Conceptual Mitigation Monitoring Plan for the Lower Berryessa Creek Program Elements: Lower Berryessa Creek and Lower Calera Creek

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Section 1.0 Introduction

This Mitigation and Monitoring Plan (MMP) has been prepared for the Santa Clara Valley Water District (SCVWD) to assure fulfillment of the habitat Mitigation Monitoring and Reporting Program (MMRP) adopted by the agency's Board of Directors;[1] and, to guide compensatory revegetation and habitat improvement for the Lower Berryessa Creek and Lower Calera Creek elements of the Lower Berryessa Creek Flood Protection Program. Together, the two program elements are referred to herein as the Project. The MMP proposes mitigation and monitoring actions to ameliorate project-related impacts to jurisdictional waters and biological resources. Its components will be incorporated into the plans and specifications of the Project to assure implementation.

1.1 LOCATION OF PROJECT ELEMENTS

The Lower Berryessa and Lower Calera Creek projects are located in a developed portion of eastern Santa Clara County within the City of Milpitas, (see Figure 1). Berryessa Creek is a part of the Coyote Watershed and is a major tributary of Coyote Creek. The Berryessa Creek watershed, including Lower Calera Creek, has a drainage area of approximately 22 square miles, draining a large area of the City of Milpitas and a portion of the City of San José. Berryessa Creek originates in the Los Buellis Hills of the Diablo Range, between Ed R. Levin County Park and Alum Rock Park, east of the City of San José. It flows westerly to Interstate 680 (I-680), then northward through the City of Milpitas to its confluence with Lower Penitencia Creek.

Lower Berryessa Creek

The Lower Berryessa Creek element extends upstream from the confluence of Lower Penitencia and Berryessa Creeks at the western end of Reach A, approximately 8,700 feet, to the downstream face of the bridge crossing of Calaveras Boulevard at the southeastern end of Reach G, (see Figure 2). With the exception of the Milpitas Town Center to the south, this element is surrounded by single-family homes. Within this element, six bridges cross the creek. The East Calaveras Boulevard bridge and the railroad bridges currently impede flows during periods of high-water flow.

Lower Calera Creek

Calera Creek originates northeast of the City of Milpitas, in the Diablo Range in the northern part of the Ed R. Levin County Park. It flows westward to its confluence with Berryessa Creek and drains a watershed with an area of less than three square miles. Land uses surrounding the Calera Creek elements include single-family homes, schools, open space, and commercial or office parks. Within the program area, Calera Creek is primarily a managed flood control channel, the majority of which is an earthen, trapezoidal channel. The Lower Calera Creek element begins at the confluence of Berryessa Creek and extends upstream approximately 3,000 linear feet to the drop structure behind Milpitas High School, (see Figure 3).

[1] SCVWD Board Action Certifying the Final Program Environmental Impact Report, Adopting the Mitigation Monitoring and Reporting Program, and Findings of Fact and Statement of Overriding Conditions for the Lower Berryessa Creek Program. Resolution No. 11-78. December 13, 2011.

1.2 DESCRIPTION OF PROJECT ELEMENTS

Lower Berryessa Creek

The improvements along Lower Berryessa Creek will include reconstructing levees and replacing existing levees with floodwalls. Levees along the northeast side of the channel will be raised for the entire length of this element, with the exception of a small segment where levees on both sides would be replaced with floodwalls. Floodwalls will be constructed along the southwest side of the channel along the entire length of this Project element; and, will include construction of low benches within the channel and adjacent to the levee that will help create and maintain the low flow channel within the creek.

To improve access for ongoing maintenance measures, maintenance roads will be improved to accommodate an 18-foot-wide access road along the inside of the floodwall and on top of the reconstructed levee, with turnouts included along the lower maintenance road.

Lower Calera Creek

Proposed improvements for the Lower Calera Creek element will include widening and reconfiguring the channel and constructing concrete floodwalls along each side of the existing channel. From the confluence with Lower Berryessa Creek to North Milpitas Boulevard, improvements will include extending the existing channel walls by up to 4 feet and constructing new headwalls at the culverts under the railroad crossing and under North Milpitas Boulevard.

Downstream of Arizona Avenue, new floodwalls will be constructed on both sides of the channel and will vary in height from approximately 3 feet to 6.5 feet. Upstream of Arizona Avenue, floodwalls will range from 3.5 feet to almost 6 feet on the south side of the channel, and from 2 feet to 5 feet on the north side of the channel. The levee on the south bank will be slightly raised and the levee on the north bank will be removed to accommodate a wider channel. New headwalls will be constructed at the upstream face of the culvert under North Milpitas Boulevard and at the upstream and downstream faces of the culvert under Arizona Avenue.

This element will include construction of a low bench on the north side of the channel near the existing low-flow channel that will help maintain the low-flow within the creek. To improve access for ongoing maintenance measures, a permanent 18-foot-wide access road will be constructed on the top of the levee on the south side of the channel upstream of North Milpitas Boulevard.

Section 2.0 Existing Conditions

The two creeks in the project area are managed flood control channels. The vegetation / habitat classifications presented herein are based on field observations and on the California Department of Fish and Game (CDFG) List of California Terrestrial Natural Communities recognized by the California Natural Diversity Database (CNDDB).[2] This MMP relies on A Manual of California Vegetation,[3] which maintains a detailed inventory of terrestrial natural communities based on the dominant plant species present. Wildlife habitats typically were classified and evaluated using the CDFG's A Guide to Wildlife Habitats of California.[4]

There are four main vegetation communities found within the Project area: brackish marsh; freshwater marsh; upland woody vegetation, including developed/ landscaped; and, ruderal/non-native annual grassland (see representative photos in Figures 4 through 9). Details on each community and its location within the project area are discussed below.

2.1 JURISDICTIONAL WATERS

Wetland delineations of federal waters and wetlands have been conducted for Lower Berryessa,[5] and Calera creeks; and, the extent of jurisdictional waters of the U.S. has been verified by the U.S. Army Corps of Engineers (Corps). For the Lower Berryessa Creek project element, the wetland federal jurisdictional delineation was conducted and verified in 2004.[6] However, verifications are valid for only five years. Therefore, the extent of jurisdictional waters of the U.S. for Lower Berryessa Creek was re-assessed and re-verified by the Corps in 2010.[7] Wetland delineations of federal waters and wetlands for Lower Calera Creek were conducted and verified in 2005 and an extension of the verification recently was granted by the Corps. Therefore, the delineation remains valid until 2016.

The majority of the jurisdictional waters of the U.S. located within the Project area are considered to be: freshwater marsh; brackish marsh; or, "other waters" that are located within the ordinary high water mark (OHWM). One exception to the dominant freshwater and brackish marsh wetland types observed is a seasonal wetland that is connected hydrologically to Lower Berryessa Creek, located on the east bank just upstream of the Abel Street bridge.

State-regulated, aquatic habitats may extend beyond those areas identified as federally jurisdictional. Under the Porter-Cologne Water Quality Control Act, all surface waters, including ground waters, are subject to state regulation, regardless of their connection to navigable waterways. Furthermore, areas adjacent to waters, where activities or the placement of pollutants could impair water quality or other beneficial uses, may also be subject to state regulation by the SFRWQCB. Under Sections 1600-1616 of the California Fish and Game Code, creeks, lakes and waterbodies are protected as wildlife habitat. Jurisdictional waters are quantified and listed, by type, in Table 1, below.

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[2] CDFG, 2010.
[3] Sawyer and Keeler-Wolf, 1995.
[4] Mayer and Laudenslayer, 1988.
[5] The extent of federally jurisdictional waters and wetlands for the Lower Berryessa Creek element, at its confluence with Lower Penitencia Creek, was estimated for approximately 30 linear feet of Lower Penitencia Creek.
[6] ESA, 2004.
[7] ESA, 2010.

Brackish Marsh

Brackish marsh wetlands are located in Lower Berryessa Creek, downstream from the railroad crossing at Abel Street. The brackish marsh wetlands in the Project area are a result of tidal influx, and are distinct from the wetlands upstream of Abel Street in that they support both a greater percentage of (and greater cover by) perennial species. Brackish marsh vegetation occupies the shallow margins of the channel and, in some locations, narrow bars in the middle of the channel.

Vegetation is dominated by bulrush (*Scirpus californicus*) and water smartweed (*Polygonum* sp); both of which are obligate wetland species. Willow-leaf dock (*Rumex salicifolius*), common water plantain (*Alsima plantago-aquatica*), and floating water primrose (*Ludwigia peploides*) occur as associates.

Table 1
State and Federal Jurisdictional Waters in the Area of the Projects

	Square Feet[a]	Acres[b]
Berryessa Creek		
Brackish/Freshwater Marsh	201,377	4.62
Other Waters of the U.S. (Berryessa Creek)	158,341	3.64
Berryessa Creek Jurisdictional Waters Total	*359,718*	*8.26*
Calera Creek		
Freshwater Marsh	24,655	0.57
Other Waters of the U.S. (Calera Creek)	21,070	0.48
Calera Creek Jurisdictional Waters Total	*45,725*	*1.05*
Total Jurisdictional Waters	**554,901**	**12.74**

a Square feet were calculated using GIS (ArcMap 9).
b Acreages were calculated using GIS (ArcMap 9) and were rounded to the nearest one-hundredth acre.

SOURCES: ESA, 2005b, 2008, 2010

Freshwater Marsh

Within the project area, freshwater marsh is the dominant form of wetland and includes both vegetated areas and pockets of open water within the channels. Freshwater marsh occurs along the edges of the creek channels and occupies most of the channel in reaches with sediment build-up, resulting in reduced water flows and the establishment of more freshwater marsh vegetation. Open water areas tend to occur in deeper waters within the low-flow areas of the channel. Since the creeks are managed flood control channels, the location of freshwater marsh and open water habitats are dynamic and shift from year to year depending on annual rainfall.

Dominant freshwater marsh species, including floating water-primrose (*Ludwigia peploides*) and watercress (*Rorippa nasturtium-aquaticum*), are found throughout the Lower Berryessa Creek corridor. Barnyardgrass (*Echinochloa crus-galli*), a non-native annual grass, is also an occasional dominant species. Stands of cattail (*Typha latifolia* and/or *T. angustifolia*) and California bulrush (*Scirpus californicus*) are associated species and are found in limited areas within the program area.

INSERT FIGURE 1
FOR
PROGRAM AREA AND PROJECT-SPECIFIC LOCATIONS
HERE

INSERT FIGURE 2
FOR
PROJECT LIMITS OF THE LOWER BERRYESSA CREEK ELEMENT
HERE

INSERT FIGURE 3
FOR
PROJECT LIMITS OF THE LOWER CALERA CREEK ELEMENT
HERE

2.2 UPLAND VEGETATION

No riparian habitat exists in the Lower Berryessa Creek project area; this type of habitat only occurs outside of the current Project area, along a portion of Upper Calera Creek (the Upper Calera Creek program elements 1 and 2) adjacent to Thomas Russell Middle School and adjacent to Higuera Adobe Park. Refer to Figures 4-9 for representative images of the vegetation in along Lower Berryessa and Lower Calera creeks.

Upland habitat types are predominantly characteristic of developed and landscaped areas, as well as sparsely vegetated, ruderal, non-native grasslands. A summary of the habitat is provided below; and, a more comprehensive floristic description is provided, by reach, in **Exhibit A** Existing Species Composition and Cover: Survey Notes, attached.

Developed / Landscaped

Developed or landscaped areas in the Project area typically contain non-native or ornamental species. Generally these areas support no native vegetation, although there are several city parks adjacent to sections of Lower Berryessa Creek where native species, including ceanothus (*Ceanothus* ssp.), have been included in the landscaping palette.

Ruderal / Non-Native Grassland

Ruderal communities consist of weedy vegetation that typically occurs in areas where soils and native vegetation have been significantly disturbed, resulting in a predominance of non-native species. This community, which also could be classified as non-native annual grassland, occurs above the ordinary high water mark along the levee banks (inboard levee slopes) and along the outside of the levee maintenance roads (outboard levee slopes).

This habitat type is represented in the Project area by non-native annual grasses and an assortment of non-native forbs. These species include wild oats (*Avena barbata*), annual ryegrass (*Lolium multiflorum*), bristly oxtongue (*Picris echioides*), poison hemlock (*Conium maculatum*), yellow star-thistle (*Centaurea solstitialis*), and wild radish (*Raphanus raphanistrum* L.).

Figure 4. West view of Lower Berryessa Creek (Reach A), looking downstream toward the Lower Penitencia Creek confluence.

Figure 5. Northwest view of Lower Berryessa Creek (Reach D) with the Abel Street Bridge in the background.

Figure 6. East-southeast view of Lower Berryessa Creek (Reach E), looking upstream, with N. Milpitas Drive in the background.

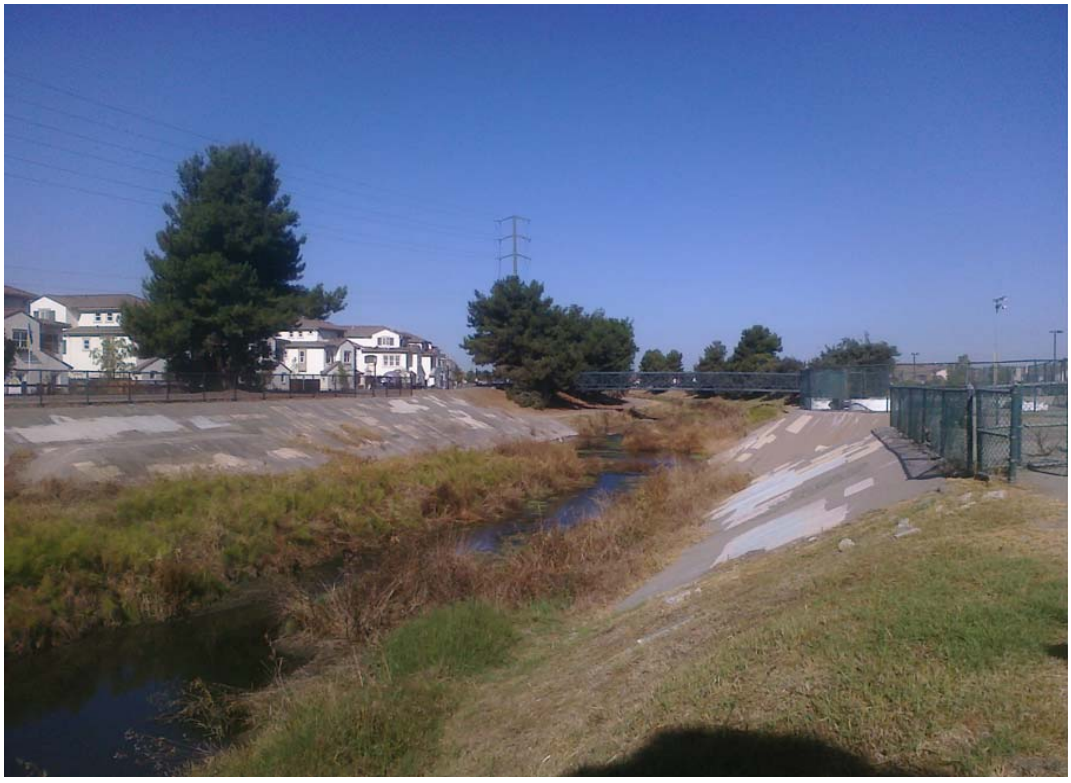

Figure 7. Northwest view of Lower Berryessa Creek (Reach F), looking downstream near Paseo Refugio.

Figure 8. East view of Lower Calera Creek (Reach A), looking upstream from sidewalk on N. Milpitas Blvd.

Figure 9. East view of Lower Calera Creek (Reach B), looking upstream from Arizona Ave.

Section 3.0 Impacts and Mitigation Measures

All anticipated impacts to fish, wildlife, and plant resources in the Project area will be temporary only. At the conclusion of project construction, natural streambed contours will become established, and open water habitat will return; and, as water returns to the channel and brings sediment with it, subsequent wetland re-vegetation by natural recruitment is anticipated.

The District considers the proposed mitigation as sufficient to address the anticipated temporary impacts, when viewed in light of: 1) avoidance of all permanent impacts; 2) the expectation of successful habitat recovery following project completion (as documented in the District's Instream Wetland Vegetation Regrowth Study[8]); and, 3) the proposed compensatory mitigation through the establishment of riparian vegetation where none now exists.

3.1 PROJECT IMPACTS

The Project will result in unavoidable temporary impacts to approximately 5.20 acres of jurisdictional brackish and seasonal wetlands; 4.17 acres of unvegetated, open water habitat, including tidal waters; 1.14 acres of upland woody vegetation comprised primarily of nearby tree and shrub plantings and exotic invasive species, all from the Lower Berryessa Creek project-level element (see **EXHIBIT B**); and 21.92 acres of adjacent ruderal, annual grassland habitat, for a total of 33.19 acres of regulated habitat. All impacts are considered temporary, as there will be no net loss of riparian or in-stream habitat resulting from project implementation.

3.2 MITIGATION MEASURES

Jurisdictional Waters

Mitigation Measure 3.D-4b: *Compensate for Loss[9] [of Jurisdictional Waters]*

"Prior to construction of the Program, the District shall obtain permits and authorizations from the Corps, SFBRWQCB, and CDFG. Consistent with the terms and conditions of these permits and authorizations, the District shall compensate for the unavoidable loss of jurisdictional waters at a minimum of a 1:1 ratio. Compensation may be provided by one or more of the following methods: 1) on-site creation or restoration; 2) off-site creation, or restoration; or, 3) payment to an approved wetland mitigation bank. A mitigation and monitoring plan (MMP) shall be developed that describes how temporary and permanent impacts shall be compensated for, including active seeding or planting in the event that natural recruitment does not occur as anticipated within the first two years following construction, and shall present a feasible revegetation plan with monitoring protocols to ensure the Program does not result in a net loss of jurisdictional waters."

Upland Vegetation

Mitigation Measure 3.D-6a: *Tree and Shrub Replacement[10]*

"Prior to the start of construction, the District shall have a qualified biologist conduct a survey to identify the trees and shrubs that would be removed during construction. Trees shall be identified by species and a determination shall be made of areal coverage of the tree canopy. The District shall prepare a tree replacement plan that requires planting of: 1) trees of species

[8] Instream Wetland Vegetation Regrowth Study, Fourth Annual Report: Results for 2001. July 2002.
[9] Lower Berryessa Creek Program, Final Environmental Impact Report (SCH#2007092084). December 2011.
[10] Ibid.

similar to those removed, or of a native species; and, 2) complimentary shrubs. Replacement shall be at a minimum, anticipated 1:1 areal coverage ratio at maturity. Following initial excavation and earthwork, tree and shrub replacement shall include tree, shrub, and other plantings in suitable areas located off of levee slopes. The plantings shall reflect the structure and density of trees and shrubs as identified in the preconstruction survey, such that the overall character, and quality, of views from the creek roads/trails are restored on-site, to the extent feasible. Where planting trees and shrubs within the same site, or within the District's ROW, is not feasible (e.g. on the levee slope within the District ROW that could reduce channel capacity, as described in Section 2.E, Program Description [of the EIR] where soils within the ROW would not support plantings; or where plantings would compromise the objectives of the Program), the District shall coordinate with the City of Milpitas to find suitable, alternative location(s) for the replacement plantings. The District shall monitor tree replacement plantings annually for a minimum of three years after completion of construction to ensure establishment of the plantings and, if necessary, shall replant to ensure the success of the replacement plantings."

Section 4.0 Revegetation Plan

4.1 REVEGETATION DESIGN

Mitigation for the temporary impacts to 5.20-acres of fresh and tidal wetlands will be satisfied through post-construction natural recruitment within the widened channels of the Project area (for a total of 5.28 *additional* instream acres).

Mitigation for the removal of mostly exotic landscape trees and shrubs in upland habitat will be accomplished through the value-added installation of riparian vegetation on low, earthen benches (see EXHIBIT C).

The proposed locations of the benches are shown on Figure 11 (Sheets C-1 through C- 7), and in the following table.

Table 2

Total Low Bench Area Calculation [Should Lower Calera bench be added to this table?]

Area	Plan Sheet #	Approx. Station	Approx. Station	Length (ft)	Bench Width (ft)	Side Slope Width (ft)	LOW BENCH FOOTPRINT AREA	
							Ft^2	Acre (AC)
1	C-1	3+92	9+15	523	12 – 18	6	7,845	0.1801
2	C-2	11+62	21+00	938	10 – 18	6	13,132	0.3015
3	C-3 thru C-5	30+29	53+90	2,361	6 – 18	6	40,095	0.9205
4	C-6 and C-7	59+12	70+82	1,170	6 – 18	6	20,748	0.4763
Total low bench length				4,992				
Total low bench area							81,820	1.8783

4.2 Plant Selection and Installation

Woody Plant Installation

Table 3
Conceptual Woody Plant Palette

Species Name	Common Name	Rate (lbs./acre)	Plant Spacing (Feet on Center)	Propagule Type
Low Bench Riparian Plantings				
Salix lasiolepis	Arroyo Willow	-	12-15	Cutting or Container
Salix laevigata	Red Willow	-	12-15	Cutting or Container
Salix hindsiana	Sandbar Willow	-	12-15	Cutting or Container
Baccharis salicifolia	Mulefat	-	12-15	Cutting or Container
Sambucus mexicana	Blue Elderberry	-	15	tree-pot or 1 gal.

Trees and Shrubs in Containers

The trees and shrubs will be grown in and planted from container-grown plant stock. The following recommendations are provided to ensure successful planting and establishment within the mitigation areas.

- All planting shall occur between October 1st (or the onset of the rainy season, if later) and March 30th to take advantage of winter rains and moist soil conditions;
- Planting layouts will be finalized in the field by the Revegetation Monitor (see 4.5.1, below). Plant locations and species will be indicated with colored pin flags;
- Planting shall adhere to the minimum spacing requirements as recommended in Table 3, below;

While adjustments in planting layout are possible under direction of the Revegetation Monitor, minimum spacing requirements must be adhered to. At the time of planting, the Revegetation Monitor will coordinate the placement of flags to denote planting sites for individual plants. Additional planting recommendations include the following.

- Planting hole depth for planting trees and shrubs shall be 1½ times deeper than the depth of the root ball, but may be adjusted depending on soil type and location; planting hole width shall be twice as wide as the width of the root ball (Figure XX [ASSIGN FIGURE NUMBER HERE]).
- The planting holes will be backfilled with suitable soil from the site, maintaining the crown of the plant slightly above the grade of the soil. The top of the rootball and crown of the plant will not be covered with backfill soil, as the plant will settle after watering to meet the surrounding soil grade;
- The plants will be lightly firmed in place by hand, and watering basin will be formed around the plant. Each plant will be thoroughly watered-in, filling the basin with clean potable water. The orientation of each plant will be adjusted if necessary.

Willow Stakes or Pole Cuttings

Willow and mulefat stakes will be installed on the low benches, described above. Willow and mulefat stakes will not be installed on the constructed embankments. Cuttings will be taken from a variety of large, healthy shrubs and trees in the Coyote Creek watershed in proximity to the Project area, to the extent practicable. The pole cuttings will be soaked for 10-14 days after collection.

Live willow and mulefat pole cuttings will be used in the riparian planting zone, using methods described and illustrated in Figure YY [ASSIGN FIGURE NUMBER HERE].;

- Pole cuttings must have side branches removed and bark intact;
- Pole cuttings should be approximately three feet in length (a minimum of two feet for mulefat), and should be ½ inch to 1½ inches in diameter;

Pole cuttings should be inserted into the ground so that a minimum of 80 percent of the entire length is below ground.

Herbaceous Plant Installation

Table 4
Conceptual Hydroseed Plant Palette

Species Name	Common Name	Rate (lbs/acre)	Plant Spacing (Feet on Center)	Propagule Type
Levee Slope and Upland Hydroseed				
Bromus carinatus	California brome	10	-	Pure Live Seed (PLS)
Elymus glaucus	Blue wild-rye	10	-	PLS
Hordeum brachyantherum	Meadow barley	10	-	PLS

A plant palette for native grass hydroseed mix is provided in Table 4, above, and is consistent with the recommendations of the District's *Water Resources Protection Manual, Design Guide*.[11] Application will occur between the end of August and the end of October, conducting the application as close as possible to the beginning of the rainy season. The hydraulic mixture will not be applied when rainfall is anticipated within 24 hours.

The mulch will be produced from natural or recycled fiber (e.g., newsprint or wood fiber); and, free of synthetic materials (e.g., plastic). It will be free of factors that inhibit germination or growth and contain no more than 7 percent ash or 250 parts per million of Boron. The mulch slurry will be colored with a nontoxic water-soluble dye to aid in uniform application, and a soil stabilizer (tackifier) will be used (e.g., M-Binder, Ecotac-Sat and J-Tac).

Hydraulic equipment will be used to provide a uniform application of the seed and mulch in separate applications using water as a carrying agent. The seed and mulch will NOT be mixed and applied simultaneously. Seed should not rest in the water for more than 30 minutes prior to application. The mixture will be applied so that no gaps exist between the hydromulch matrix and the soil, and there are no holes greater than one millimeter in the matrix.

To protect the hydroseed and ensure the greatest germination, planting of any container stock should result in minimum damage to hydroseeded areas. Additionally, hydroseeding will be applied to the areas that require erosion control methods or for slope stability before other vegetation is installed.

4.3 AS-BUILT DRAWINGS

As-built drawings of the installed mitigation will be provided with the finalized Mitigation Monitoring Plan, subsequent to MMP approval by resource agencies, and prior to any installation activities begin.

4.4 RESPONSIBLE PARTIES

Prior to implementation of this MMP, a Revegetation Monitor shall be designated by the SCVWD. This person shall be a qualified biologist, revegetation ecologist, or revegetation consultant who will supervise the implementation of mitigation installation and long-term monitoring. The Revegetation Monitor shall be responsible for:

- Interpreting plans in the interest of a successful revegetation effort;
- Supervising site preparation;

[11] Available at http://www.valleywater.org/Programs/WaterResourcesProtectionManual.aspx

- Approving all plant materials prior to installation;
- Overseeing field placement of plants, including placement of flags (color-coded by species) denoting locations for individual plants;
- Overseeing installation, including training and directing planting crews if necessary;
- Monitoring revegetation progress and reporting to SCVWD and/or regulatory agencies, as necessary;
- Providing guidance and instruction to SCVWD for ongoing maintenance to ensure the long-term, successful establishment of the plantings. If necessary, the Revegetation Monitor will train crews in the methods represented in this plan;
- Guiding remedial actions as needed to replace plants, so that success criteria and permit conditions are met; and
- Ensuring that non-native species removal complies with all state and federal requirements and training maintenance crews in proper techniques and best management practice for weed control, if necessary.

4.5 IRRIGATION

If necessary, temporary supplemental irrigation shall be provided, e.g., main line with quick couplers for hand held hose irrigation.

4.6 RANGE OF CONTINGENCY MEASURES

In the event that revegetated areas do not meet success criteria as outlined in this document, contingency measures would be implemented to maintain regulatory compliance. Contingency measures may include on-site remediation of revegetated areas and additional revegetation. On-site remediation would occur if anticipated plant survival and/or other success criteria were not met during any point in the monitoring period.

Remedial actions could also include reseeding or replanting if it is determined that the vegetation component has not, and is unlikely to, meet the success criteria described in this MMP and in the regulatory permits prepared for the project. Erosion control measures would be carried out as necessary to address slope instability and sediment transport within the creek corridor and planting areas.

The removal and/or eradication of non-native vegetation from the revegetation site may be considered as an on-site remediation measure. The control of undesirable species would serve to improve plant establishment and habitat quality.

The success criteria would provide a basis for determining the need for possible corrective actions. However, given the potential vagaries of weather patterns and other environmental conditions beyond the control of the Project, failure to attain one or more of the success criteria will not necessarily imply that the mitigation has failed. Rather, the entire set of monitoring results will provide a basis for discussion with regulatory agencies as to whether remedial actions are warranted. Despite failure to attain one or more specific performance criteria, monitoring results may suggest that the mitigated areas are developing properly, overall performance goals are being met, and that no corrective intervention would be warranted. Most importantly the success criteria are intended to be used and interpreted based on professional judgment of the Revegetation Monitor and assisting District biologists as well as regulatory agency staff.

4.7 PLANT ESTABLISHMENT PERIOD AND MAINTENANCE

In order to determine whether mitigation goals are being achieved, it is necessary to set success criteria. The monitoring of revegetation activities and the success of the revegetation activities will be evaluated against baseline conditions identified in the FEIR, wetland delineation and other environmental documentation prepared in coordination with the project. Success criteria include:

- At least 50 percent survival of installed plants for the first three years following planting;
- At least 50 percent native plant cover at the end of the five-year monitoring period;
- Excessive rills, gullies or other erosion features will not be allowed to persist within revegetation areas for each monitoring year;
- Irrigation must be removed or turned off for a minimum of two consecutive years, and the mitigation areas must meet all other criteria during this period; and,
- Plants replacing individuals from the original installation that have died over the course of the monitoring period shall be monitored subject to the same criteria as the original installation for a period of five years from their date of planting, but may be curtailed as soon as project cover success criteria are met.

Section 5.0 Monitoring and Adaptive Management

5.1 MONITORING PROTOCOL

A monitoring approach will be developed during baseline monitoring and will reflect the individual site conditions, the success criteria in this MMP, and the methods presented below. A protocol describing this approach will be written by the Revegetation Monitor and referenced each year to ensure repeatable and accurate implementation of data collection methods. This monitoring protocol document provides a step by step approach for collecting monitoring data, location of all monitoring points (transects, photo-points, etc), and a list of materials needed.

5.2 METHODS

A monitoring approach will be developed during baseline monitoring and will reflect the individual site conditions, the success criteria in this MMP, and the methods presented below. A protocol describing this approach will be written by the Revegetation Monitor and referenced each year to ensure repeatable and accurate implementation of data collection methods. This monitoring protocol document will provide a step by step approach for collecting monitoring data, location of all monitoring points (transects, photo-points, etc), and a list of materials needed / used.

Percent Cover

One of the simplest methods for monitoring small scale vegetation change is through the use of line transects. This method is widely applicable to vegetation enhancement, habitat improvement, and weed removal projects, and measures percent cover of vegetation. Transects will be established at the time of planting or weed removal or shortly thereafter. A sufficient number of transects to adequately assess performance of vegetation will be established within revegetation or weed removal areas, with a minimum of one transect per 2,500 square feet of area. The same transects will be used throughout the monitoring period.

There are two types of commonly-used line transects: the line-intercept and the point-intercept. The line-intercept is the typical method used for woody perennial vegetation that has a large canopy at maturity and measures the distance that the crown of each plant, projected downwards vertically, intercepts the measuring tape. All distances for each individual species should then be added together. The percent cover for a species is the cumulative length of intercepts for each species divided by the length of the transect, or tape measure, multiplied by 100.

The point-intercept method simply utilizes the same measuring tape laid on the ground and the monitor uses a pin flag to make observations at prescribed intervals by “dropping” the pin flag. Species names of all plants touching the pin are recorded at each point. If there is no vegetation touching the pin after it is dropped; “bare” is recorded. This method is useful in grassland communities where it is not practical to use the line-intercept method. The total percent cover for a species or functional group (such as native or exotic) is calculated by dividing the number of times the pin encounters that species by the total number of times the pin is dropped.

5.3 SURVIVORSHIP

Counting the number of installed woody plants within the planting area provides a simple method for measuring survivorship. The count can be repeated during each monitoring event to determine how many of the initially planted species have survived. Depending on the

characteristics of the project it may be useful to tag each plant (labeling each tag with a unique identifier) in order to make sure that the same plants are assessed in exactly the same manner each year.

5.4 HEALTH AND VIGOR

General health and vigor of all plantings will be recorded during monitoring to determine if the plants appear to be establishing and thriving. Documenting the health and vigor of each individual, or stand, will help, including:

- Evidence of stress from excessive or inadequate water;
- Evidence of disease;
- Evidence of browsing, burrowing, or vandalism that is causing plants damage or loss ;
- Evidence of topsoil erosion or roots exposure.

5.5 OVERALL SITE ASSESSMENT

Conditions will be assessed including: habitat characteristics (e.g. increase/decrease/new occurrence of invasive species infestations, general health and productivity of vegetation communities), observation of wildlife species, human disturbances, trash, and natural disturbances (tree fall, wind damage, drought), all of which may have an impact on the success of management actions. Observations will be recorded in a field notebook or standardized data form in the same manner during each site visit.

Site observations, in addition to photo-documentation will be used to assess any erosion or bank instability during the monitoring period. The Revegetation Monitor will record observations of bank failure, irregular sediment transport or deposition, and any changes within the channel.

5.6 PHOTO-DOCUMENTATION

Photo-documentation will be used to provide a qualitative assessment of overall site conditions, including vegetative dominance and structure, as well as changes in vegetative composition and cover over time. Photo-documentation is useful in documenting management projects of all sizes. Permanent photo-points will be established at project completion and identical color photographic scenes will be taken as a part of regular monitoring.

5.7 ANALYSIS OF RESULTS

Data will be collected in the field according to the methods described above. This includes both quantitative and qualitative data that will be entered into a database, written up, or otherwise saved in a place that can be easily retrieved for summarizing results and for comparison during the next monitoring event. To evaluate whether project goals and objectives are being met, it is necessary to compare the monitoring data and results to the success criteria and make conclusions about how the goals are, or are not, being achieved.

5.8 MONITORING AND REPORTING SCHEDULE

Annual monitoring reports will be submitted each year to the permitting agencies on December 31st or as specified in project permits. The first year report will summarize the baseline information as well as the first year monitoring results. Baseline information must include 'as-built' plans, drawings, or maps, that accurately depict what was planted and where. Thereafter,

annual reports will consist of a summary of information contained in previous reports, as well as a presentation of the current year's results and discussion of any comparisons between years or trends noted.

Annual reports will include, at the minimum, the following information:

- Summary description of the monitoring methods, including data collection and analysis;
- An overview of the revegetation effort, including a general discussion of site conditions, changes since previous report, and either qualitative (or quantitative, where quantification would be informative in making needed distinctions) comparisons;
- Analysis of success in relation to performance standards;
- Color photographs of the revegetation areas taken from the same reference points on the ground and standardized with respect to direction, lens type, etc.;
- A map of the area with relevant features, and;
- A discussion of any corrective actions needed or undertaken (including exotic plant control efforts or replanting).

During the first and second year after implementation of revegetation actions, all areas will be inspected for significant erosion or instability prior to the storm season and then during annual monitoring in the spring. Any identified unstable areas will require appropriate erosion control measures (e.g., netting, vegetation, silt fencing, straw, etc.). Appropriate erosion control measures will be applied to any identified unstable areas. During the third year, an erosion inspection will be carried out prior to the start of the storm season with erosion control measures applied to unstable areas.

Section 6.0 Plan Preparation Team

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Section 7.0 References

California Department of Fish and Game (CDFG). 2010. *List of California Terrestrial Natural Communities recognized by the California Natural Diversity Database (*CNDDB).

ESA. 2004. [ESA: NEED TO COMPLETE THE CITATION HERE.]

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ESA, 2010. [ESA: NEED TO COMPLETE THE CITATION HERE.]

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Mayer and Laudenslayer. 1988. *A Guide to Wildlife Habitats of California.*

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EXHIBIT A

Existing Species Composition and Cover: Survey Notes

California Circle to N. Abel St., Station 0+00 to 24+00

West Side Structural/Species Composition and Cover Estimates:

- Riparian/inboard levee predominantly non-native, herbaceous with very few trees.
  - Composite [tree + shrub] aerial cover visually estimated at 5%. DBH range = 5-18 inches.
  - No shrubs present.
- Outboard levee is predominantly non-native, herbaceous with very few landscape trees/shrubs on fence line escaping from backyard landscaping.
  - Composite [tree + shrub] aerial cover visual estimate = 5%. DBH range 2-15".

East Side Structural/Species Composition and Cover Estimates:

- Riparian/inboard levee is all non-native, herbaceous.
- Outboard levee [mostly at grade with levee road] predominantly non-native, herbaceous.
  - One exception found only around PG&E tower along last d/s two hundred feet of this reach. Old mixed landscape [planted natives + exotics].
  - Composite [tree + shrub] Aerial Cover = 75%, primarily exotic tree species, 15-25 ft tall, 3-6 inch DBH.
  - tree dominants = non-native lollypop tree with leaf deforming pysllid insect infestation, native red willow (multi-trunk)
  - exotic tree sub-dominants = invasive Mexican fan palm, ornamental pear, invasive olive, pistache, invasive black acacia, 1 cypress
  - exotic shrubs/vine = firethorn, hopseed, red trumpet vine
  - native shrub = coyote brush

N. Abel Street to N. Milpitas Blvd., Station 24+00 to 55+50

West Side Structural/Species Composition and Cover Estimates:

- Riparian/inboard levee predominantly non-native, herbaceous with 22 infrequent landscape trees.
  - Tree aerial cover estimate = 20%.
  - Tree dominants = 30 ft tall pines with 12-14" dbh & invasive holly oak with 4-6" dbh & 12-15 ft height.
  - No shrubs present.
- Outboard levee from N. Able Street to upstream end of triangle park.
  - Composite [tree + shrub] aerial cover = 30-40% [20% trees + 20% shrubs]. Tree DBH range 2-12". Tree height range = 6-12 ft. Shrub height = 6 ft.
  - Tree dominants = non-native ash possibly naturalized from park planting.
  - Other trees present = 2 Mexican fan palms, 1 black acacia, 1 Eucalyptus @ 10" DBH, purple leaf plums, Pyracantha
  - Shrub dominant = Hakea
  - Other shrubs present = oleander

- Outboard levee from upstream end of triangle park to North Milpitas Blvd.
  - Composite [tree + shrub] aerial cover visual estimate = 100% [80% shrubs + 20% trees]. Shrubs 6-12 ft tall. Occasional trees 10-30 ft tall with DBH range 4-18 inches.
  - Tree dominant = African sumac
  - Other trees present = pines, 1 London plane, invasive holly oak, purple leaf plums, Eucalpytus
  - Shrub dominant = Acacia redolens
  - Shrub sub- dominants = Hakea [50% live, 50% dead], lemonade berry
  - Other shrubs/vines present = Jasminum polyanthemum, oleander, firethorn

East Side Structural/Species Composition and Cover Estimates:

- Riparian/ inboard levee from N. Abel Street to N. Milpitas Blvd. predominantly non-native herbaceous with scattered trees.
  - Dominant trees = planted pines 8-10" DBH [live and dead] & 15-20 ft tall and invasive holly oak @ 3-6 inch DBH & 8-12 ft tall.
  - No shrubs present
- Outboard levee from north Abel Street to downstream end of lake (station 34+00) Mix of non-native landscape trees and shrubs.
  - Composite [Tree + Shrub] Aerial Cover visual estimate = 100% [40% trees + 60% shrubs].
  - Dominant trees = exotic Peruvian pepper, exotic pines; 30 ft tall; DBH range 6-14 inches
  - Dominant shrub = exotic Acacia longifolia 10-15 ft tall
  - Shrub sub-dominants = southern California native lemonade berry, invasive Italian buckthorn
- Outboard Levee along lake. Predominantly non-native herbaceous with 3 dead Mexican fan palms @ 14" dbh under power lines.
  - 1 holly oak, shrub form
- Outboard Levee u/s end of lake to N. Milpitas Blvd: mix of older landscape trees and shrubs
  - Composite [Tree + Shrub] Aerial Cover = 100% [75% trees + 25% shrubs]
  - Dominant trees = pines and Peruvian pepper to 30 ft tall; multi-stems; DBH range 8-14 inches
  - Shrub dominant = southern California native lemonade berry; 5-10 ft tall
  - Shrub sub-dominant = Acacia redolens

N. Milpitas Blvd. To N. Hillview Drive, Station 55+50 to 79+50

West Side Structural/Species Composition and Cover Estimates:

- Riparian/inboard levee from N. Milpitas Blvd to N. Hillview Drive: predominantly exotic herbaceous with scattered individual exotic trees.
  - Tree aerial cover visual estimate = 15-20%.
  - Tree dominants = holly oak to 30 ft tall and 10-12" dbh; multi-trunk pines to 40 ft tall and 12-18 inch dbh, 1 valley oak 10" dbh.
  - No true shrubs present. One holly oak stump sprout @ 10 ft tall.
- Outboard levee [shallow grade] Mix of predominantly non-native landscape shrubs 6-14 feet tall with a few scattered small trees to 15 feet tall.
  - Composite [tree + shrub] aerial cover estimate = 100% [tree 10% + 90% shrub]
  - Trees present = African sumac, pines

- Dominant shrub = Acacia redolens
- Sub-dominant shrubs = bottlebrush, cotoneaster, non-local ceanothus [some dead or chlorotic], coyote brush, glossy privet

- Outboard levee [at grade with Mervyn's parking lot landscape]
  - Composite [tree + shrub] aerial cover visual estimate = 40%.
  - Dominant trees = pine and holly oak. Pines to 40 ft tall and 20" dbh.
  - Psyllid-infested lollypop trees from Mervyn's landscape hanging over a few feet inside project ROW could be trimmed back.

East Side Structural/Species Composition and Cover Estimates:
Both inboard and outboard levees, primarily dry, mowed non-native herbaceous with scattered isolated landscape trees & shrubs. Outboard landscaping concentrated near trail entries at Santa Rita Drive and N. Hillview.

- Composite [tree + shrub] aerial cover visual estimate = 20-25%
- Tree Aerial Cover visual estimate = 20%; DBH range 6-18"
- Tree dominants = planted pine 25-40 ft tall
- Tree sub-dominants = holly oak 4-6" dbh and 8-15 ft tall; plus a few psyllid-infected lollypop trees
- Shrub Cover Estimate = 5% only on outboard ; average 10 ft. tall; dominants = elderberry & coyote brush

N. Hillview Drive to Calaveras Blvd., Station 79+50 to 86 + 00

West Side Structural/Species Composition and Cover Estimates:

- Riparian/inboard levee is old landscaping.
  - Composite [tree + shrub] aerial cover visual estimate = 60% [10% shrub + 50% tree]
  - Tree dominants = holly oak to 20-25 ft tall with 5-10" dbh
  - Shrub dominants = planted toyons and invasive glossy privet 10-20 ft tall
  - Other shrubs present = coyote brush, elderberry, dying Italian buckthorn

East Side Structural/Species Composition and Cover Estimates:

- Riparian/inboard levee is old landscaping.
  - Composite [tree + shrub] aerial cover visual estimate = 80% [30% shrub + 50% tree]. Tree dbh range = 4-20 inches. Tree height range = 15-40 ft
  - Tree dominant = planted pine
  - Other trees present = holly oak, Mexican fan palm, non-native ash, London plane, eastern redbud, olive
  - Shrub dominants = lollypop trees in shrub form
  - Other shrubs present = coyote brush, Italian buckthorn, toyon
- Outboard levee does not exist.

Nomenclature[12] for Trees

African sumac = *Rhus lancea*
ash = *Fraxinus uhdei*
black acacia = *Acacia melanoxylon*
cypress = *Cupressus sp.*
eucalyptus = *Eucalyptus sp.*

[12] From The Jepson Manual: *Higher Plants of California*. University of California Press. 1993.

Nomenclature for Trees *(Continued)*
holly oak = *Quercus ilex*
lollypop tree = *Myoporum laetum*
London plane = *Platanus X acerifolia*
Mexican fan palm = *Washingtonia robusta*
olive = *Olea europaea*
ornamental pear = *Pyrus calleryana or Pyrus kawakamii*
Peruvian pepper = *Schinus molle*
pine = *Pinus spp.*
pistache = *Pistacia chinensis*
purple leaf plum = *Prunus cerasifera*
red willow = *Salix laevigata*

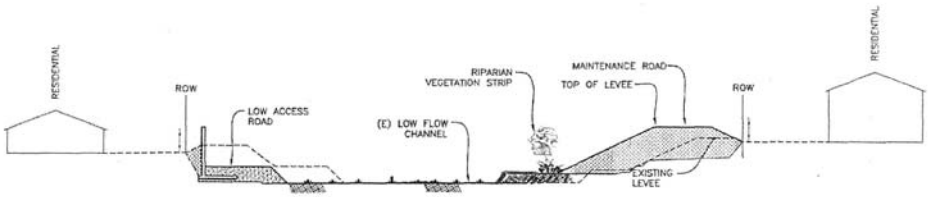
Nomenclature for Shrubs
acacia shrubs = *Acacia redolens;* and, *A. longifolia*
bottlebrush = *Callistemon sp.*
ceanothus = *Ceanothus sp.*
cotoneaster = *Cotoneaster lacteus*
coyote brush = *Baccharis pilularis*
elderberry = *Sambucus mexicana*
firethorn = *Pyracantha sp.*
glossy privet = *Ligustrum lucidum*
hopseed = *Dodonaea viscose*
Italian buckthorn = *Rhamnus alaternus*
jasmine = *Jasminum polyanthemum*
lemonade berry = *Rhus integrifolia*
oleander = *Nerium oleander*
red trumpet vine = *Distictis buccinatoria*
sweet hakea = *Hakea suaveolens*

EXHIBIT B

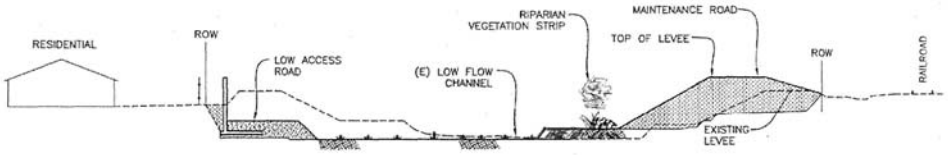
Annotated Aerial Photo Showing Impacted Upland Vegetation

EXHIBIT C

Proposed Low Bench Locations for Riparian Plantings



TYPICAL SECTION REACH A
Looking Downstream



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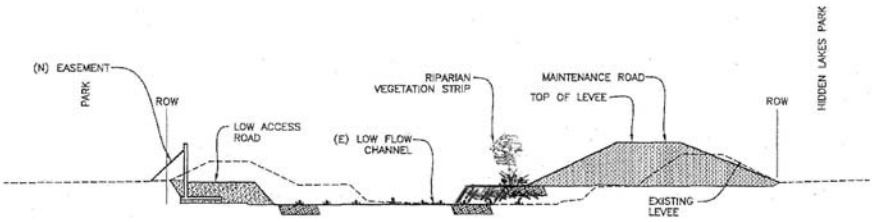

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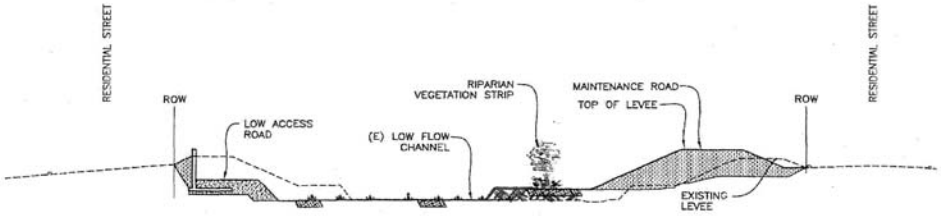
Looking Downstream



TYPICAL SECTION REACH E
Looking Downstream

EXHIBIT D

Water Resources Protection Manual, Design Guide 5

[ADD HERE FROM W-DRIVE FILE]