.
- **Further Study Needed**. The tool is appropriate, but funds needed to study more.
- **Recommended.** The tool has been studied and is known to work in the community, although has yet to be done.
- **Effective or Highly Effective**. These are tools that have already been chosen and implemented and have proven to reduce flood risk.

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
Strategy 1 – Modifying Human Susceptibility to Flood Hazards				
Tool – Development Policies and Land Use Regulations	**Recommended.** Valley Water, as a special district, does not have the authority to regulate land use or development – this falls to the Cities of Milpitas and San Jose, and Santa Clara County. However, Valley Water could coordinate with the County and municipalities to advocate for expanding the guidelines and standards for land use near streams to include climate change resilience considerations (this would also align with the direction Valley Water is moving in its Climate Change Action Plan, which is currently under development).	**Effective.** The City of Milpitas already has development policies and land use regulations in place that reduce flood risk for the 100-year flood event. In addition, Valley Water should continue efforts to improve Berryessa Creek upstream of Milpitas to lessen the flood hazard. New projects in Milpitas are required to complete CEQA to address potential impacts from development and to provide mitigation where appropriate.	**Recommended.** The City of San Jose already has development policies and land use regulations in place that reduce flood risk. Given that Berryessa Creek in San Jose is already fully built out and flows through a residential area (part of which is the preserved open space of Berryessa Creek Park), the City's existing policies would appear to be sufficient for protecting the residual risk area of the project. The City could also expand guidelines and standards for land use near streams to include climate change resilience considerations (this would also align with the direction Valley Water is moving in its Climate Change Action Plan, which is currently under development).	**Recommended.** The County Land Use Plan shows the headwaters of Berryessa Creek as a mapped Resource Conservation Area (Hillsides)[19]. The County's General Plan defines Hillside areas as mountainous lands and foothills unsuitable and/or unplanned for annexation and urban development. The County could formalize this through policy and/or regulation to preclude new development in this area. The County could also expand its guidelines and standards for land use near streams to include climate change resilience considerations (this would also align with the direction Valley Water is moving in its Climate Change Action Plan, which is currently under development).

[19] See footnote 11.

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
Tool – Flood Warning System	**Effective.** Valley Water has stream and rainfall gauges to monitor storm events and provide flood warning notifications through email blasts, apps, etc. Individuals can sign up to receive alerts via AlertSCC, Ready SCC, and the American Red Cross Flood App.	**Effective**. When Valley Water forecasts flooding, the City of Milpitas Office of Emergency Management communicates with Valley Water and the National weather Service to warn those who may be affected using social media, phone, text, and email alerts, 1620AM, KMLP-15, local news media, and emergency vehicles.	**Effective.** When Valley Water forecasts flooding, the City of San Jose Emergency Operations Center communicates with Valley Water and the National Weather Service to warn those who may be affected using social media, text and email alerts, and apps.	**Effective**. Santa Clara County's ALERT system, Alert SCC, Ready SCC, and American Red Cross Flood apps all monitor flood conditions and allow for local notification.
Tool – Emergency Operations Plans	**Effective.** Valley Water already has effective emergency plans in place.	**Effective.** Milpitas has an effective EOP in place.	**Effective.** San Jose has an effective EOP in place.	**Effective.** Santa Clara County has an effective EOP in place.
Tool – Elevation of Buildings	**Further Study Needed.** Valley Water, as a special district, could provide education and outreach to local residents and business owners regarding their residual risk, and the benefits of elevating buildings. With the Project completed, benefits would only be realized for flood events greater than the 100-year level. For residential structures, this would not be cost effective. There may be some businesses where this would be viable and cost effective depending on the building type, the services provided, and contents.	**Effective.** Milpitas currently provides an annual citywide flood hazard informational document to provide education on flood risks in the City. The document mentions that property owners can seek guidance on potential flood proofing measures from City engineering staff. The City currently enforces development within the SFHA through its Floodplain Management Plan Ordinance, which requires that first floors in new residential construction and substantial improvements be raised 1-foot above the BFE.	**Not Recommended.** Not applicable, given that the residual risk area for the Project is located in Milpitas.	**Not Recommended.** Not applicable, given that the residual risk area for the Project is located in Milpitas.

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
Tool – Relocation of Buildings	**Further Study Needed**. Valley Water, as a special district, could provide education and outreach to local residents and business owners regarding their residual risk, and the benefits of building relocation. With the Project completed, benefits would only be realized for flood events greater than the 100-year level. For residential structures, this would not be cost effective. There may be some businesses and/or critical facilities where this would be viable and cost effective depending on the building type, the services provided, and contents.	**Not Recommended.** This would not be a viable option in Milpitas due to the absence of vacant property.	**Not Recommended.** Not applicable, given that the residual risk area for this Project is located in Milpitas.	**Not Recommended.** Not applicable, given that the residual risk area for this Project is located outside of the County's jurisdiction, in the incorporated City of Milpitas.

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
Tool – Flood proofing of Buildings in the Floodplain	**Further Study Needed**. Valley Water, as a special district, could provide education and outreach to local residents and business owners regarding their residual risk, and the benefits of wet and dry floodproofing. With the Project completed, benefits would only be realized for flood events greater than the 100-year level. For residential structures, this would not be cost effective. There may be some businesses and/or critical facilities where this would be viable and cost effective depending on the building type, the services provided, and contents.	**Effective.** Milpitas currently provides an annual citywide flood hazard informational document to provide education on flood risks in the City. The document mentions that property owners can seek guidance on potential flood proofing measures from City engineering staff. The City currently enforces development within the SFHA through its Floodplain Management Plan Ordinance, which requires that first floors in new residential construction and substantial improvements be raised 1-foot above the BFE. In addition, for commercial structures, floodproofing measures are required, including the elevating of mechanical and electrical equipment 1 foot above the BFE.	**Not Recommended.** Not applicable, given that the residual risk area for this Project is located in Milpitas.	**Not Recommended.** Not applicable, given that the residual risk area for this Project is located outside of the County's jurisdiction, in the incorporated City of Milpitas.

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
Tool: Berms and Floodwalls for Buildings	**Further Study Needed.** Valley Water, as a special district, could provide education and outreach to local residents and business owners regarding their residual risk, and the benefits of berms and floodwalls. With the Project completed, benefits would only be realized for flood events greater than the 100-year level. For residential structures, this would be unlikely to be cost effective. There may be some businesses and/or critical facilities where this would be viable and cost effective depending on the building type, the services provided, and contents.	**Further Study Needed**. The City of Milpitas could provide education and outreach to local residents and business owners regarding their residual risk, and the benefits of berms and floodwalls. With the Project completed, benefits would only be realized for flood events greater than the 100-year level. For residential structures this would be unlikely to be cost effective. There may be some businesses and/or critical facilities where this would be viable and cost effective depending on the building type, the services provided, and contents.	**Not Recommended.** Not applicable, given that the residual risk area for this Project is located in Milpitas.	**Not Recommended.** Not applicable, given that the residual risk area for this Project is located outside of the County's jurisdiction, in the incorporated City of Milpitas.

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
Tool: Fill or Conversion of a Basement with Main Floor Addition for Buildings	**Further Study Needed.** Valley Water, as a special district, could provide education and outreach to local residents and business owners regarding their residual risk, and the benefits of fill or conversion of a basement. With the Project in place, benefits would only be realized for flood events greater than the 100-year level. For residential structures, this would not be cost effective. There may be some businesses and/or critical facilities where this would be viable and cost effective depending on the building type, the services provided, and contents.	**Not Recommended.** Not applicable, as the City of Milpitas does not have structures with basements.	**Not Recommended.** Not applicable, given that the residual risk area for this Project is located in Milpitas.	**Not Recommended.** Not applicable, given that the residual risk area for this Project is located outside of the County's jurisdiction, in the incorporated City of Milpitas.
Tool: Acquisition of Buildings	**Not recommended.** Given that the Project already provides flood protection to a 100-year level, acquisition of structures in the residual risk area is not likely to be cost effective.	**Not recommended.** Given that the Project already provides flood protection to a 100-year level, acquisition of structures in the residual risk area is not likely to be cost effective.	**Not Recommended.** Not applicable, given that the residual risk area for this Project is located in Milpitas.	**Not Recommended.** Not applicable, given that the residual risk area for this Project is located outside of the County's jurisdiction, in the incorporated City of Milpitas.

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
Strategy 2 – Modifying the Impact of Flooding				
Tool: Information and Education	**Recommended**. While Valley Water has an active information and education program, additional regular and targeted outreach to residents and business owners in the residual risk area regarding the potential for flooding during events exceeding the 100-year level, and things that can be done to prepare for and mitigate these risks, could prove to be very beneficial in terms of protecting lives and property.	**Effective.** Milpitas currently provides an annual citywide flood hazard informational document to provide education on flood risks in the City. The document mentions that property owners can seek guidance on potential flood proofing measures from City engineering staff.	**Not Recommended.** Not applicable, given that the residual risk area for this Project is located in Milpitas.	**Not Recommended.** Not applicable, given that the residual risk area for this Project is located outside of the County's jurisdiction, in the incorporated City of Milpitas.
Tool: Flood Insurance	**Recommended.** While Valley Water itself isn't a governmental entity eligible to participate in FEMA's National Flood Insurance Program, Valley Water could conduct outreach to property owners in the project's residual risk area regarding the potential for flooding during events exceeding the 100-year level, and the benefits of maintaining a flood insurance policy.	**Effective.** The City of Milpitas continues to participate in FEMA's National Flood Insurance Program. In addition, the City conducts outreach to property owners in the Project's residual risk area regarding the potential for flooding during events exceeding the 100-year level, and the benefits of maintaining a flood insurance policy.	**Recommended.** The City of San Jose should continue its participation in FEMA's National Flood Insurance Program. In addition, the City could conduct outreach to property owners in the Project's residual risk area regarding the potential for flooding during events exceeding the 100-year level, and the benefits of maintaining a flood insurance policy.	**Recommended.** Santa Clara County should continue its participation in FEMA's National Flood Insurance Program.

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
Tool: Community Rating System	**Effective**. Valley Water is not a governmental entity eligible to participate directly in FEMA's National Flood Insurance Program, and participation in the NFIP's CRS is at the municipal level (it is not something property owners can do directly). However, in their "Fictitious Community" role, Valley Water helps the cities within its district to organize their flood mitigation work proof to obtain CRS credits. Valley Water holds regular meetings with CRS members within their district, and supports communities being audited by FEMA through providing auditors with access to their virtual file structure (maintained by Valley Water) so that auditors can easily locate supporting documentation for activities that earn points for CRS. Valley Water's efforts in this support role foster local community flood mitigation initiatives and should be continued.	**Effective.** The City of Milpitas participates in the NFIP's CRS, entering the program in October 1991. FEMA's list of participating CRS communities as of April 2021 indicates that Milpitas is a CRS Class 7 community, with policyholders in SFHAs receiving a 15% discount on their flood insurance premiums, and those outside of mapped SFHAs receiving a 5% premium discount.	**Effective**. The City of San Jose participates in the NFIP's CRS, entering the program in October 1991. FEMA's list of participating CRS communities as of April 2021 indicates that San Jose is a CRS Class 7 community, with policyholders in SFHAs receiving a 15% discount on their flood insurance premiums, and those outside of mapped SFHAs receiving a 5% premium discount.	**Recommended**. Santa Clara County was accepted into the CRS program in May 2004. FEMA's list of participating CRS communities as of April 2021 indicates that the County is a CRS Class 10 community whose status has been rescinded, with policyholders not eligible to receive discounts on their flood insurance premiums. It would be beneficial to residents in unincorporated areas under the jurisdiction of the County for the County to re-enter the CRS program.

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
Tool: Tax Adjustment Rebates	**Further Study Needed**. As the county's primary water wholesaler, Valley Water makes sure there is enough clean, safe water for homes and businesses. To finance this monumental task, Valley Water collects revenue, primarily from property taxes, well owners, agricultural water customers and water retailers, such as San Jose Water Company. Most county residents do not pay a bill directly to Valley Water; instead, they pay their local water retailers. The cost local residents pay the retailers, however, is affected by the cost to Valley Water of supplying that water. Further study would be needed to determine whether Valley Water could offer any type of rebate to property owners in the residual risk area of the Project who undertake mitigation to protect against flood events greater than the 100-year level. Further study would be needed to assess feasibility and interest.	**Further Study Needed.** Further study would be needed to determine whether the City of Milpitas could offer any type of tax rebate to property owners in the residual risk area of the Project who undertake mitigation to protect against flood events greater than the 100-year level. Particular consideration could be given to critical facilities or facilities in which hazardous materials are used/stored that still could be impacted by flooding above the 100-year level of the Project. Further study would be needed to assess feasibility and interest.	**Not Recommended.** Not applicable, given that the residual risk area for this Project is located in Milpitas.	**Not Recommended.** Not applicable, given that the residual risk area for this Project is located outside of the County's jurisdiction, in the incorporated City of Milpitas.

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
Tool: Emergency Relief	**Further Study Needed**. Federal disaster aid and emergency relief funding becomes available during a Federal disaster declaration. It is possible that an event could exceed the 100-year level but not have enough of an impact to meet the threshold for a Federal disaster declaration. In a case like this, it may be beneficial for Valley Water to consider the viability of adding a very small service charge to fund the creation of an emergency relief bank that could be put toward offsetting repair costs for property owners in the Project's residual risk area during non-declared events. Relief could be in the form of grants, low-interest loans, etc.	**Further Study Needed**. Federal disaster aid and emergency relief funding becomes available during a Federal disaster declaration. It is possible that an event could exceed the 100-year level but not have enough of an impact to meet the threshold for a Federal disaster declaration. In a case like this, it may be beneficial for the City of Milpitas to consider the viability of adding a very small tax to fund the creation of an emergency relief bank that could be put toward offsetting repair costs for property owners in the Project's residual risk area during non-declared events. Relief could be in the form of grants, low-interest loans, etc.	**Not Recommended.** Not applicable, given that the residual risk area for this Project is located in Milpitas.	**Not Recommended.** Not applicable, given that the residual risk area for this Project is located outside of the County's jurisdiction, in the incorporated City of Milpitas.

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
Tool: Post-Flood Recovery Processes	**Effective.** Valley Water has sufficient emergency plans in place and has experience in responding to flood events. It has the capabilities and resources in place for post-flood recovery. It is recommended that existing plans be kept up-to-date, and that staffing and funding resources be maintained in the future through annual budgeting processes.	**Recommended.** The City of Milpitas is in the process of developing a comprehensive Disaster Recovery Plan that identifies recovery planning roles and priorities, a structure that provides for broad stakeholder and community involvement and input and transitions from short-term recovery into intermediate and long-term recovery. It is recommended that the plan adhere to guidance provided within the National Disaster Recovery Framework (NDRF).	**Not Recommended.** Not applicable in terms of mitigating risk in the project's residual risk area, given that the residual risk area for this project is located in Milpitas.	**Not Recommended.** Not applicable in terms of mitigating risk in the project's residual risk area, given that the residual risk area for this project is located outside of the County's jurisdiction, in the incorporated City of Milpitas.

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
Strategy 3 – Preserving and Restoring the Environmental Beneficial Functions of Floodplains				
Tool: Wetlands Protection and Restoration	**Recommended.** In alignment with the Climate Change Action Plan, Valley Water should consider expanding efforts to protect, restore, enhance, and maintain riparian areas and wetlands, and transitional and upland buffers in areas upstream of the Project.	**Effective.** Wetlands protection and restoration projects have been completed, such as the Dixon Landing/880 interchange project in the early 2000's. Depending on other projects, this effort could be a reasonable mitigation measure required by the California Environmental Quality Act (CEQA). Milpitas General Plan Policy CON 3-5 provides that the City will work with Valley Water to preserve wetlands, riparian corridors, and buffer zones in Milpitas by continuing to require that new development follows the "Guidelines and Standards for Land Use Near Streams." In addition, the City will continue to encourage the use of Green Stormwater Infrastructure where such measures are likely to be effective and technically and economically feasible.	**Recommended.** The City could consider efforts to protect, restore, enhance, and maintain riparian areas and wetlands, and transitional and upland buffers in areas upstream of the Project.	**Recommended.** The County could consider efforts to protect, restore, enhance, and maintain riparian areas and wetlands, and transitional and upland buffers in areas upstream of the Project.

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
Tool: Erosion and Sediment Control	**Further Study Needed.** The USACE Geomorphic and Sediment Transport Assessment indicates that the Project area is a sediment deposition zone, and that routine sediment removal is needed to maintain design performance. Sediment management measures could be considered in the creek's upstream reaches (upstream of Old Piedmont Road), such as sediment retention/trapping in the upper reaches for coarse sediment control.	**Further Study Needed.** The USACE Geomorphic and Sediment Transport Assessment indicates that the Project area is a sediment deposition zone, and that routine sediment removal is needed to maintain design performance. Sediment management measures could be considered in the creek's upstream reaches (upstream of Old Piedmont Road). Since much of the upper watershed is grazed, the City or Santa Clara County could consider limitations on grazing activities along the channel banks for control of finer sediments.	**Further Study Needed**. The USACE Geomorphic and Sediment Transport Assessment indicates that the project area is a sediment deposition zone, and that routine sediment removal is needed to maintain design performance. Sediment management measures could be considered in the creek's upstream reaches (upstream of Old Piedmont Road). Since much of the upper watershed is grazed, the City could consider limitations on grazing activities along the channel banks for control of finer sediments.	**Further Study Needed**. The USACE Geomorphic and Sediment Transport Assessment indicates that the project area is a sediment deposition zone, and that routine sediment removal is needed to maintain design performance. Sediment management measures could be considered in the creek's upstream reaches (upstream of Old Piedmont Road). Since much of the upper watershed is grazed, the County could consider limitations on grazing activities along the channel banks for control of finer sediments.

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
Tool: Water Quality Enhancement	**Effective.** Valley Water's participation in the Santa Clara Valley Urban Runoff Pollution Prevention Program is an effective tool that is already being implemented to enhance water quality. This program is a multi-jurisdictional cooperative effort among the County, the Santa Clara Valley Water District, and thirteen north county cities, all working to improve the water quality of south San Francisco Bay and the streams of Santa Clara County, by reducing nonpoint source pollution in storm water runoff and other surface flows. The program's participating agencies undertake various activities[20] to address the requirements of their shared National Pollution Discharge Elimination System (NPDES) Permit.	**Effective.** The City's participation in the Santa Clara Valley Urban Runoff Pollution Prevention Program is an effective tool that is already being implemented to enhance water quality. This program is a multi-jurisdictional cooperative effort among the County, the Santa Clara Valley Water District, and thirteen north county cities, all working to improve the water quality of south San Francisco Bay and the streams of Santa Clara County, by reducing nonpoint source pollution in storm water runoff and other surface flows. The program's participating agencies undertake various activities[20] to address the requirements of their shared NPDES Permit. In addition, Milpitas General Plan Policy CON 3-6 provides that the City will work cooperatively with local, state, and federal agencies to implement the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCCVRPP).	**Effective.** The City's participation in the Santa Clara Valley Urban Runoff Pollution Prevention Program is an effective tool that is already being implemented to enhance water quality. This program is a multi-jurisdictional cooperative effort among the County, the Santa Clara Valley Water District, and thirteen north county cities, all working to improve the water quality of south San Francisco Bay and the streams of Santa Clara County, by reducing nonpoint source pollution in storm water runoff and other surface flows. The program's participating agencies undertake various activities[20] to address the requirements of their shared NPDES Permit.	**Effective.** The County's participation in the Santa Clara Valley Urban Runoff Pollution Prevention Program is an effective tool that is already being implemented to enhance water quality. This program is a multi-jurisdictional cooperative effort among the County, the Santa Clara Valley Water District, and thirteen north county cities, all working to improve the water quality of south San Francisco Bay and the streams of Santa Clara County, by reducing nonpoint source pollution in storm water runoff and other surface flows. The program's participating agencies undertake various activities[20] to address the requirements of their shared NPDES Permit.

[20] The goals of these activities include the following: Eliminate illicit connections and illegal discharges to the storm drain system; Promote public awareness of and participation in the Programs efforts to control nonpoint source pollution; Identify and control storm water pollution generated by industrial and commercial activities; Establish storm water management programs for public agencies to reduce the amount of pollutants that enter and accumulate in storm drains from governmental operations; Identify and establish local regulatory control measures for activities that can

contribute pollutants to the storm drain system, such as new development and construction, and residential, commercial and industrial activities; Identify specific pollutant sources, such as those from transportation activities, and identify strategies to control them; Monitor streams, storm drains, and land use sites to assess sources and effects of, as well as control and treatment options for pollutants in urban runoff; Characterize and identify the groups of chemicals in nonpoint source pollution discharges which are toxic to aquatic life in streams.

Tool: Enhancement of Recreation and Educational Opportunities	**Recommended.** Many opportunities exist for delivery of public outreach activities with a recreational benefit. For example. there is an opportunity to team with the City of San Jose and Santa Clara County Parks and Recreation Department to deliver a public educational activity at Berryessa Creek Park in which attendees learn about the creek, the Project, the effects of development in the floodplain, and stream and stormwater management. Other educational opportunities include informational walks along the creek describing the Project, its design level, and maintenance requirements, and an educational hike in partnership with the County for reaches upstream of Old Piedmont Road to teach the public about responsible land management practices. Valley Water could also develop an Upper Berryessa Creek recreation plan, in partnership with the City of San Jose and the County of Santa Clara Parks and Recreation Department.	**Not Recommended.** Berryessa Creek Park falls within the jurisdiction of the City of San Jose.	**Recommended.** Many opportunities exist for delivery of public outreach activities with a recreational benefit. For example, there is an opportunity to deliver a public educational activity at the Berryessa Creek Park in which attendees learn about the creek, the Project, the effects of development in the floodplain, and stream and stormwater management. Other educational opportunities include informational walks along the creek describing the Project, its design level, and maintenance requirements, and an educational hike in partnership with the County in for reaches upstream of Old Piedmont Road to teach the public about responsible land management practices. The City could also develop an Upper Berryessa Creek recreation plan, in partnership with Valley Water and the County of Santa Parks and Recreation Department.	**Recommended.** Many opportunities exist for delivery of public outreach activities with a recreational benefit. For example, there is an opportunity to team with the City of San Jose and County of Santa Clara Parks and Recreation Department to deliver a public educational activity at the Berryessa Creek Park in which attendees learn about the creek, the Project, the effects of development in the floodplain, and stream and stormwater management. Other educational opportunities include informational walks along the creek describing the Project, its design level, and maintenance requirements, and an educational hike in partnership with the City of San Jose and County for reaches upstream of Old Piedmont Road to teach the public about responsible land management practices. The City of San Jose could also develop an Upper Berryessa Creek recreation plan, in partnership with Valley Water and the County of Santa Clara Parks and Recreation Department.
Tool: Preservation of Cultural Resources	**Further Study Needed.** The GRR notes the presence of archaeological sites of both	**Further Study Needed.** The GRR notes the presence of archaeological sites of both	**Further Study Needed.** The GRR notes the presence of archaeological sites of both	**Further Study Needed.** The GRR notes the presence of archaeological sites of both

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
	prehistoric and Native American burial, in and/or near the creek channel. Additionally, the construction plans for the project delineated archaeological dig zones and required an archeologist and Most Likely Descendant from the Local Tribe present during any excavation in the dig zones. Further opportunities may exist for implementing actions for preservation of cultural resources. This would need to be studied further to determine an appropriate course of action.	prehistoric and Native American burial, in and/or near the creek channel. Additionally, the construction plans for the project delineated archaeological dig zones and required an archeologist and Most Likely Descendant from the Local Tribe present during any excavation in the dig zones. Further opportunities may exist for implementing actions for preservation of cultural resources. This would need to be studied further to determine an appropriate course of action.	prehistoric and Native American burial, in and/or near the creek channel. Additionally, the construction plans for the project delineated archaeological dig zones and required an archeologist and Most Likely Descendant from the Local Tribe present during any excavation in the dig zones. Further opportunities may exist for implementing actions for preservation of cultural resources. This would need to be studied further to determine an appropriate course of action.	prehistoric and Native American burial, in and/or near the creek channel. Additionally, the construction plans for the project delineated archaeological dig zones and required an archeologist and Most Likely Descendant from the Local Tribe present during any excavation in the dig zones. Further opportunities may exist for implementing actions for preservation of cultural resources. This would need to be studied further to determine an appropriate course of action.
Strategy 4 – Modifying Floodwaters				
Tool: Dam and Reservoir	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.	**Not recommended.** At this time, the project Provides protection for flood events at or below the 100-year event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.	**Not recommended.** At this time, the Project provides protection for flood events at or below the 100-year event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.	**Not recommended.** At this time, the Project provides protection for flood events at or below the 100-year event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
Tool: Stormwater Detention Basins	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.
Tool: Levees and Floodwalls	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.	**Not recommended**. At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
Tool: Landforms	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.
Tool: Channel Alterations, Diversions, and Bypasses	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
Tool: Pump Stations	**Not recommended.** At this time, the Project provides protection from Berryessa Creek flooding for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates. Note: The City of Milpitas owns and operates one storm water pump station (Hidden Lakes) that discharges into lower Berryessa Creek. While Valley Water improved the creek outfall structures as part of the project, Milpitas should evaluate the capacity, operation, and reliability of the station to ensure it continues to provide effective protection in the future.	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.	**Not recommended.** At this time, the Project provides protection for events at or below the 100-year flood event. Further floodwater modification activities could be considered in the future depending on the Project's observed operational performance, and the frequency of flooding given the impacts of climate change over time. This should be reassessed with regular plan updates.

Table 7 – Evaluation of Strategies and Tools				
Strategies and Tools Considered	**Jurisdictional Assessment**			
	Valley Water	**City of Milpitas**	**City of San Jose**	**Santa Clara County**
Tool: Stormwater Conveyance Improvements	**Further Study Needed.** Project provides protection from Berryessa Creek flooding for events at or below the 100-year flood event. However, local drainage systems are typically not sized to provide capacity for 100-year flow. Localized flooding may be addressed through improvements in pipe conveyance capacity, such as increased pipe sizes or installation of parallel drainage systems. Areas of local flooding – inspect and determine if increased conveyance capacity is needed, or whether sediment removal is necessary.	**Further Study Needed**. Project provides protection from Berryessa Creek flooding for events at or below the 100-year flood event. However, local drainage systems are typically not sized to provide capacity for 100-year flow. Localized flooding may be addressed through improvements in pipe conveyance capacity, such as increased pipe sizes or installation of parallel drainage systems. Areas of local flooding – inspect and determine if increased conveyance capacity is needed, or whether sediment removal is necessary.	**Further Study Needed.** Project provides protection from Berryessa Creek flooding for events at or below the 100-year flood event. However, local drainage systems are typically not sized to provide capacity for 100-year flow. Localized flooding may be addressed through improvements in pipe conveyance capacity, such as increased pipe sizes or installation of parallel drainage systems. Areas of local flooding – inspect and determine if increased conveyance capacity is needed, or whether sediment removal is necessary.	**Further Study Needed.** Project provides protection from Berryessa Creek flooding for events at or below the 100-year flood event. However, local drainage systems are typically not sized to provide capacity for 100-year flow. Localized flooding may be addressed through improvements in pipe conveyance capacity, such as increased pipe sizes or installation of parallel drainage systems. Areas of local flooding – inspect and determine if increased conveyance capacity is needed, or whether sediment removal is necessary.

VI. Action Plan

The Action Plan set forth in Table 9 on the following page represents a series of measures that have been identified, building upon the goals and objectives of this FPMP and an assessment and consideration of a range of potentially viable strategies and tools. A total of 28 action items have been identified for implementation. The Action Plan will be reassessed on an annual basis and updated as deemed necessary by Valley Water for the Berryessa Creek Flood Risk Reduction Project with appropriate coordination with the City of Milpitas, City of San Jose, and Santa Clara County, and appropriate outreach to the general public and other stakeholders.

Table 8 – Action Plan												
Action Item	**Goal 1 - Proactively Manage and Reduce Flood Risk to Protect Lives and Property**		**Goal 2 - Obtain a Balance Between Development Pressures and Floodplain Management**		**Goal 3 - Foster Communication and Coordination as a Path to Risk Reduction**		**Valley Water**	**City of Milpitas**	**City of San Jose**	**Santa Clara County**	**Priority**	**Timeline**
	Objective 1.a - Preserve the level of protection provided by the Upper Berryessa Creek Flood Risk Management Project.	***Objective 1.b - Address potential measures (structural & nonstructural), practices, & policies that will reduce the impacts of future flooding in the residual risk area of the Project.***	***Objective 2.a - Preserve and enhance the natural and beneficial functions of the floodplain through protection and restoration of the riparian environment.***	***Objective 2.b - Manage development in floodplain areas through enforcing building codes, development standards, land use regulations, and floodplain management ordinances.***	***Objective3.a - Improve the general public understanding of the flood risks.***	***Objective 3.b - Foster better communication and coordination with key stakeholders, including but not limited to, other agencies and surrounding communities.***						
Adopt the Upper Berryessa Creek Floodplain Management Plan.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	High	3 months
Perform operation and maintenance activities as outlined in the USACE O&M Manual for the Berryessa Creek Flood Risk Management Project, to ensure that the system will continue to function as designed; and prepare annual operating budgets in a manner that allocates sufficient resources to do so.	✓						✓				High	Ongoing
Research and adopt higher standard floodplain regulations.	✓	✓		✓			✓	✓	✓	✓	High	1 year
Expand the guidelines and standards for land use near streams to include climate change resilience considerations	✓	✓	✓	✓			✓	✓	✓	✓	High	1 year
Continue to implement existing flood monitoring and warning systems that are already in place; and expand as future needs may dictate.		✓			✓		✓	✓	✓	✓	High	Ongoing
Continue to maintain existing EOPs, with regular evaluations and updates as specified in the plan.		✓				✓	✓		✓	✓	High	Ongoing
The City of Milpitas shall update its current EOP to address recommendations set forth in its Emergency Management Program Assessment. The City will continue to maintain its EOP, with regular evaluations and updates as specified in the plan.		✓				✓		✓			High	1 year
Provide education and outreach to local residents and business owners regarding how building elevation can be used to mitigate residual risks; as well as information regarding potential FEMA grant opportunities to offset costs for projects of this nature.		✓			✓		✓	✓			Medium	1 year
Provide education and outreach to local residents and business owners regarding the residual risk, and the benefits of building relocation; as well as information regarding potential FEMA grant opportunities to offset costs for projects of this nature.		✓			✓		✓	✓			Medium	1 year
Provide education and outreach to local residents and business owners regarding the residual risk, and the benefits of wet and dry floodproofing as well as information regarding potential FEMA grant opportunities to offset costs for projects of this nature.		✓			✓		✓	✓			Medium	1 year
Provide education and outreach to local residents and business owners regarding the residual risk, and the benefits of berms and floodwalls**;** as well as information regarding potential FEMA grant opportunities to offset costs for projects of this nature.		✓			✓		✓	✓			Medium	1 year

Table 8 – Action Plan												
Action Item	**Goal 1 - Proactively Manage and Reduce Flood Risk to Protect Lives and Property**		**Goal 2 - Obtain a Balance Between Development Pressures and Floodplain Management**		**Goal 3 - Foster Communication and Coordination as a Path to Risk Reduction**		**Valley Water**	**City of Milpitas**	**City of San Jose**	**Santa Clara County**	**Priority**	**Timeline**
	Objective 1.a - Preserve the level of protection provided by the Upper Berryessa Creek Flood Risk Management Project.	***Objective 1.b - Address potential measures (structural & nonstructural), practices, & policies that will reduce the impacts of future flooding in the residual risk area of the Project.***	***Objective 2.a - Preserve and enhance the natural and beneficial functions of the floodplain through protection and restoration of the riparian environment.***	***Objective 2.b - Manage development in floodplain areas through enforcing building codes, development standards, land use regulations, and floodplain management ordinances.***	***Objective3.a - Improve the general public understanding of the flood risks.***	***Objective 3.b - Foster better communication and coordination with key stakeholders, including but not limited to, other agencies and surrounding communities.***						
Provide education and outreach to local residents and business owners regarding the residual risk, and the benefits of fill or conversion of a basement; as well as information regarding potential FEMA grant opportunities to offset costs for projects of this nature.		✓			✓		✓	✓			Medium	1 year
Additional regular and targeted outreach to residents and business owners in the residual risk area regarding the potential for flooding during events exceeding the Project's 100-year design level, and things that can be done to prepare for and mitigate these risks.		✓			✓		✓	✓			High	1 year
Continue to participate in FEMA's NFIP and diligently enforce codes and ordinances regarding new development and substantial improvements in the floodplain.	✓	✓		✓	✓	✓		✓	✓	✓	High	ongoing
Conduct outreach to property owners in the Project's residual risk area regarding the potential for flooding during events exceeding the Project's 100-year design level, and the benefits of maintaining a flood insurance policy.	✓	✓			✓	✓	✓	✓	✓	✓	High	1 year
Santa Clara County was accepted into the NFIP's CRS program in May 2004. As of April 2021, FEMA's list of eligible CRS communities indicates that the County's status has been rescinded, with policyholders not eligible to receive discounts on their flood insurance premiums. The County should consider taking steps necessary for re-entry into the CRS program.	✓	✓		✓	✓	✓				✓	High	1 year
Continue active participation in the NFIP's CRS program.	✓	✓		✓	✓	✓		✓	✓		High	ongoing
Conduct further studies to determine whether tax adjustment rebates of any kind could be offered as an incentive to encourage activities that will exceed the minimum requirements of the NFIP.	✓	✓	✓	✓	✓	✓	✓	✓			Low	5 years
Conduct further studies to determine the viability of adding a very small service charge or tax to fund the creation of an emergency relief bank of funds that could be put toward offsetting repair costs for property owners in the Project's residual risk area during non-declared events.		✓			✓	✓	✓	✓			Low	5 years
Continue to keep existing emergency plans in place and up-to-date and ensure that staffing and funding resources are maintained in the future through annual budgeting processes.		✓			✓	✓	✓		✓	✓	High	ongoing
Implement actions identified in the City of Milpitas Emergency Management Program Assessment Report.		✓			✓	✓		✓			High	1 year
Consider efforts to protect, restore, enhance, and maintain riparian areas and wetlands, and transitional and upland buffers around those features, if possible, in areas upstream of the project.	✓	✓	✓	✓			✓	✓	✓	✓	Moderate	2 years
Conduct further studies to determine the viability of sediment management measures in the upstream reaches of Berryessa Creek (upstream of Old Piedmont Road).	✓	✓					✓	✓	✓	✓	Medium	2 years

Table 8 – Action Plan												
Action Item	**Goal 1 - Proactively Manage and Reduce Flood Risk to Protect Lives and Property**		**Goal 2 - Obtain a Balance Between Development Pressures and Floodplain Management**		**Goal 3 - Foster Communication and Coordination as a Path to Risk Reduction**		**Valley Water**	**City of Milpitas**	**City of San Jose**	**Santa Clara County**	**Priority**	**Timeline**
	Objective 1.a - Preserve the level of protection provided by the Upper Berryessa Creek Flood Risk Management Project.	***Objective 1.b - Address potential measures (structural & nonstructural), practices, & policies that will reduce the impacts of future flooding in the residual risk area of the Project.***	***Objective 2.a - Preserve and enhance the natural and beneficial functions of the floodplain through protection and restoration of the riparian environment.***	***Objective 2.b - Manage development in floodplain areas through enforcing building codes, development standards, land use regulations, and floodplain management ordinances.***	***Objective3.a - Improve the general public understanding of the flood risks.***	***Objective 3.b - Foster better communication and coordination with key stakeholders, including but not limited to, other agencies and surrounding communities.***						
Enhance recreation and educational opportunities by coordinating the delivery of public outreach activities with a recreational component.					✓	✓	✓	✓	✓	✓	Medium	2 years
Develop an Upper Berryessa Creek Recreation Plan in partnership with Valley Water, Milpitas, San Jose, and Santa Clara County.					✓	✓	✓	✓	✓	✓	Low	5 years
The GRR notes the presence of archaeological sites of both prehistoric and Native American burial, in and/or near the creek channel. Opportunities may exist for implementing actions for preservation of cultural resources. This would need to be studied further to determine an appropriate course of action.		✓				✓	✓	✓	✓	✓	Medium	2 years
Valley Water will maintain and provide public access to the most current flood hazard maps and related information.							✓	✓	✓	✓	High	ongoing
On an annual basis, Valley Water will provide information to owners and residents of flood prone property within its jurisdiction concerning the residual flood risk and availability of flood insurance.							✓	✓	✓	✓	High	3 months

VII. Monitoring, Evaluation, and Changes to the Floodplain Management Plan

To ensure that this FPMP remains a current and relevant representation of local visions for floodplain management, and in accordance with USACE recommendations (and FEMA requirements for CRS participating communities), this plan should be reviewed and updated after its adoption, with particular attention being paid to the update on progress of action items.

VIII. For More Information

For more information about the Project, or this floodplain management plan, please visit Valley Water's web site at https://www.valleywater.org/project-updates/upper-berryessa-creek-flood-protection or contact:

- Karl Neuman, project manager, (408) 630-3059
- Jose Villarreal, public information, (408) 630-2879
- Sign up to receive project updates via email. Go to: https://visitor.r20.constantcontact.com/manage/optin?v=001lIzAYwypGmhUB5KdhqzzjFBzKBt9RALw9-8PYNn-1VL7iEK0mZI1uQxI5s-CLFrER2Z2zRLeY5zjsOrGRFs-G0UMANLJPCZGplWeYmbYKtU%3D
- Use "Access Valley Water" to submit questions, complaints, or compliments. Click on the "Projects planned for my neighborhood" tab and select "Berryessa Creek (upper) flood protection project - Calaveras Blvd. to Interstate 680."

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X. Appendices

Appendix A – Outreach Activities - Pending