



**DOWNTOWN CREEKS PRESERVATION, RESTORATION AND DEVELOPMENT PLAN**

ASSESSMENT SUMMARY OF EXISTING CREEK CONDITIONS, LAND USE AND ENHANCEMENT OPPORTUNITIES

LAFAYETTE, CALIFORNIA

February 2016

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# CHAPTER 1: INTRODUCTION

INTRODUCTION

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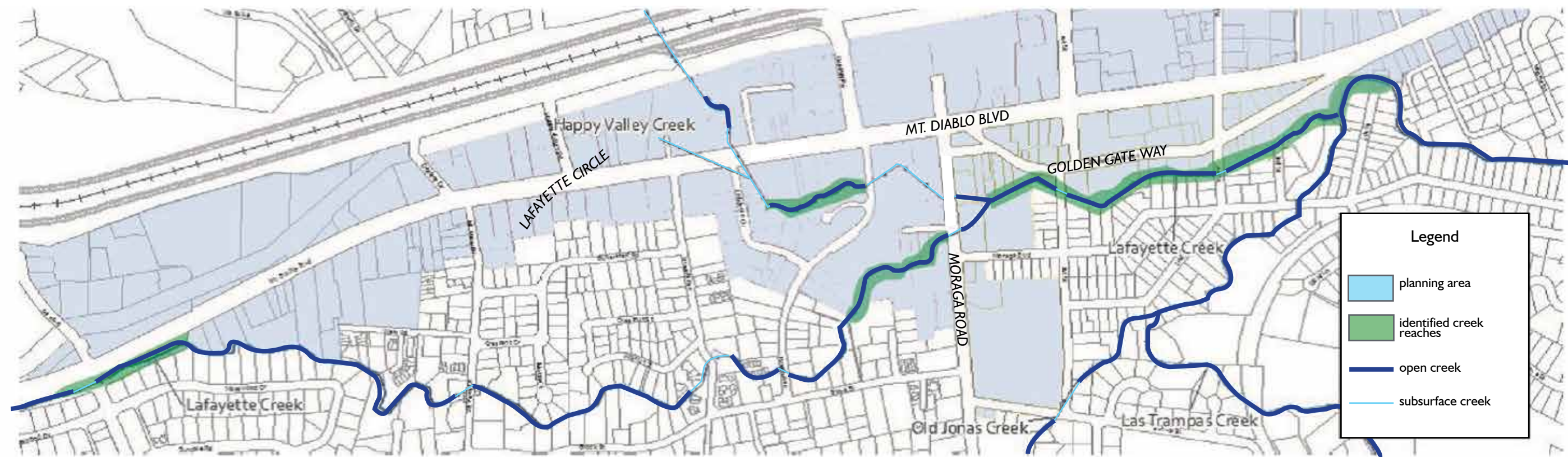


Figure 1-1: Creek reaches included in the Downtown Creeks Plan

INTRODUCTION

Creeks, with their flowing water and active wildlife habitats, are intrinsically vibrant and dynamic areas. They have the ability to immediately improve our well-being and our health, and to stimulate our imagination and curiosity. Creeks have the unique ability to simultaneously calm us and invigorate us. Throughout history they have provided sustenance for both our body and spirit.

Lafayette exists as a city today in large part because its creeks provided ideal conditions for settlement. As such, their value in creating the community of Lafayette should be celebrated.

Lafayette’s riparian corridors are a unique natural resource of the city that unites and engages the community and enhances its vitality. These riparian corridors provide an ecosystem of plant and animal communities that are core to Lafayette’s small town, semi-rural character. Preserving and restoring this

natural resource are fundamental to the community’s character.

As part of the City of Lafayette’s 2012 Downtown Specific Plan (DSP), Lafayette is charged with protecting its creek resources. There are approximately 1.6 miles of creek running through downtown Lafayette. Along the creek system, there are multiple potential opportunities for public access; however, public access is currently limited. The potential for the public to enjoy the creek resource is dependent on creating better public awareness and upgrading or providing access to the creeks, and improving the ecological health of the creeks and the surrounding ecosystem. To this end, Lafayette solicited consultants to develop a Downtown Creeks Preservation, Restoration, and Development Plan (Downtown Creeks Plan), which will provide a mapping analysis and an ecosystem assessment, and will ensure the long-

term health and preservation of the Lafayette Creek ecosystem.

Key goals of the Downtown Creeks Plan include:

- Identifying creek preservation and restoration opportunities;
- Clarifying creek setback requirements for the downtown;
- Developing standards for how new developments should relate to adjacent creeks;
- Producing strategies and methods for creek improvements and stewardship;
- Developing opportunities for public access and pathways;
- Preventing property damage by creek processes (flooding, erosion); and
- Identifying public safety and environmental

concerns

The Downtown Creeks Preservation, Restoration and Development Plan is intended to provide a long-term vision for:

- Restoration of riparian habitat;
- Public access to creeks;
- Protecting property from damage from creeks;
- Creek amenities that promote economic development; and
- Creek stewardship.

Lafayette’s creek reaches (specific portions of a creek) that are included in the Downtown Creeks Plan are shown on the map above.



# INTRODUCTION

## EXECUTIVE SUMMARY

The creeks of Lafayette are a truly unique feature of the city, distinguishing Lafayette from most other cities in the Bay Area where creek beds have been altered and riparian vegetation removed. By embracing and celebrating the natural beauty and vitality of the creeks, Lafayette can make an already charming and desirable downtown into an even more desirable destination for the community.

Assessing the baseline creek conditions and the neighboring built conditions along the creeks will provide a solid foundation for developing a plan to restore creek habitat, provide public access to the creeks, and highlight the creeks as a prominent and valuable natural resource of the Lafayette community.

This report provides an assessment of the current creek conditions, the physical processes that have created those conditions, the land use context along the creeks, and the opportunities for enhancing our beautiful natural resource.

### Existing Creek Conditions

Creek conditions are highly varied as the creek waters flow through Lafayette. Over time, portions of the creeks have been filled, culverted, or routed through concrete channels to accommodate development or to reduce the risk of flooding. This report assesses the conditions along the identified reaches of the creeks, in terms of biology, hydrology, bank stability, and urban context.

For this assessment, the creek areas have been divided into six reaches to facilitate the study as follows: West, North, South, East 1, East 2, and East 3. Along the length of the study area, almost all of the creek banks are deeply incised and quite steep. The only exception to this scenario is the East 3 Reach which has some gentler slopes and terraces.

The urbanization of the watersheds tributary to the creeks has likely led to declining water quality through the introduction of urban stormwater runoff

constituents such as heavy metals, hydrocarbons, nutrients and pesticides, among others. Also, urbanization, by increasing watershed imperviousness, tends to increase runoff peak flows and volumes in storm events which, if unmitigated, can contribute to erosion downstream. Most of the creeks exhibit minimal bank erosion due to concrete and steel culverts and channels set within the creeks, and certain portions contain bank armoring to reduce erosion and scour. The primary exception is in the West reach where the bank erosion has undercut a tree and is placing the nearby road at risk.

Additionally, large portions of these reaches are within the 100-year floodplain. Flooding issues tend to occur just upstream of culverts, which may be undersized in some areas. Once the culverts are overwhelmed, the water backs up the creek causing flooding upstream.

Trees protected under the City's Tree Protection Ordinance have been mapped along the creek corridor, along the creek banks and in built areas neighboring the creek banks. These trees provide significant habitat and aesthetic value.

A number of invasive plant species dominate some reaches of the creek. Of particular concern is English Ivy (*Hedera helix*), which has invaded almost the entire length of the creek study area. The ivy crowds out native species, and reaches up into the tree canopy, choking even mature trees. Within the creek channels, it compromises bank stability. Removal of this invasive species is critical to restoring habitat, preventing damage to native and other protected trees, and protecting creek bank stability.

### Existing Land Use Context

Built conditions along the creek study area include parking lots, commercial buildings, and residential uses, almost entirely under private ownership. The scenario of multiple property owners and private uses along the creeks presents challenges regarding public access and comprehensive stewardship of the creeks. The ownership patterns along the creeks will require coordination between numerous parcel owners, business owners, and government agencies to restore



Figure 1-2: Creek reaches and study area key map

environmental health of the creeks and to enhance awareness of and public access to the creeks.

### Opportunities For Creek Restoration and Public Enjoyment of the Creeks

Opportunities exist for restoring riparian habitat and improving maintenance of the creeks, and for increasing public awareness of and access to the creeks. In most instances, public-private coordination and partnerships will be necessary. This report identifies potential opportunities for enhancement to be explored in greater detail in later phases of the project.

(Note: Proposed enhancements will be detailed more fully in this Executive Summary as the Plan is completed.)



## CHAPTER 2: CONTEXT



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### BRIEF SITE HISTORY AND SETTLEMENT

The creeks of Lafayette and their banks have served as a cultural center for hundreds of years. Originally settled by a Miwok sub-group more than 10,000 years ago, archaeological artifacts of Native American settlements have been found as recently as the 1970's along Lafayette Creek.

Subsequent to Native American habitation, the Mexican government established land grants in the area. The 3,329-acre Rancho Acalanes land grant was purchased in 1847 by the pioneer Elam Brown, who built his home along Happy Valley Creek near what is now 32 Lafayette Circle. Today, Lafayette encompasses nearly all of this land grant site.

Through the early 1900's, farming was the primary occupation in Lafayette. Common crops included vineyards, pear orchards and various grains. Farming conditions could be challenging due to dry conditions in the summer months, and severe flooding from the creeks.

### URBANIZATION OF THE CREEKS

Creek bank stabilization, erosion and flooding were concerns early in the development of Lafayette's history. To address these concerns, portions of the creeks were culverted or channelized with a concrete U-Channel. The culverts and channels were constructed to convey water under roadways, and to prevent flooding and creek bank erosion. The storm drain system outflows into the creeks. A concrete drop structure was constructed downstream of the confluence of Lafayette Creek and Las Trampas Creek, in East 3 (see Figure 1-2 for a description of creek reaches). The segments of Lafayette Creek included in East 1 and East 2 were channelized in 1955.

From the historic aerial photograph in the top right (Figure 2-1), one can see the natural course of Lafayette, Happy Valley and Las Trampas Creeks around 1940. The aerial below (Figure 2-2) shows the effects of urbanization of central Lafayette on the watershed. Today, the creeks have a combination of

conditions that range from channelized sections with concrete beds and walls, to areas that have natural creek conditions and habitat areas.

The urbanization of Lafayette and its watershed has increased the areas of paved and impervious surfaces, reducing the pervious surface area available to allow water to percolate through the soils. The lower percentage of pervious surface area has created two problems for Lafayette's creeks and riparian areas. First, water quality of the creeks is reduced since impervious surfaces such as asphalt and concrete enable toxic substances such as heavy metals and pesticides to enter the creeks in higher concentrations. Second, the higher percentage of impervious surfaces increases runoff during storm events, which can increase erosion in the creek channels and raise the risk of flooding.

### HYDROLOGY AND GEOLOGY

The creeks that are discussed in this report are within the Las Trampas Creek watershed, which, in turn, is part of the larger Walnut Creek watershed (Figure 2-3). Happy Valley Creek joins Lafayette Creek at the western end of East Reach 1. Lafayette Creek's confluence with Las Trampas Creek is located slightly farther downstream, in East Reach 3. The 2003 Contra Costa County Watershed Atlas lists Las Trampas Creek watershed size as 17,238 acres, with an average annual rainfall of 26 inches, a mean daily flow of 15.4 cubic feet per second (cfs), and an estimated 25% impervious surface. The State of California lists Walnut Creek and all its upstream tributaries, including Lafayette Creek and Happy Valley Creek, as polluted by the pollutant diazinon (an agricultural insecticide).

Lafayette Creek and Happy Valley Creek are both perennial streams with flow rates and volumes vary widely based on the season and precipitation events. Both streams are supplied by surface runoff from the local watershed, and Lafayette Creek is also fed by Lafayette Reservoir. All of the reaches assessed are surrounded by low- to moderate- density housing or commercial buildings.



Figure 2-1: Aerial showing Lafayette Creeks study area around 1940. (Source: USGS)



Figure 2-2: Aerial of study area in early 2000's. (Source: USGS)



## CONTEXT

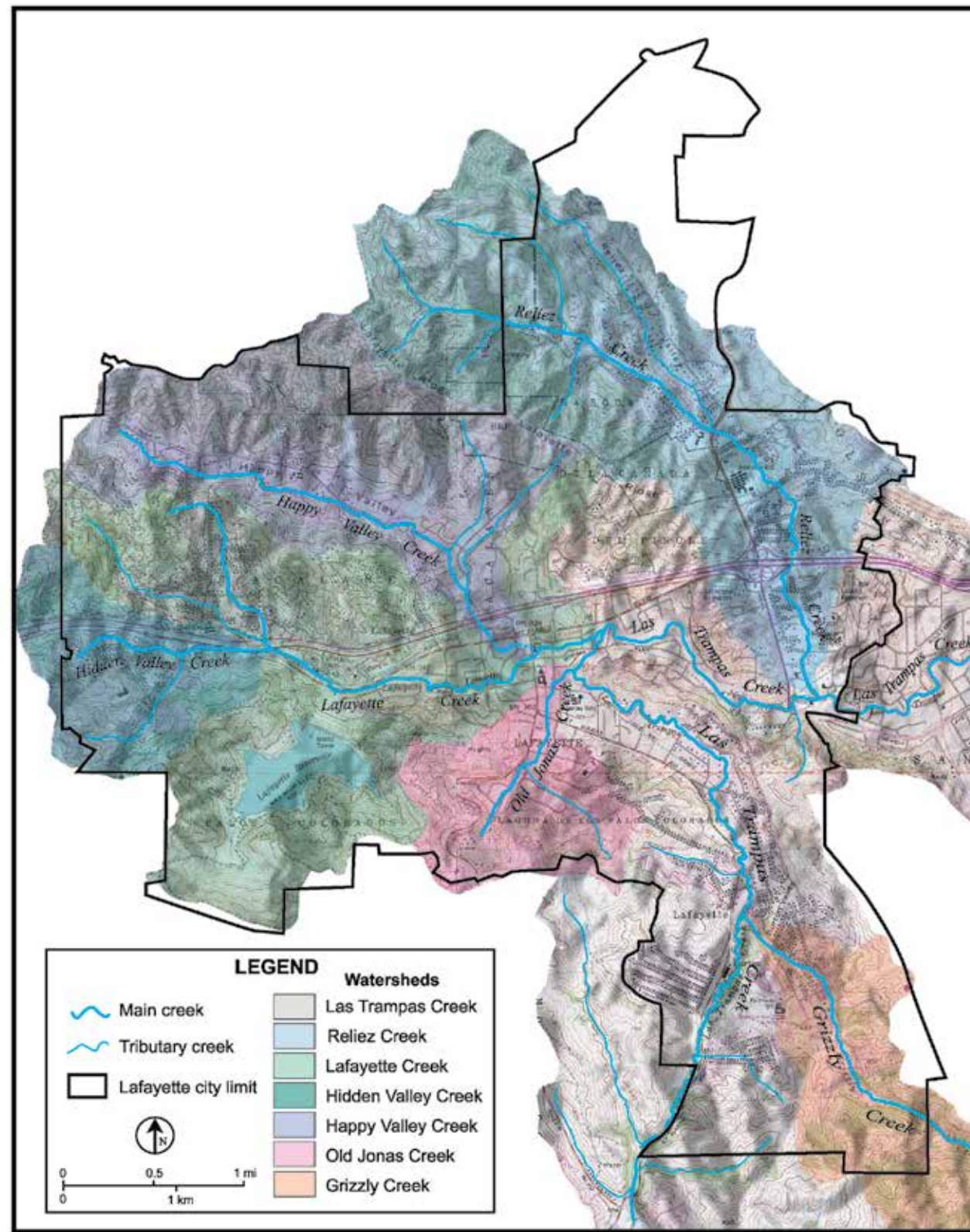


Figure 2-3: Las Trampas Creek watershed  
(Source: Lafayette Creeks Committee)

Lafayette Creek and Happy Valley Creek both contain relatively stable creek beds due to anthropomorphic interventions that have occurred over the last 100 years intended to stabilize and harden the channels due to their proximity to urban areas. However, most of the original fluvial geomorphic characteristics of the channels, including historic overbank floodplain areas, have been lost. As in many areas of the San Francisco East Bay, urbanization of the watershed's tributary to the creeks has likely led to declining water quality through the introduction of urban stormwater runoff constituents such as heavy metals, hydrocarbons, nutrients and pesticides, among other pollutants. Also, urbanization tends to increase runoff and peak flow volumes in storm events by increasing watershed imperviousness. If unmitigated, these storm events can create erosional responses in downstream receiving water often referred to as "hydromodification," which has likely happened in both channels. Although erosion or scour potential related to hydromodification is minimized in the reaches studied due to construction of concrete and steel culverts, channelization of banks, and other bank armoring, erosion remains a problem (see below for details).

The most effective strategy for improving the water quality of urban runoff discharging into urban streams is the implementation of bioretention areas (or other biotreatment post-construction stormwater best management practices) between urban stormwater discharge points and the receiving water. Typically, bioretention areas are placed curbside, replacing conventional drainage inlets. They collect urban stormwater runoff during rain events at points of drainage concentration, treat stormwater runoff and then link into the stream system. This solution also reduces the peak discharge of water entering the creek system during storm events, reducing flooding. Additionally, removing concrete and rock from the creek bed and replacing it with native riparian vegetation could also improve water quality, though it would probably have little effect on creek flooding.

The majority of the creeks are highly incised (downward erosion of the creek bed), having high banks, with little to no floodplain within the banks.

The only exception is the portion of Lafayette creek after the concrete channel and just prior to the drop structure, where the creek is only moderately incised. After the drop structure it returns to the condition of having highly incised channels.

Several factors have contributed to creek bank instability and erosion issues. Most of the creek reaches have steep banks, with no floodplain areas within the banks to ameliorate erosion impacts. Urbanization has increased peak stormwater flows, causing downcutting in soft bedrock and alluvial deposits to cause the dramatically incised channels with undercut banks that we see today. Furthermore, the invasion of English Ivy (*Hedera helix*) has displaced deep rooted native riparian vegetation which would have provided significantly stronger bank protection. The shallow root system of English Ivy has compromised the stability of the banks. Additionally, not all buildings along the creeks conform to current setback requirements, further increasing slope stability risk issues.

As discussed previously, urbanization and undersized culverts have elevated the risks presented by potential flooding in the area. The flood hazard map shown as Figure 2-4 indicates areas within the downtown that may be inundated by 100-year and 500-year floods. Flood protection is the highest priority for assessing potential improvement measures to the downtown creeks.

### NATURAL HISTORY AND ECOLOGY

Encroachment by humans across the watershed and into the riparian corridor in the form of development (buildings, roads, and other facilities) changes the hydrologic and hydraulic function and character of the creek. These impacts often lead to degradation of habitat values through increased erosion, loss of native vegetation and armoring of channel bed and banks. Despite the existing development conditions, the Lafayette creeks form a riparian woodland and scrub ecosystem that provides habitat for wildlife and native plants, and which can be characterized by four zones (Figure 2-4): 1) creek channel, 2) riparian zone, 3) upland zone, and 4) top of bank / building and backyard areas.



The creek channel provides fragmented habitat for aquatic species, birds and mammals, since portions of it are contained in culverts or concrete channels, or have been compromised by invasive species. As such, habitat for native trout, the Pacific tree frog, California newt, western toad and other amphibians has been diminished. Some reaches of the creek still have a natural bed with emergent vegetation and banks dominated by native species, and continue to have a high value for a diverse assemblage of aquatic and terrestrial plant and animal species. Although populations of anadromous chinook salmon and steelhead were found in the Lafayette creeks, the concrete channels, culverts and drop structures, including those downstream along Walnut Creek, have created barriers preventing their migration into the project area. Some native species such as stickleback and possibly resident trout continue to occupy the creeks in the project area and upgradient watershed where suitable aquatic habitat remains.

The riparian zone should consist of riparian woodland and scrub. Although no longer contiguous along the creek reaches, there are areas where the woodland shrubs and tree canopy are well developed, providing good habitat and nesting sites for mammals and birds. However, many of the riparian zone areas have been invaded by non-native invasive species such as English Ivy (*Hedera helix*), which has reduced food sources for native animal species.

English Ivy is smothering existing trees in many areas along the creek banks. English Ivy threatens tree life by climbing up trees and blocking light to tree leaves. This can cause branch die back, weakening branches, causing them to break off, and ultimately killing the tree. As such, trees infested with ivy can be a hazard if located near walkways or homes. At ground level, English Ivy creates a monoculture, which inhibits native plants from growing, and eliminates native food sources for animals.

Other non-native invasive plant species that are creating impenetrable thickets include Himalayan blackberry (*Rubus discolor*) and giant reed (*Arundo donax*). Appendix B contains a more extensive list of invasive species.

The upland zone still provides habitat for terrestrial animals where concrete channels and fences do not create barriers. In areas where plant growth is dense, there is habitat for a variety of bird species and animals such as the red fox, gray fox, black-tailed deer and other animals. Mature tree canopies in this area also provide nesting sites for numerous birds-of-prey.

The top of bank has been developed in most areas. Except for a few remnant valley oak trees, parking lots, commercial buildings, ornamental landscaping, and residential uses are typically located in this zone, limiting habitat areas.

The culverts, drop structures, and channelized segments of the Lafayette creeks have resulted in lost habitat for aquatic and terrestrial animals. Trout which were once common in the Lafayette creeks prior to the man-made creek interventions, are now rarely seen. Trout have occasionally been seen along this reach, but may originate from spill events of the Lafayette Reservoir (Source: Robert Leidy et al, Historical Distribution and Current Status of Steelhead / Rainbow Trout in Streams of the San Francisco Estuary, p. 21). Studies by the Contra Costa Resource Conservation District (CCRCD) have scored the downtown creek reaches of Lafayette as having a marginal Indicator of Biologic Integrity (IBI) score (Source: Feb 2013, Walnut Creek Watershed Inventory Report, prepared for the Walnut Creek Watershed Council).

**PLANNING CONTEXT**

The Lafayette Downtown Creeks Plan is being developed within the context of a number of planning documents adopted by the City of Lafayette. These documents include:

- City of Lafayette General Plan:** The General Plan, adopted in 2002, addresses the City’s creeks in both its Open Space and Conservation Chapter, and its Safety Chapter. Most of the General Plan guidance has been incorporated into the goals and policies of the Downtown Specific Plan. The following programs provide some additional guidance for the Downtown Creeks Plan:

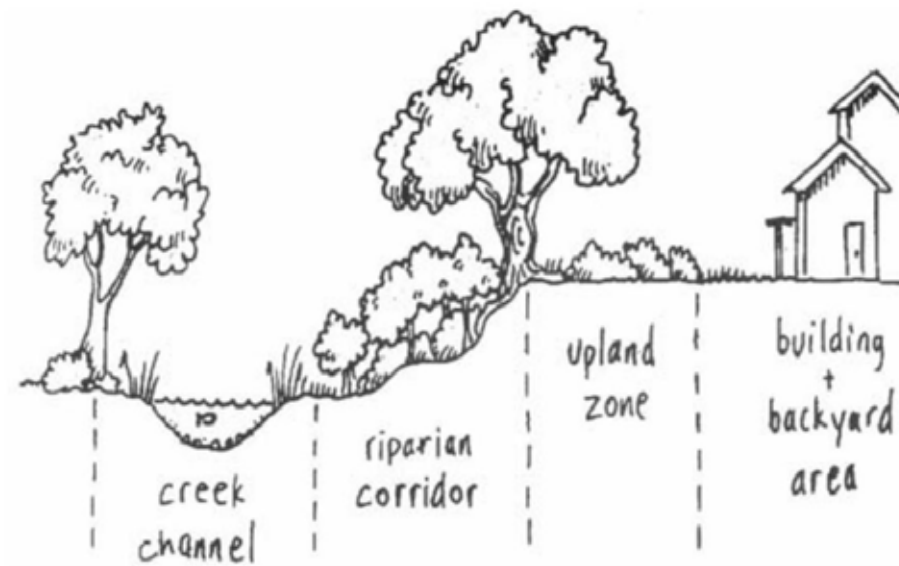


Figure 2-4: Creek zones. (Source: City of Lafayette)

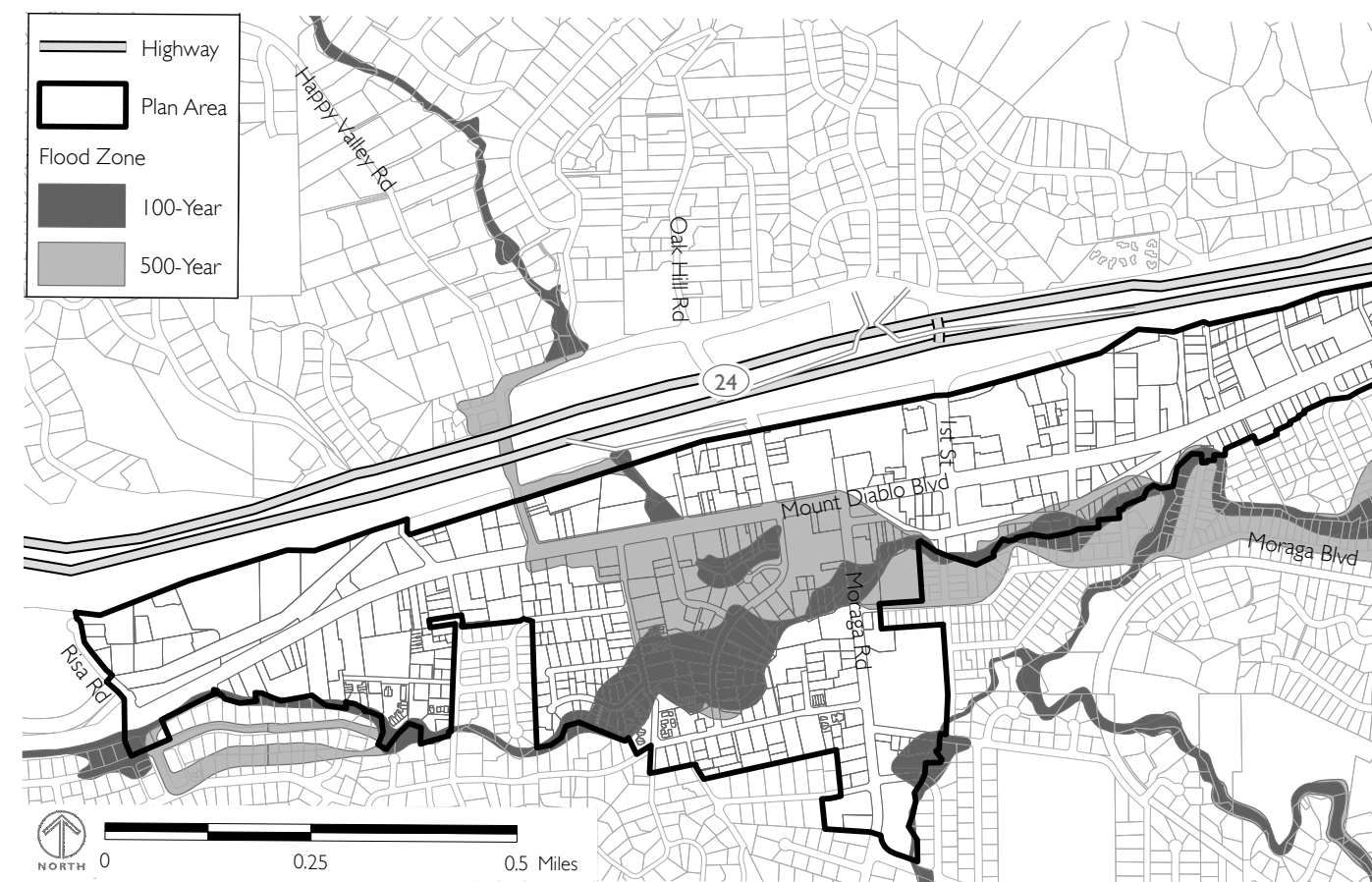


Figure 2-5: Flood hazard map (Source: FEMA)

## CONTEXT

### Program OS-5.1.3

In cooperation with the Contra Costa County Flood Control District and the California Department of Fish and Game, develop a long-term management plan for addressing creek bank stability on Las Trampas Creek, Grizzly Creek, and other creeks with bank slumping problems. This plan should identify the location of problem areas and develop a strategy for addressing these problems on a watershed basis. Since responsibility for many problem areas rests with private owners, the City should assist owners in addressing these problems by:

- 1) Compiling a list of stability management practices recommended for the particular stretch of creek.
- 2) Compiling a list of possible contractors available to do the work.
- 3) Investigating potential funding sources including public and non-profit agencies and foundations.
- 4) Expediting the permitting process so that an owner does not need to submit studies and data to local, State, and federal agencies to obtain separate permits.

### Program S-3.4.3

Periodically assess the need to establish improvement districts and other financing mechanisms to fund necessary storm drainage and watercourse improvements to minimize flood hazards and creek erosion.

### Downtown Specific Plan:

The downtown creeks are an integral part of the Downtown Specific Plan (DSP), adopted in 2012. As part of its discussion of the Public Realm, as well as proposing three parks (Library Park, Town Green and Gazebo Park) adjacent to the downtown creeks, the DSP includes the following pertaining specifically to the downtown creeks.

### Goal 15 Public Realm – Creeks.

Protect and enhance downtown creeks.

### Policy 15.1

Preserve the natural resource value of the creeks.

### Program 15.1.1

Evaluate projects within and adjacent to the creek corridors on the following priorities (in priority order):

- Flood protection
- Preservation of riparian habitat
- Visual access
- Opportunities for education about the creek's riparian resources
- Physical access to the top of creek banks

### Policy 15.2

Preserve creeks as a significant contributor to the downtown character.

### Program 15.2.1

Prepare a Downtown Creeks Preservation, Restoration and Development Plan. The Plan should establish a long term vision for downtown creeks and should address the following:

- Creek setbacks
- Relationship with adjacent development
- Existing trees
- Damage prevention
- Creek preservation and restoration
- Creek stewardship
- Nuisance abatement
- Public access
- Pathways
- Other public safety and environmental concerns

This Downtown Creeks Assessment Summary is a part of the Program 15.2.1 Downtown Creeks Preservation, Restoration and Development Plan.

### Downtown Design Guidelines:

Adopted in 2014, these guidelines include the following goals and guidelines pertaining to the downtown creeks and preservation of trees:

### Goal:

Development design should embrace the creeks and connect the public to them.

### Guidelines:

1. Maintain and restore native riparian areas.
2. Provide views of the creek through window placement, decks, balconies, and outdoor spaces.

3. Orient development to take advantage of the creek for walkways, dining, and outdoor space.

4. Maintain an open character by deemphasizing property lines and reinforcing the continuity of the creek.

5. Transition landscaping toward and along the creek corridor for a consistent native riparian plant palette.

6. Provide public creek crossings to link neighborhoods to the downtown.

7. Preserve downtown trees by designing development around existing trees and minimizing encroachment within the dripline of the trees.

### Trails Master Plan:

Adopted in 2006, this document identifies the Shield Block Creek Trail as a planned trail facility. (See Figure 2-6)

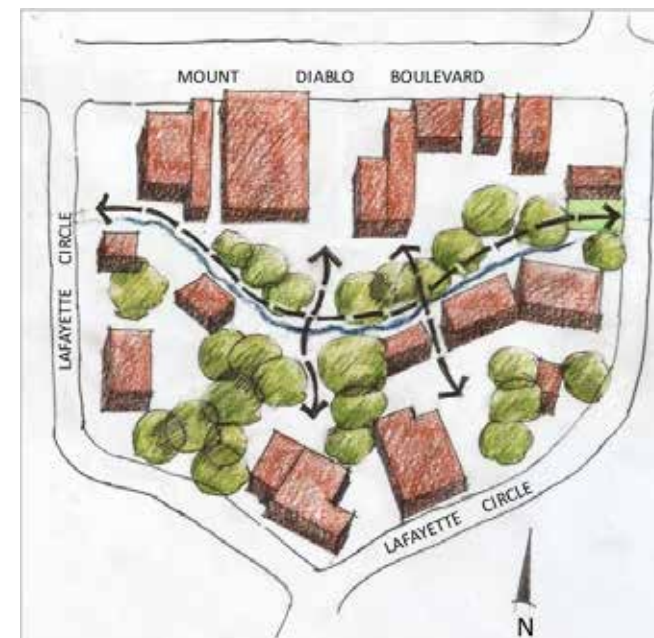


Figure 2-6: Downtown Specific Plan Shield Block plan showing Creek Trail and Crossings

### Public Art Master Plan:

Downtown creeks and adjacent pathways and public spaces can be ideal settings for public art. The Public Art Master Plan, adopted in February 2013, promotes public art in downtown parks and public spaces.

### Program:

Introduce interactive public art in downtown parks and other public spaces, particularly artworks that can be used by children for play.

More art in the downtown will enhance its character and make it an even greater downtown. Important locations include:

- Lafayette Plaza
- Lafayette Library and Learning Center
- Public rights-of-way (medians, sidewalks, landscaped areas)
- Publicly accessible plazas, walls, courtyards
- Brook Street Park

## CODES AND ORDINANCES

The Lafayette Municipal Code controls land uses and establishes development standards. It also regulates flood damage prevention, including creek setbacks.

### Flood Damage Prevention Ordinance:

Lafayette Municipal Code Ordinance No. 512 contains regulations and provisions created to promote the public health, safety and general welfare, and to minimize public and private losses due to flood conditions. Among its provisions it provides in Article 4, Standards for Flood Hazard Reduction applicable to all areas of special flood hazards. Article 4 sets forth standards for anchoring, construction materials and methods, elevation and floodproofing, materials and equipment storage, utilities, subdivisions, manufactured homes and recreational vehicles, floodways and flood-related erosion-prone areas. The Ordinance includes detailed guidelines and procedures for obtaining a variance from its requirements.

### Creek Setback Ordinance:

For purposes of the Downtown Creeks Plan, Article 5, the Creek Setback Requirements, are of primary importance and are fully set forth below.



**6-1841 Structure setback.**

(a) As defined by Section 6-312 and Section 6-355, buildings and structures shall be set back from an unimproved creek channel as follows:

(1) Channel Depth of Zero through 21 Feet. If the side slopes of the channel are steeper than 2:1 (horizontal:vertical), the width of the structure setback is determined by a line measured from the toe of the slope a distance of twice the channel depth plus the appropriate top-of-bank setback as follows:

Channel Depth (Feet)	Top of Bank Setback Minimum Width (Feet)
0 — 6	12 each side
6 — 12	15 each side
12 — 18	18 each side
18 — 21	21 each side

If the side slopes of the channel are flatter than 2:1 (horizontal:vertical), the structure setback is the appropriate setback indicated in the table above, measured from the top of the bank.

(2) Channel Depth Exceeding 21 Feet. If the depth of a channel exceeds 21 feet, the width of the structure setback is determined by measuring from the toe of the slope a distance of three times the channel depth.

(b) If a parcel is subject to subdivision easements or setback requirements under Contra Costa County Ordinance Code Sections 914-14.002 through 14.014 which are inconsistent with Section 6-1841(a), those subdivision requirements control.

(c) No permanent structure other than fences and drainage and erosion protection improvements may be constructed within the setback area. Landscaping (including trees and shrubs) is permitted within the setback area.

**6-1842 Exception.**

(a) The city engineer may approve exceptions to the requirements of Section 6-1841 to allow construction of structures within the setback area if:

- (1) The submitted materials under Section 6-1842(c) are complete and adequate; and
- (2) The property owner agrees to enter into and record an agreement holding the city and other public agencies harmless in the event of flood or erosion damage. The agreement shall bind successors in interest and be in a form acceptable to the city attorney.

(b) In approving an exception, the city engineer may impose conditions deemed necessary for creekside erosion protection and on-site drainage.

(c) A person requesting an exception under this section shall submit to the city engineer:

- (1) A topographical survey of the lot precisely showing the creek bottom, sides, top of bank and proposed and existing structures;
- (2) A soils report prepared by a licensed civil engineer specializing in soils analysis which describes the soils condition for the proposed structure and analyzes and makes recommendations as to the creek bank stability and erosion hazard; and
- (3) Certification signed by the engineer who prepares the soils report that in the professional opinion of the

engineer there is no likelihood of a hazard to persons or property resulting from the proposed construction.

(d) The decision of the city engineer may be appealed to the city council as provided in Section 6-1852(b).

**Municipal Regional Stormwater Permit, Provision C.3:**

The Federal Clean Water Act addresses urban stormwater runoff pollution through the National Pollutant Discharge Elimination System (NPDES) stormwater program. The San Francisco Bay Regional Water Quality Control Board administers this program under the Municipal Regional Stormwater Permit (MRP), which regulates both the quality and quantity of stormwater discharges. The effective date of the most recent MRP is January 1, 2016, and the City of Lafayette as a Permittee is covered under this MRP.

Generally speaking, Provision C.3 of the MRP applies to new development and redevelopment projects (including road projects) which create and/or replace 10,000 square feet or more of impervious surface, as well as to several types of projects (auto service facilities, gas stations, restaurants, and uncovered parking lots) which create and/or replace 5,000

square feet or more of impervious surface. Site design requirements apply to all development projects of 2,500 – 10,000 square feet and detached single-family home projects. The goal of Provision C.3 is to address stormwater runoff pollutant discharges and prevent increases in runoff flows, primarily through the implementation of low impact development (LID) techniques.

LID techniques are intended to reduce runoff and mimic a site’s predevelopment hydrology by minimizing disturbed areas and impervious cover and then infiltrating, storing, detaining, evapotranspiring, and/or biotreating stormwater runoff close to its source. LID practices include measures such as rain barrels and cisterns, green roofs, permeable pavement, preserving undeveloped open space, and biotreatment through rain gardens, bioretention units, bioswales, and planter/tree boxes.

Provision C.3 also requires Lafayette to develop a Green Infrastructure Plan, which will expand the use of LID on a larger scale. The Green Infrastructure Plan would be implemented over the 2020 – 2040 time period.

It is the intent of this Plan to identify opportunities to integrate the MRP’s stormwater treatment strategies into its recommendations for creek enhancements.

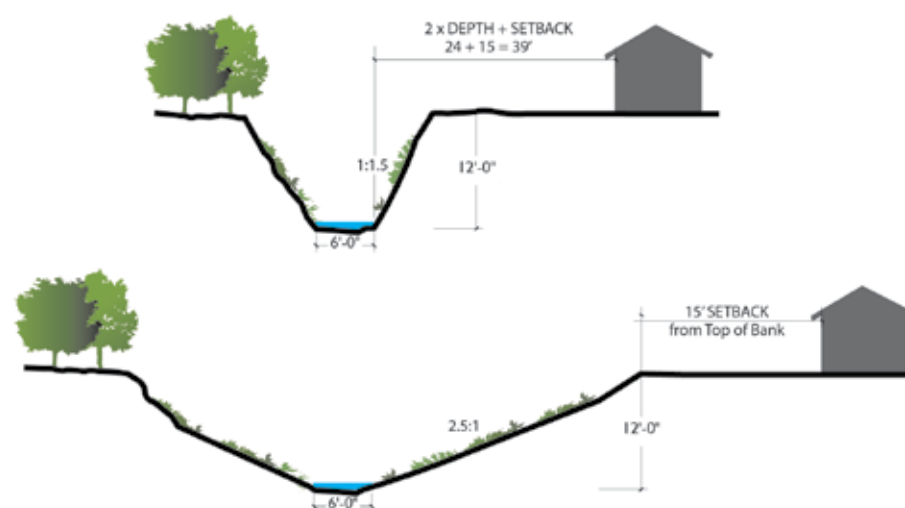


Figure 2-7: Examples of setbacks for buildings and structures, per Lafayette Municipal Code.

## CONTEXT

### **Tree Protection Ordinance:**

Municipal Code Chapter 6-17, addresses protection of Lafayette’s trees. The ordinance supports the City’s policies to protect existing woodlands and their associated vegetation, protect native trees, preserve riparian habitat, encourage the planting of native species, and avoid the cutting of mature trees. All trees in the plan area are considered “Protected Trees” under Item 8 of the ordinance, and subject to regulation. Relevant portions of the definition include:

6-17-2 Q. “Protected tree” means a tree on public or private property meeting one or more of the following standards:

3. Riparian tree. Is a native riparian tree with a trunk diameter of six-inches or more or one component trunk of a multi-trunked tree with a diameter of four-inches or more and that is one of the following species:

- Bigleaf maple (*Acer macrophyllum*)
- Boxelder (*Acer negundo*)
- White alder (*Alnus rhombifolia*)
- Black walnut (*Juglans hindsii*)
- Cottonwood (*Populus fremontii*)
- Red willow (*Salix laevigata*)
- Arroyo willow (*Salix lasiolepis*)
- Coast live oak (*Quercus agrifolia*)
- Valley oak (*Quercus lobata*)
- California bay (*Umbellularia californica*)
- California buckeye (*Aesculus californica*)
- Blue elderberry (*Sambucus Mexicana, aerulea, or glauca*)

5. Downtown tree. Is a tree of any size or species within a commercial zoning district.

## REGULATORY SETTING

Human activities have disrupted natural processes and past planning decisions have impacted ecosystems. Federal and state laws have been enacted to mitigate these impacts to our waters and habitats.

The Lafayette Downtown Creeks Plan area includes areas that are subject to protection by State and Federal agencies and governed by regulatory Acts. Agencies with jurisdiction over creek-related projects include, but are not limited to: 1) the US Army Corps of Engineers, 2) the California Department of Fish and Wildlife (CDFW), and 3) the Regional Water Quality Control Board (RWQCB). Regulatory Acts that may apply to creek projects in this area include the Clean Water Act, the Porter-Cologne Act, State Fish and Game Code, as well as the Migratory Bird Treaty Act, the California Environmental Quality Act (CEQA), and possibly the Endangered Species Act.

Various levels of permitting may be required depending on the level of improvements proposed. Routine maintenance and some habitat enhancement may be possible with only agency consultation. Other works such as bank stabilization may require more extensive permitting, depending on the particulars of the project. Ongoing coordination with the regulatory agencies may result in a palette of improvements that the agencies are likely to approve, or more clearly defined project criteria, reducing uncertainty for property owners. A comprehensive Downtown Creeks Plan may result in reduced permitting requirements, facilitated permitting, or reduced fees.

## PROPERTY OWNERSHIP

The creeks included in this study are predominantly under private ownership. Since most segments of the creeks within this study are privately owned, homeowners and businesses will need to coordinate with the City of Lafayette and with State and Federal agencies to achieve the goals of the Lafayette Downtown Creeks Plan, and ensure that any modifications, enhancement or development conforms to established regulations and policies.

Coordinating the permitting and logistics required for effective eradication of the invasive species within the creek channel will require a comprehensive approach, such as a master maintenance program.

See Figure 2-8 for the creek properties within the study area that are under public ownership or easement. Almost all parcels adjacent to Downtown creeks are privately owned, so realizing the vision of the Downtown Creeks Plan will require the cooperation and support of these private property owners.



Figure 2-8: Public ownership and easements.

## OPPORTUNITIES

This Assessment Report identifies multiple opportunities for enhancements and improvements to Lafayette's downtown creeks. Many of these are discussed more specifically in the following chapter, Existing Conditions. The opportunities fall into a number of general categories.

**Riparian Revegetation:** Removal of invasive species and re-vegetating with native riparian plant species is fundamental to improving the stability, health and habitat value of the creeks, addressing erosion issues, as well as improving visibility from public and private properties. As noted in the previous section, mechanisms to accomplish this in a comprehensive and coordinated manner will need to be developed.

**Wayfinding System:** Currently, the creeks running through the downtown are somewhat hidden, and many visitors to the downtown do not realize that the creeks exist. Establishing a consistent treatment at overlooks or other visual access points can raise awareness of the extent of these beautiful features. A family of fences, benches, bollards, interpretive signage or other site furnishings can become symbols of the creek presence.

**Shared Parking:** In many cases, the creeks run through the backs of properties adjacent to parking lots. Downtown parking is currently very segmented and inefficient. The Downtown Specific Plan recognizes that a consolidated approach to parking is a priority in the area. Construction of a parking structure or shared parking could allow for improved pedestrian access and enhanced uses that take advantage of the presence of the creeks.

**Creek Setbacks:** While building setbacks are necessary for creek bank and property protection, the setback areas may provide suitable opportunities for pedestrian activity and physical or visual access to the creeks. Figure 2-7 illustrates a typical condition along the downtown creek reaches. Most of the potential improvements along the creek reaches will be accomplished when a property is redeveloped.

Implementation of the Downtown Creeks Plan will be accomplished incrementally over the long term.

**Low Impact Development Measures:** New development and redevelopment must incorporate measures to control stormwater runoff. These regulations require site designs that minimize the area of new roofs and paving and in most cases require remaining runoff from impervious areas to be captured and used or treated using bioretention. In some developments, the rates and durations of site runoff must also be controlled.

**Bioretention Areas:** Creation of bioretention areas are the most effective means of both reducing the amount of pollutants that enter the creek channels, and reducing erosion and flooding risks during storm events. Bioretention areas reduce heavy metal and other toxic runoff into creeks by means of vegetative uptake, absorption by clay, filtration and biodegradation. Bioretention areas also serve to allow excess road water and other impervious surface runoff to be absorbed into the soil before it reaches a creek, thereby reducing water inflows into the creeks and reducing creek channel flooding and erosion risk.

Stormwater control measures for individual projects can be designed to enhance the Downtown creek corridors. Opportunities may also exist for neighboring parcels to consolidate their designs and locate their stormwater control features in a manner that is integrated with the Downtown creek corridors.

Water quality conditions could also be improved by removing concrete and rock from the creek and replacing it with native riparian vegetation.

Additional creek bank stability improvement recommendations for each creek reach area can be found in Appendix A, the Hydrologic and Geologic Assessment Summary.



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## CHAPTER 3: EXISTING CONDITIONS, LAND USE AND ENHANCEMENT OPPORTUNITIES

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PLAN AREA REACHES



Figure 3-1: Overall Map

NOTE ON MAPPING SOURCES: Throughout this chapter, aerial base imagery is from ERSI, parcel boundaries and topographic information is from the Contra Costa County GIS website (2015), bank condition information provided by ENGE0, and biological survey was conducted by Environmental Collaborative in September, 2015. Biological Conditions maps were produced by www.digitalmappingsolutions.com on 2015-11-04. Additional mapping features were produced by Gates + Associates.



# EXISTING CONDITIONS, LAND USE AND ENHANCEMENT OPPORTUNITIES

## WEST REACH - LAFAYETTE CREEK

### SUMMARY

#### Location

- Located in the West End District; western gateway to Lafayette.
- Along Mt. Diablo Blvd., across from the Veterans Memorial Center

#### Creek Conditions

- Several areas of large and moderate bank erosion were noted along this segment.
- The 100-year Flood Zone extends approximately 50 feet at its widest point from the north and south creek banks.
- Creek conditions are natural for most of this section; there is a culvert at the western end.
- Steeply incised creek banks characterize this reach.

#### Land Use Context

- The parcel that largely encompasses the West Reach is owned by the City of Lafayette.
- Mt. Diablo Blvd. is located immediately north of the creek.
- Residential units and one commercial building are located on the south side of the creek.

#### Biological Conditions

- Black walnut trees are the predominant tree species along this creek section.
- Non-native invasive plants are found along the entire length of this section.

#### Outdoor and Pedestrian Use Space

- No existing outdoor use areas are located in this area.

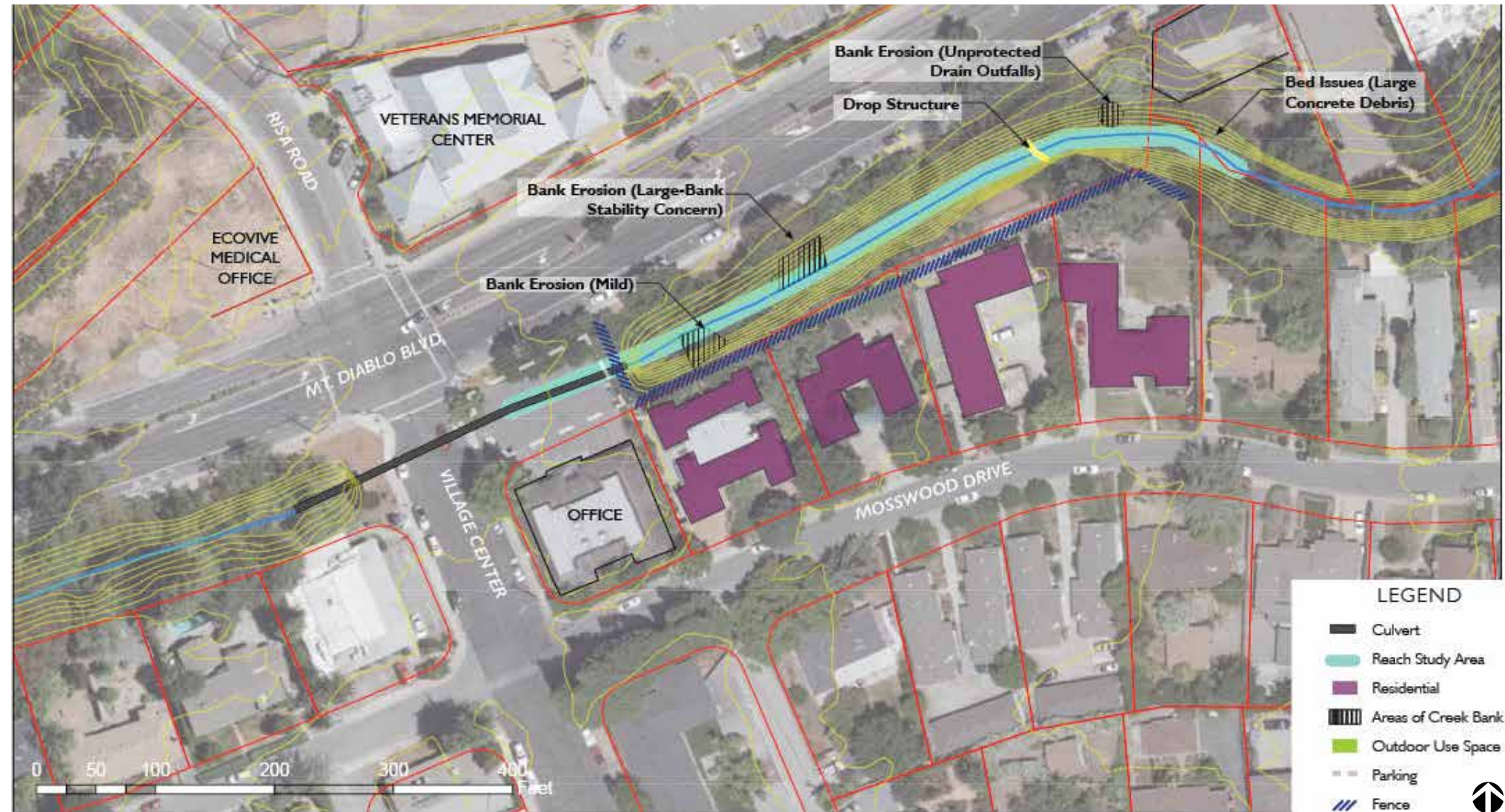


Figure 3-2: West Reach Existing Conditions.

#### Opportunities

- Address erosion issues that threaten Mt. Diablo Blvd.
- Create a riparian habitat restoration demonstration area
- Enhance the creek experience for pedestrians
- Create a bulb-out and bioretention area
- Create a gateway for Lafayette celebrating the creeks



KEY MAP



**WEST REACH - LAFAYETTE CREEK**

**Creek Conditions**

Of all the creek sections, this section of Lafayette Creek has the closest proximity to Mt. Diablo Blvd. and is easily visible to pedestrians walking along Mt. Diablo Blvd. It is the only reach in the Downtown Creeks Study area to be owned almost entirely by the City of Lafayette.

The West Reach has natural creek conditions except for the culvert that runs under the parking lot at the west end of this study area.

The banks of the creek are steeply sloped in the West Reach, and there is no floodplain.

Several areas of bank concern have been noted along this section of the creek. There are two areas of bank erosion, one unprotected storm drain outfall, and one area with bed issues where concrete debris has accumulated. The largest area of erosion and concern is located just opposite the Veterans Memorial Center. In this location, the bank is being severely undercut, exposing much of the root system of a large buckeye tree, and threatening to undermine the road stability of Mt. Diablo Blvd. Undercutting of the root zone is estimated to be between 50-70%. On the western end, there is an area of mild erosion. The drop structure is located approximately 200 feet east of the large stability concern area.

The 100-year Flood Zone extends approximately 50 feet from both creek banks at its widest points, and therefore is mostly contained within this segment.

**Land Use Context**

Located within walking distance of the Lafayette Reservoir, the pedestrian and bike pathways are heavily used along the West Reach. Many reservoir visitors use the streets in this area to park their cars and walk up to the reservoir. This area is easily accessible via BART and nearby commercial buildings, and does represent a transitional area between Lafayette’s commercial downtown and the rural area surrounding Lafayette Reservoir. As such, natural landscaping and landscaping materials are preferred for this area.

Land use in the West End District is predominantly commercial and residential, and some civic buildings as represented by the Veterans Memorial Center. However, this section of the creek has no buildings immediately adjacent to the northern creek bank; the northern creek bank is bordered by pedestrian paths, bike paths, and Mt. Diablo Blvd. Residential buildings are located on the south side of the creek, however they are separated from the creek by solid wood fencing.

No buildings fall within the perimeter of the 100-year Flood Zone, although portions of the residential yards do sometimes extend into this zone.

**Outdoor and Pedestrian Use Space**

Outdoor use areas include the public sidewalk, pedestrian paths and bike paths along Mt. Diablo Blvd. Some informal footpaths lead to the creek banks.



*Walking path near Lafayette Reservoir along Mt. Diablo Blvd.*



*Veterans Memorial Center*

# EXISTING CONDITIONS, LAND USE AND ENHANCEMENT OPPORTUNITIES

## WEST REACH - LAFAYETTE CREEK

### Biological Conditions and Features

Invasive non-native plant species are very prevalent along this section of the creek. The invasive plants include English ivy (*Hedera helix*), giant reed (*Arundo donax*), and bamboo. The ivy is most prevalent, and is smothering the trees in this area.

Trees in this section of the creek include black walnut (*Juglans hindsii*), white alder (*Alnus rhombifolia*), California buckeye (*Aesculus californica*), live oak (*Quercus agrifolia*), and valley oak (*Quercus lobata*).



Figure 3-3: West Reach Biological Conditions



WEST REACH - LAFAYETTE CREEK

OPPORTUNITIES

Public Access and Use

Public ownership of this segment of the creek creates a unique opportunity to develop a gateway for the downtown area, and to create a model for creek restoration. Creating a model of creek restoration along this reach would exemplify the benefits of creek restoration to the public, and provide a blueprint for how to restore other areas of Lafayette’s creeks. Private land owners could leverage this information to restore segments of the creek which they own.

To improve pedestrian access to the creek from Mt. Diablo Blvd., the on-street parking on the east bound side of Mt. Diablo Blvd. could be eliminated and replaced with a wider sidewalk (pervious paving), overlook, and bioretention area. A bioretention area would serve a dual purpose of buffering pedestrians from busy Mt. Diablo Blvd., and cleansing stormwater runoff before it reaches the creek.

An overlook deck on the western end of this creek section could serve a dual purpose of increasing public access to the creek, as well as shoring up the area of high erosion concern. A second opportunity lies further east where the bank needs to be stabilized due to erosion issues. Bank stabilization in this area could also provide creek access.

Removal of invasive species would open views to the creek from this well-traveled sidewalk.

Habitat Restoration

The natural creek conditions that exist along the West Reach have suffered extensively from non-native invasive plant species. Removing the non-native vegetation, and re-vegetating with native riparian plants, would be an important component of restoring this area of the creek to more natural conditions. Removing the English ivy would also make the creek area and habitat much more open and visible to pedestrians.

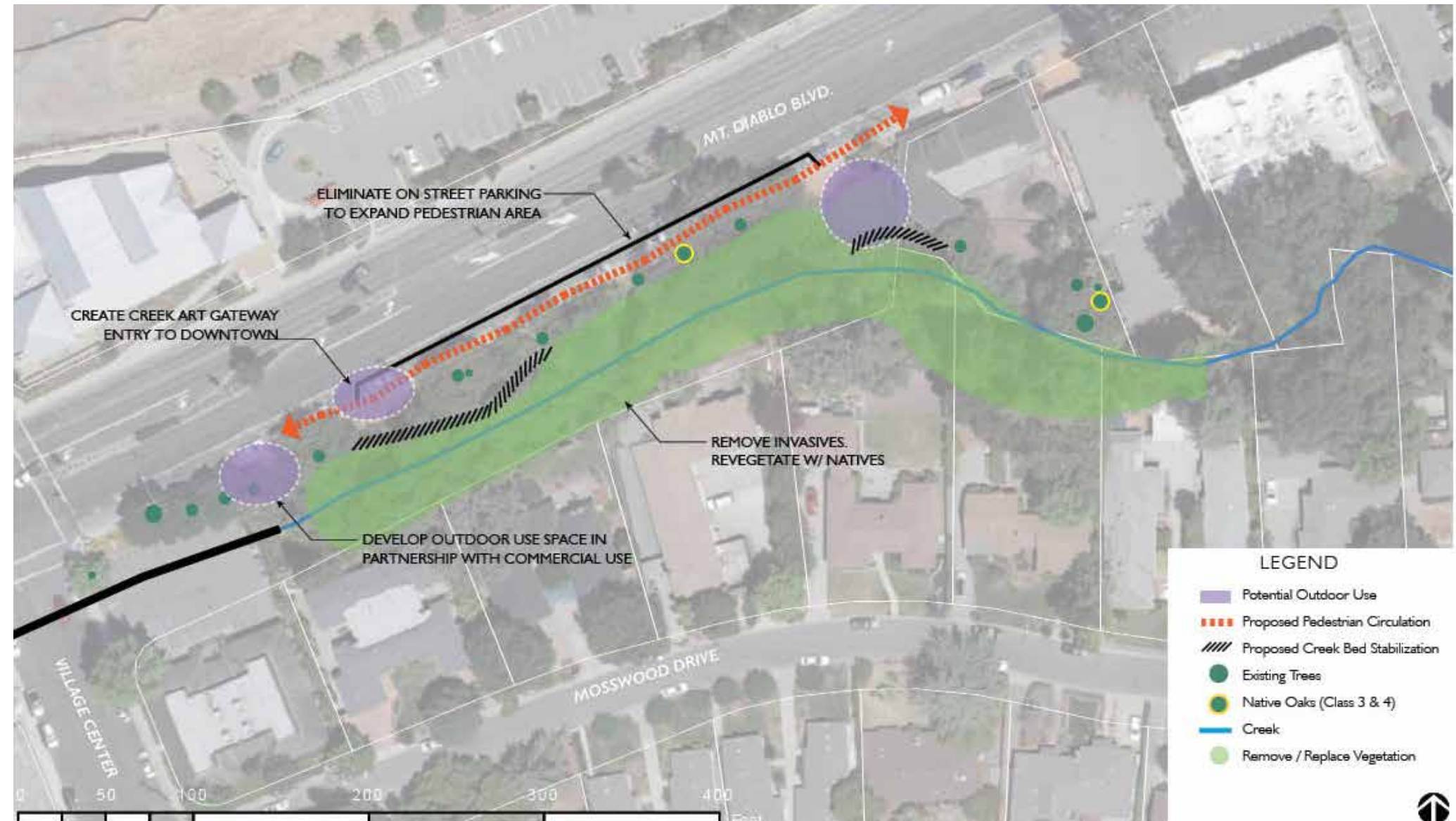


Figure 3-4: West Reach Opportunities



Current creek frontage along Mt. Diablo Blvd.



Possible enhancements include a wider sidewalk with overlook.



# EXISTING CONDITIONS, LAND USE AND ENHANCEMENT OPPORTUNITIES

## NORTH REACH - HAPPY VALLEY CREEK

### SUMMARY

#### Location

- Located between the western and eastern segments of Lafayette Circle, south of Mt. Diablo Blvd.

#### Creek Conditions

- The area is relatively flat with a minimal elevation change of approximately 16 feet.
- The 100-year Flood Zone extends approximately 75-125 feet from the creek banks at its widest points.
- Natural stream conditions with some culverts.

#### Land Use Context

- The creek is located on the rear property lines, often behind commercial parking lots and with limited linear access along the creek.
- High pedestrian use area due to the proximity to businesses, apartments and restaurants
- The south side of the creek is mixed-use with residential and business uses; commercial and retail uses are located on the north side of the creek.

#### Biological Conditions

- Some of Lafayette's largest and most attractive valley oaks are located in this reach.
- Invasive non-native plant species extend almost the entire length of the creek banks.
- Redwoods and valley oaks are the most common trees in this area.

#### Outdoor and Pedestrian Use Space

- A short existing path along the northern edge of the creek is not connected to other pedestrian paths.
- The Downtown Specific Plan has identified a potential Town Green site adjacent to the creek and several large valley oaks, behind the Roundup Saloon which is located on Mt. Diablo Blvd.
- There is no public outdoor use space immediately adjacent to the creek on the south bank.



Figure 3-5: North Reach Existing Conditions

#### Opportunities

- Create bioretention areas to improve water quality and ameliorate flooding
- Restore riparian habitat
- Improve north-south and east-west pedestrian connectivity
- Increase awareness of the creek from public rights-of-way



KEY MAP



Existing path along a portion of parking lot does not connect to overall pedestrian network.



The Downtown Specific Plan identified the area near Lafayette Circle and the creek as a potential site for a Town Green.



**NORTH REACH - HAPPY VALLEY CREEK**

**Creek Conditions**

The North Reach is a section of Happy Valley Creek that runs through the “Shield Block,” located in the central downtown area. At the western end of this reach, the creek emerges from a culvert under Mt. Diablo Blvd. and a parking lot. At the east end, the creek enters a culvert that extends eastward under Lafayette Circle and La Fiesta Square. Natural creek conditions exist in the area between the two culverts.

The conditions of the creek between the two culverts are characterized by a moderately sinuous creek shape, and steeply incised creek banks with no floodplain. (See Appendix A: Hydrologic and Geologic Assessment Summary.) However, the upland and top bank zones are relatively flat with gentle slopes. Under ordinary conditions, the water depth along this segment is approximately 2-3 feet. During rain events and high water conditions, the creek depth can increase to 8-10 feet.

Moderate levels of bank erosion are occurring on both sides of the creek at the eastern end of this reach, extending approximately 300 feet. Erosion and undercutting has occurred under a concrete walkway at the base of the concrete wall at The Cooperage American Grill building, but the extent has not been determined. Two other smaller areas (extending approximately 30-50 feet) of mild to moderate erosion have been noted further west along this reach. Most of the erosion in this area is directly related to ivy. A large rain event will likely increase erosion in this area.

The 100-year Flood Zone area extends approximately 75-125 feet from the both creek banks at its widest points (see Figure 2-4).

**Land Use Context**

The North Reach is bordered predominantly by offices and retail businesses, and the parcels along the creek are privately owned. Located in the Shield Block, the Downtown Specific Plan (DSP) has designated this area as a primary retail center for the City. The DSP has noted that Postino restaurant, the Roundup Saloon, and the Hen House buildings, as well as the redwood trees and creek, are intrinsic to creating the small town feel in this block of the city. Due to the historical significance of the Shield Block, the DSP proposes a Town Green to be located in the area between the Roundup Saloon and the creek.

Several buildings are located within the flood zone including The Cooperage which is located entirely within the 100-year Flood Zone. Several other offices and residences on the southern creek bank are also located within the Flood Zone. The northern creek bank is flanked predominantly by parking lots. Buildings on the north side are set back farther from the creek, and only portions of those buildings are within the Flood Zone. Many of the existing buildings along the southern creek bank do not conform to current setback requirements.

**Outdoor and Pedestrian Use Space**

An office building located at the western end of the reach has a balcony overlooking the creek where the creek is easily visible; this property does not meet the current creek setback standard.

There is a small pedestrian trail along the northern bank at the edge of the Clocktower and Postino’s parking lot. Fences between properties prevent significant pedestrian movement along the creek as well as opportunities for shared parking and more efficient use of parking areas. North-south pedestrian connections across the creek are limited to the streets.

A small bioretention area and decomposed granite walking path is located across from The Cooperage and between two parking lot areas. Under a canopy of oak trees, a historical plaque denotes this area as the former home site of Elam Brown.



*The creek experience is dominated by parking lots and dumpster areas.*



*The foundation wall of the Cooperage could be an opportunity for a creek mural.*



*Bioretention area located in the parking area across from The Cooperage American Grill.*

EXISTING CONDITIONS, LAND USE AND ENHANCEMENT OPPORTUNITIES

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**NORTH REACH - HAPPY VALLEY CREEK**

*Biological Conditions and Features*

Some of Lafayette’s largest and most attractive valley oak trees are located in the North Reach near the planned Town Green site.

Trees located along the North Reach include native as well as some non-native tree species. Planted coast redwoods (*Sequoia sempervirens*) are the most prevalent species and serve as the primary cover, followed by valley oaks (*Quercus lobata*) and the California buckeye (*Aesculus californica*). The largest and most established of the trees are the redwoods and the valley oaks.

Plant species that are located along the banks of the North Reach include both native riparian plant species as well as invasive non-natives. English ivy, a non-native invasive plant, is the primary understory plant, extending almost the entire length of the North Reach. Other invasive plant species along this segment include giant reed (*Arundo donax*).

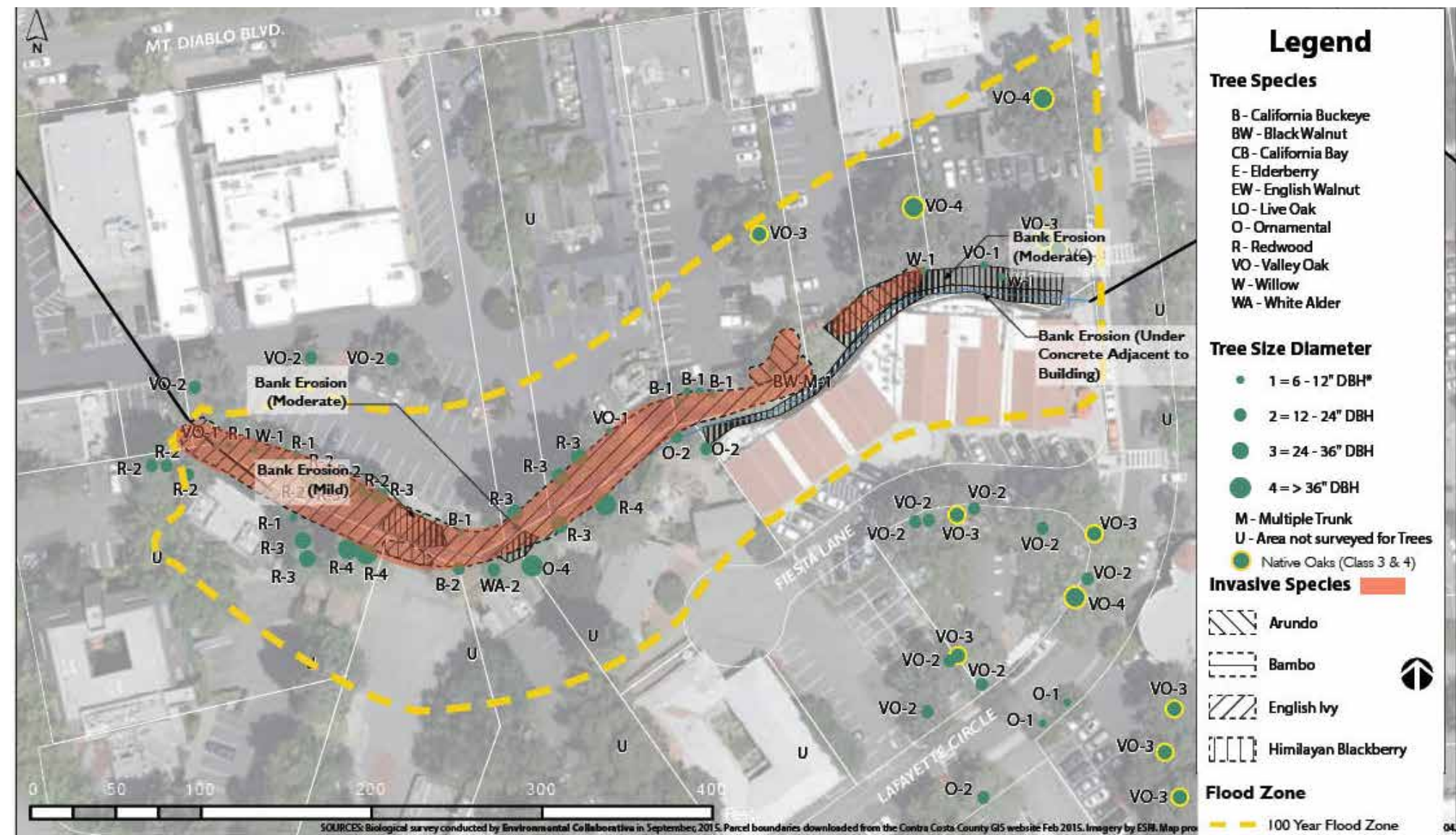


Figure 3-6: North Reach Biological Conditions



Future development should better integrate use of natural resources into site design.



# EXISTING CONDITIONS, LAND USE AND ENHANCEMENT OPPORTUNITIES

## NORTH REACH - HAPPY VALLEY CREEK

### OPPORTUNITIES

#### Public Access and Use

The North Reach is located in one of Lafayette's historic areas known as the 'Shield Block'; as noted in the Downtown Specific Plan, the architecture and passageways of this block provide some of the best examples of Lafayette's pioneering small-town character. This area is also the former home site of Elam and Margaret Brown; Elam Brown was one of the first Lafayette settlers and purchased Acalanes Rancho, which comprises most of modern day Lafayette. Since much of this segment of the creek has natural creek conditions, and it is located in one of Lafayette's most historically significant areas, restoring the riparian habitat and conditions along this reach would further solidify and unify the historic character of the Shield Block.

The North Reach has the potential to provide an area where people could gather under the large Valley Oaks and enjoy the ambience of the creek after coffee, lunch, or shopping. The Downtown Specific Plan and the Lafayette Trails Master Plan recommend creekside trails through the Shield Block. Such trails would provide an easily accessible environmental education opportunity for children and adults and an area where interpretive signs could be placed along pedestrian pathways and creek overlooks. The Town Green proposed adjacent to the creek on the north side should integrate the creek experience into its design.

Some of Lafayette's most mature Valley Oak trees are located in the Shield Block and visible from Lafayette Circle; these trees could be highlighted for their historical and ecological significance to the city. Making these trees a focal point in the landscape by adding seating or interpretive signage would emphasize their importance to Lafayette.

Improved pedestrian circulation will be paramount to increasing public access to the creek. To achieve this goal, it will be important to connect existing east-west oriented paths along the creek bank with

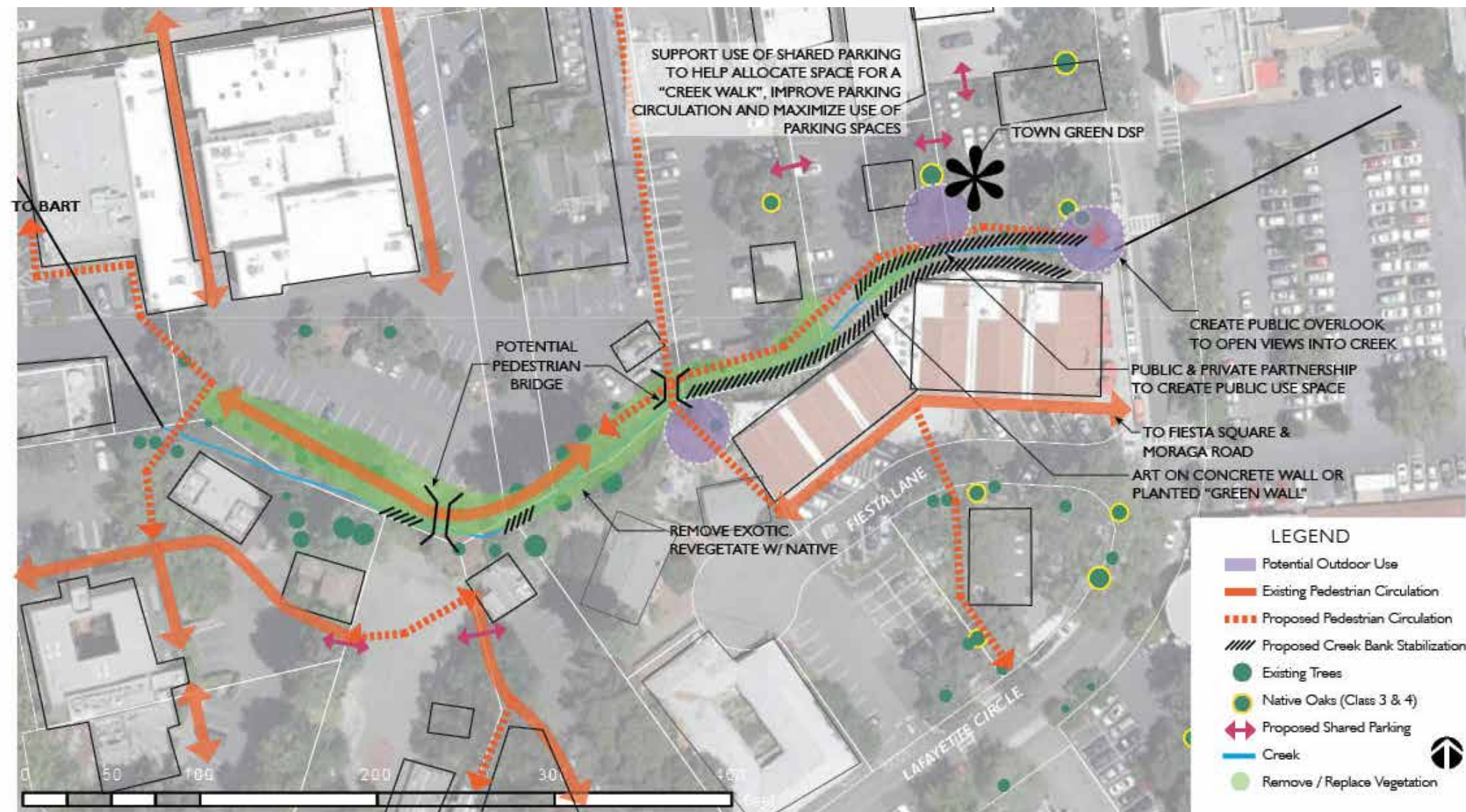


Figure 3-7: North Reach Opportunities.

new paths, enabling direct access between The Cooperage, Postino, and La Fiesta Square via the creek. Additionally, it will be important to expand north-south pedestrian access across the creek, and two approximate locations have been identified in the Downtown Specific Plan as potential sites for a future bridge. A bridge across the creek would link the pedestrian activity on Lafayette Circle and Mt. Diablo Blvd. The first proposed bridge site is located toward the end of Fiesta Lane, crossing to the Postino Restaurant property. Postino representatives are supportive of the bridge. The second site is located

slightly further west from this site, and fewer trees would need to be removed during bridge construction. The second site has more open vantage points, and may provide a better view of the creek in both directions.

A parking garage included in the Downtown Specific Plan could provide the impetus for improving the creek experience with a trail through what are currently parking lot areas. Fewer parking stalls along the creek would increase the available land for pedestrian paths and bioretention areas. In



Retail uses can benefit from the special creekside ambiance.



addition to the ecological benefits of bioretention areas (described in the Habitat Restoration section), bioretention areas can beautify an area, further enhancing the pedestrian creek experience.

Views of a creek are a significant component of the creek experience that could be enjoyed by all. A universally accessible street level overlook deck located adjacent to the sidewalk along Lafayette Circle would have a variety of benefits. An overlook with seating adjacent to the street would provide a gathering spot for visitors, its visibility from the road would increase awareness of the creek, and interpretive signage could be installed to educate visitors on the riparian habitat.

Re-imagining the concrete wall along the creek under The Cooperage as an asset could re-vitalize commercial and retail businesses along the creek corridor. A mural on this wall could integrate images or concepts relevant to a riparian ecosystem, and could also be part of the visual experience from the overlook. Another option could be to install and irrigate plants on the wall face so it becomes a “living green wall.” Additionally, outdoor dining and display areas facing the creek could be created within the creek setbacks.

The majority of improvements proposed for this area would occur incrementally over time, and would be linked to the redevelopment and improvement activities on individual properties.

**Habitat Restoration**

Creek restoration along the North Reach will provide numerous benefits for the riparian ecosystem and the community. Replacing the ivy with native riparian vegetation would help stabilize the creek banks and help address erosion issues. In addition to the

environmental benefits, habitat restoration can be a means of community engagement through volunteer efforts to remove the ivy.

Water quality is fundamental to a healthy creek ecosystem. Runoff from parking lots during rain events is a major source of pollutants, and whenever possible, water runoff from parking lots directly into creek systems should be prevented. Since there are numerous parking lots located immediately adjacent to the creek banks in this reach, direct runoff is likely reducing creek water quality. Reconfiguring and designing the parking lots and pedestrian access through these areas could provide an opportunity to develop bioretention areas at the rear of the parking lots above the creek banks. Bioretention areas would filter polluted runoff from the parking lots, improving the water quality entering the creek along this segment of the creek. Slowing water runoff into the creeks, and allowing more water to percolate into the soil via the bioretention areas, could also ameliorate flooding risks due to constrictions at the culvert locations and loss of floodplain within the creek banks.

Earlier pro-bono planning by Restoration Design Group for the Shield Block, subsequent to adoption of the Downtown Specific Plan, developed a more ambitious creek restoration concept. This concept, illustrated in the figure to the right (Figure 3-2), identified a 31’ setback requirement from the toe of slope on each side pursuant to the City’s existing setback ordinance. This setback area was allocated to the creek and permitted a wider and restored riparian channel for flood water storage, habitat restoration, and a “creek walk.”



Figure 3-8: Restored riparian channel concept sketch  
Source: Restoration Design Group



# EXISTING CONDITIONS, LAND USE AND ENHANCEMENT OPPORTUNITIES

## SOUTH REACH - LAFAYETTE CREEK

### SUMMARY

#### Location

- Located in the Downtown Retail District between Lafayette Circle to the north and Moraga Road to the east

#### Creek Conditions

- Creek banks are relatively steep; some erosion and existing support structures are in need of repair.
- Natural creek conditions except for the culvert under the parking area and access drive, and the culvert under Moraga Road.
- Due to constrictions created by culverts, the 100-year Flood Zone is quite extensive on the north side of the creek. Creekside buildings opposite the Methodist Church and most of the area upstream from the parking lot culvert are located within the Flood Zone.

#### Land Use Context

- Multi-family and single family residential is located on the north and northwest side of the creek.
- La Fiesta Square is located on the north side of the creek.
- Lafayette United Methodist Church is the largest building complex on the south side of the creek.

#### Biological Conditions

- The predominant tree species are valley oaks and non-native ornamentals.
- Invasive non-native plant species extend the entire length of the non-culverted stream bank.

#### Outdoor And Pedestrian Use Space

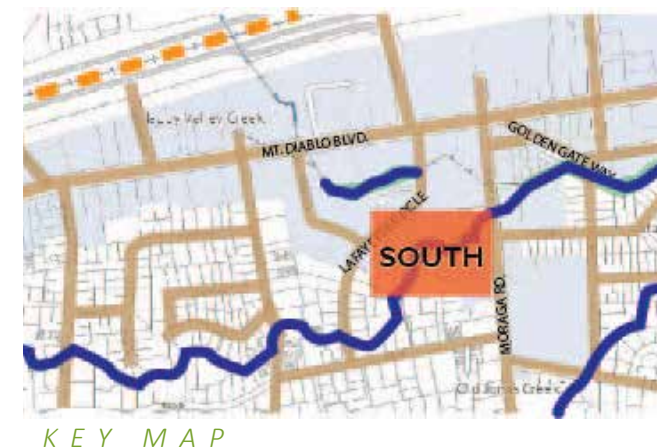
- Creek-side garden and outdoor areas exist on multi-family, Futures Explored, and the church properties.
- Existing pedestrian paths connect Moraga Road to the parking areas west of the church.



Figure 3-9: South Reach Existing Conditions

#### Opportunities

- Replace the culvert under the parking lot with a bridge, and restore the natural creek channel.
- Restore riparian habitat.
- Expand public access to the creeks via expanded pedestrian pathways.
- Develop public use space adjacent to Moraga Road.



KEY MAP



Garden space near multi-family residences.



**SOUTH REACH - LAFAYETTE CREEK**

**Creek Conditions**

The banks of the South Reach are much steeper than those of the North Reach. The steeper banks required the construction of support walls and fencing toward the western end of this section; however, these structures are now in danger of collapsing into the creek. Toward the eastern portion of this section, a deck at the Cake Box is located within the creek high water mark.

Two culverts are located along this section of creek; one extends under Moraga Road, and the other extends under the access drive to the church parking lot. Between these culverts, wooden support wall structures are in danger of collapsing, and there is an area of mild bank erosion. The slopes are steep along this creek segment, and stabilization of the creek bank is recommended.

Despite the steep banks in several areas of the creek, just north of the creek where the slopes are nearly level, the 100-year Flood Zone extends approximately 300 feet at its widest points, crossing Moraga Road and Lafayette Circle. Inadequate culvert capacity is largely responsible for the expansive upstream flooding.

**Land Use Context**

The South Reach is located in the Downtown Retail District which includes the busy retail center of La Fiesta Square located north of the creek; the area also supports a wide variety of other land uses. Immediately adjacent to the creek banks, there are mixed-use areas that include privately owned residential, retail and church properties. There are no city-owned parcels.

On the eastern end of this Reach, Lafayette United Methodist Church is located along the south creek bank, and its parking lot straddles the creek. Several commercial and retail business are located opposite the church on the north creek bank along Wilkinson Lane, which connects to parking at La Fiesta Square.

The creek located behind these businesses is overgrown with non-native vegetation, and the creek banks are littered with trash. Before it passes through the culvert under Moraga Road, the creek is visible from the sidewalk; the traffic noise from Moraga Road limits the auditory benefits of the creek.

Residential buildings are located predominantly near the western end of the South Reach, and consist of both single family and multi-family units.

Several commercial and residential buildings fall within the 100-year Flood Zone on the north side of the creek, as can be seen in the map on the following page. Along the western end of this creek section, approximately seven residential buildings and two apartment buildings are located within the Flood Zone.

**Outdoor and Pedestrian Use Space**

There are eight existing outdoor use areas in the vicinity of the South Reach. The largest outdoor use area is located just outside the Cake Box and south of Sugi, on the north side of the creek, near Moraga Road; the creek area nearest Moraga Road has become overgrown and unused.

Several residential structures, Futures Explored, and the Methodist Church have created well-used creekside outdoor spaces. The multi-family residential space has a garden and children’s play area located on the north side of the creek; a cyclone fence separates the garden and play area from the creek bank. The site is quiet, well removed from traffic noise, and the creek can be easily seen and heard from this garden setting. Futures Explored has also taken advantage of their creekside setting and has created a picnic area along the creek under the oaks; although this picnic area is also near the parking lot, it is quiet, and the sound of the creek can be easily heard at this site. Similarly, the Lafayette United Methodist Church garden, which has native riparian plantings and seating, also benefits from a quiet creekside setting on the south bank of the creek. At the western end of the church parking lot is a site where several shipping containers are located immediately adjacent to the creek; this site

would be an ideal setting for picnic tables or other outdoor uses, and the shipping containers are not optimizing the outdoor use of the creekside setting. There is a pedestrian pathway from Moraga Road through the church lot to the parking lot that connects to Lafayette Circle. An informal pedestrian pathway connects the north end of East Street to the church parking lot. The church parking lot crosses the culvert, creating north-south access across the creek, and links to the parking lot near Futures Explored.

A number of other outdoor use spaces are located further away from the creek. A former private residence along Lafayette Circle which has been converted to commercial space, has a relatively large garden area located behind the building. This garden area has picnic tables and is shaded by the canopy of a large pine tree. There is also a large play area located adjacent to American Kitchen, north of the creek, which can be accessed via the church parking lot.

The steep banks along the South Reach make pedestrian access to the creek bed difficult.



*Creek bank adjacent to the church is overgrown.*



*Attention is not drawn to the creek at Moraga Road.*



*Culvert beneath church parking lot*



# EXISTING CONDITIONS, LAND USE AND ENHANCEMENT OPPORTUNITIES

## SOUTH REACH - LAFAYETTE CREEK

### Biological Conditions and Features

Invasive non-native plant species extend along the entire length of the banks of the non-culverted portion of the South Reach. English ivy (*Hedera helix*) and Himalayan blackberry (*Rubus armeniacus*) are the predominant invasive non-native species.

Trees located along the South Reach include native riparian as well as some non-native species. Unlike the North Reach which has an abundance of redwood trees, Redwoods are scarce along the South Reach. The predominant tree species is the valley oak, and a variety of non-native ornamental trees are the second most common tree type. A number of large native oak trees have been identified along this Reach.

Himalyan blackberry is forming dense thickets out-competing native vegetation, and English ivy is smothering existing trees in the South Reach. In addition to out-competing native riparian vegetation, the dense growing habit of the blackberry also limits creek access by larger animals, thereby impacting the creek flora and fauna.

A small stand of bamboo is another invasive species found on the south bank of this reach.

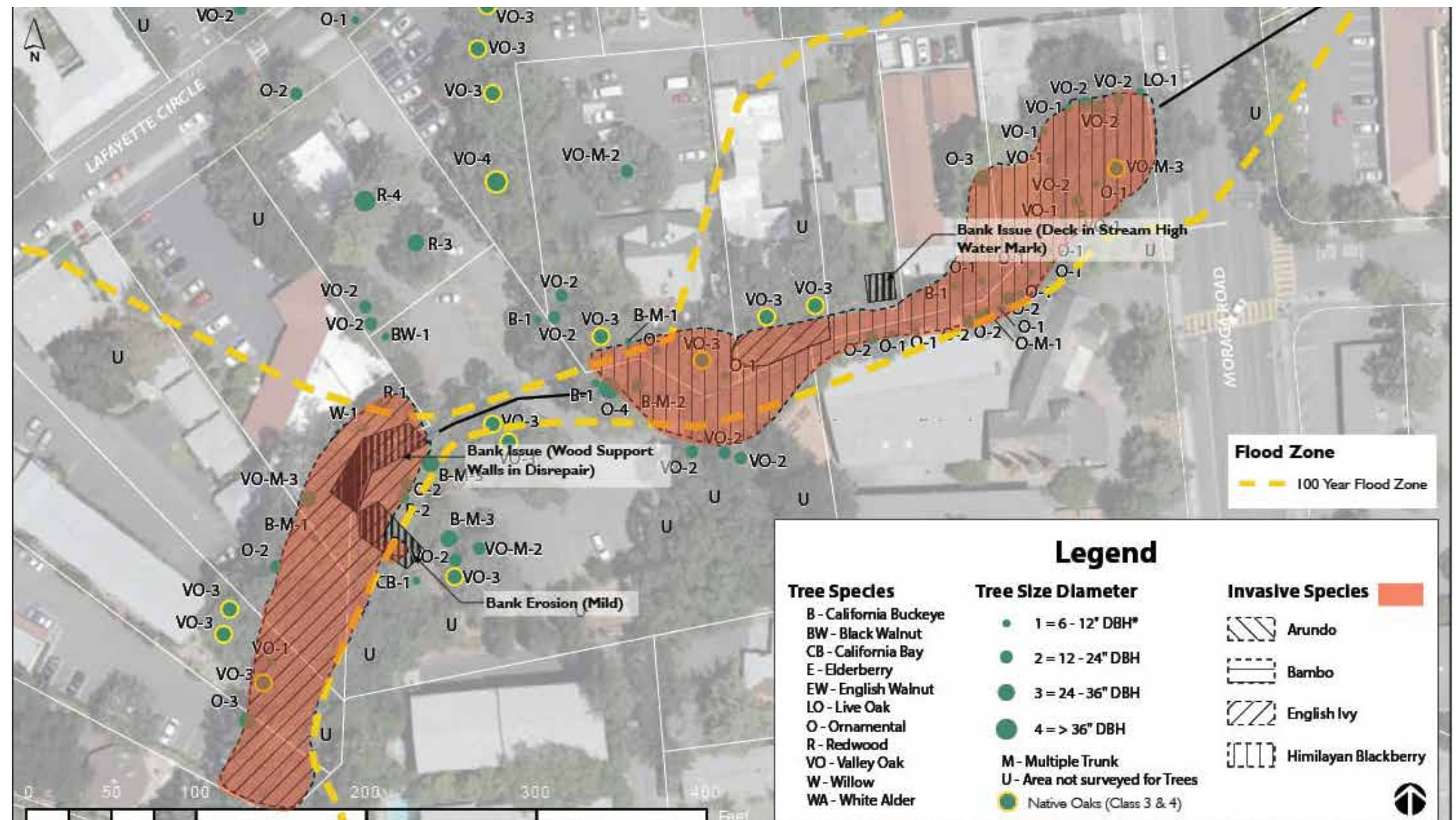


Figure 3-10: South Reach Biological Conditions



**SOUTH REACH - LAFAYETTE CREEK OPPORTUNITIES**

**Public Access and Use**

New pedestrian walkways in this segment could create a more cohesive sense of place. A network of pedestrian pathways would serve to connect the church, nearby residential sites, retail businesses and the creek area more directly, thereby integrating the riparian corridor into the everyday lives of Lafayette residents. Pathways located further away from busy streets such as Moraga Road, would allow pedestrians to enjoy not only views of the creek, but also the pleasant sound of the running waters of the creek.

The natural creek conditions of the South Reach could be optimized to expand the public’s interaction with the creek. Orienting retail uses toward the creek through expanded outdoor seating or patio areas would create opportunities to achieve this goal. In particular, the outdoor space near the Cake Box provides an excellent creek-facing retail opportunity.

A big community impact could be made by converting the small parking lot off Moraga Road to a public outdoor space. The high visibility of this parking lot from Moraga Road, and its proximity to the Church and the Lafayette Elementary School, could be transformative for the community. At this site, the sidewalk could be widened, and a creek overlook could be created. Cleaning up the densely overgrown vegetation opposite Sugi’s would create another public space area within a grove of valley oaks in an area highly visible from Moraga Road.

These public access areas could also be locations for raingardens or other bioretention, along with interpretive signage.

**Habitat Restoration**

The natural creek conditions along the South Reach make it possible to restore and enhance the habitat area and address bank stabilization needs. A significant enhancement to biological conditions could be achieved by replacing the culverted creek

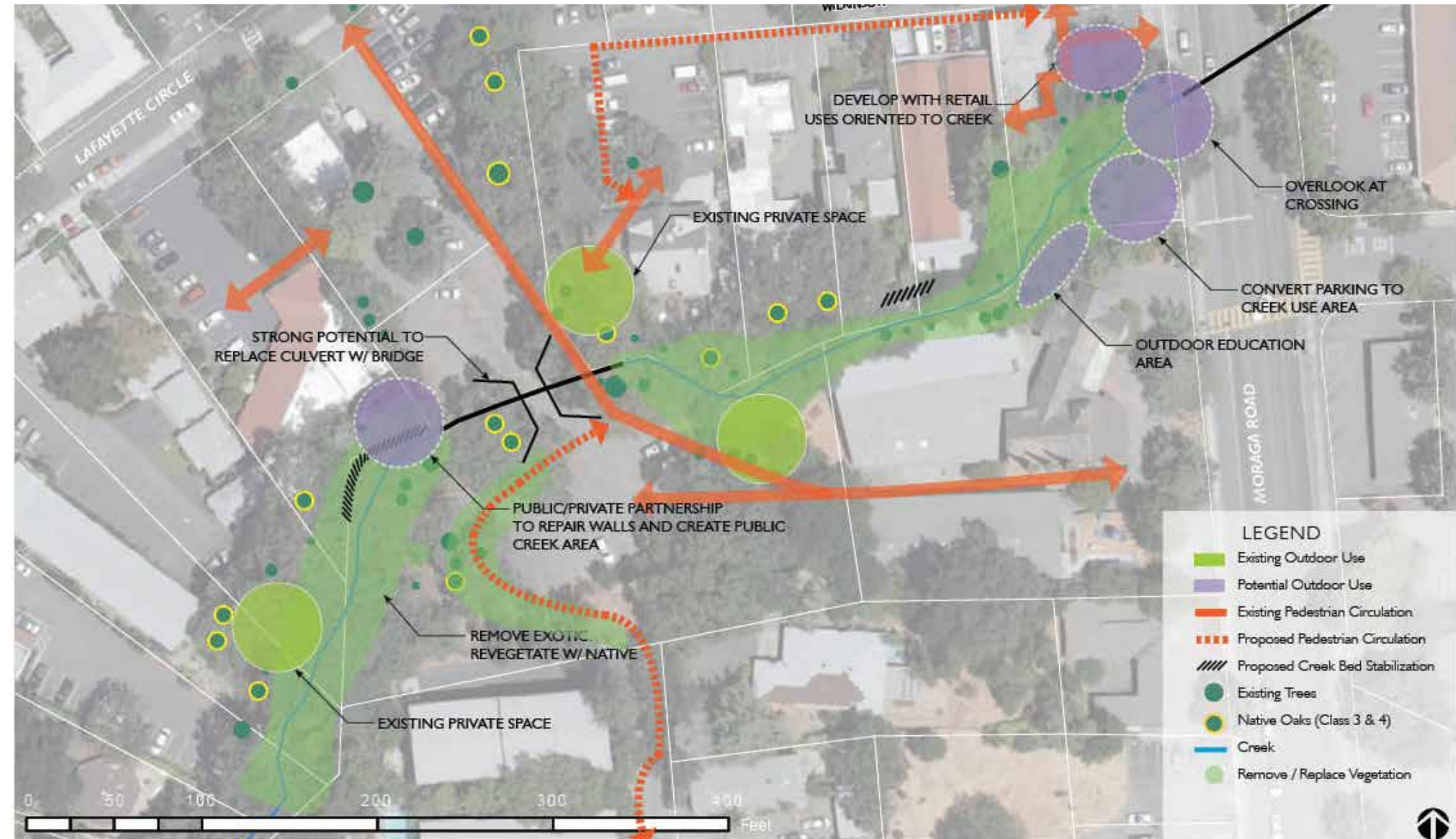


Figure 3-11: South Reach Opportunities

section through the parking lot with a bridge. The hydrological impacts of removing the culvert would need to be carefully studied to ensure existing flooding problems are not worsened. The creek banks are densely overgrown along this segment, and as a result, there is limited visibility of the creek below. English ivy and Himalayan blackberry will need to be removed to restore the area. After removal of the invasive plant species, the banks should be re-vegetated with deep rooted native plants to facilitate creek bank stabilization and to provide habitat for migration of native animals.



Signage can interpret creek features



Overlooks can provide visual access



Photosim of potential overlook area



# EXISTING CONDITIONS, LAND USE AND ENHANCEMENT OPPORTUNITIES

## EAST REACH 1 - LAFAYETTE CREEK (CHANNELIZED)

### SUMMARY

#### Location

- Located in the Plaza District of the Downtown Specific Plan and the Plaza Way Character Area.
- South of Golden Gate Way (one block south of Mt. Diablo Blvd.), near 1st Street

#### Creek Conditions

- Fenced concrete U-channel; no natural creek areas.
- The 100-year Flood Zone extends approximately 100 feet at its widest from the north and south creek banks.

#### Land Use Context

- A variety of mixed-use and commercial buildings are located on the northern side of the creek.
- Single-family residences, multi-family residential units and parking areas are located on the south side of the creek.
- The Lafayette Library, a major community destination, is located in this area.
- The Downtown Specific Plan has a park proposed in a portion the parking lot opposite the Library.
- Public parking and pedestrian enhancements have been developed along Golden Gate Way.
- The Plaza Way Overlay District provides an opportunity for outdoor use space and pedestrian access.

#### Biological Conditions

- Several significant oak trees and a redwood grove are located in this area.
- Outdoor and pedestrian use spaces are located along Golden Gate Way.
- A circular bench seating area is located along Golden Gate Way near the Theater.

#### Opportunities

- Modify / enhance the surface of the concrete



Figure 3-12: East Reach 1 Existing Conditions

channel to more closely mimic a natural creek channel and/or create more natural creek bed conditions

- Obscure the view of the barbed wire fence with taller native riparian vegetation
- Develop pocket parks along Golden Gate Way to link Lafayette Plaza Park to the library and future public park
- Create a pedestrian connection between Moraga Road and the Library
- Place utilities underground to provide unobstructed views of mature creekside trees



KEY MAP



Parking access and pedestrian link to senior residence garden



**EAST REACH 1 - LAFAYETTE CREEK (CHANNELIZED)**

**Creek Conditions**

A deep concrete U-channel, surrounded by a cyclone metal fence topped with barbed wire, extends the entire length of East Reach 1 segment. The concrete U-channel often results in dangerously high creek velocities within this segment during rain events. Additionally, the height and depth of the channel pose a public safety risk, requiring the channel to be secured with the fence. Steep creek bank slopes are found along an approximately 400-foot section at the west end of this reach, which leads to the edge of the concrete creek channel.

The cyclone fence topped with barbed wire creates a harsh and unwelcoming visual of the creek, although the tall trees along the creek bank mitigate this effect somewhat. In contrast, since this is a relatively quiet area of the city, the creek and the sound of moving water can be easily heard, creating a pleasant auditory experience.

At its widest points, the 100-year Flood Zone extends approximately 50-100 feet from both creek banks along this section. Parking lots and limited portions of some structures are located within the Flood Zone. Overall, the U-channel is effective for flood control.

The Contra Costa County Flood Control and Water Conservation District (Flood Control District) holds an easement, and maintains, the channelized segments of the creek.

**Land Use Context**

Some of Lafayette’s oldest buildings are located in this district and include the Pioneer Store Buildings, and Wayside Inn. The Downtown Specific Plan (DSP) identifies this area as the Plaza District, which is characterized by an eclectic mix of civic, retail, commercial and residential uses anchored by Lafayette Plaza, and the Lafayette Library and Learning Center. Elam Brown donated the Lafayette Plaza site, to the city of Lafayette in 1852; this site was the City’s first public space. The plaza is used for public events

such as outdoor concerts and wine tasting events. Historic buildings, some of the oldest in Lafayette, front the Plaza.

In the DSP there is a park proposed across from the Library in what is now a parking lot for mixed-use buildings near the intersection of Golden Gate Way and 1st Street.

Pedestrian paths are currently limited to the sidewalks along Golden Gate Way, and the north and south sides of the creek can be accessed via a parking lot located adjacent to the senior community of Chateau Lafayette. Improved pedestrian and bicycle connectivity is one of the primary goals of the DSP for East Reach 1, 2 and 3.

**Outdoor and Pedestrian Use Space**

On the east side of the theater, just above the creek, a small outdoor space is located near the parking spaces for the former Lafayette Pet Shoppe, which has a circular bench around a ginkgo tree. The ginkgo tree is not thriving because of the shady conditions created by the mature oak trees. The planting beds along the fence line have been neglected, and are predominantly compacted bare dirt with exposed drip irrigation lines. Furthermore, dumpsters are also located in this area, making the area uninviting for relaxing outdoor use.

Near the mixed use area, at the south edge of the parking lot, is a picnic table located above the creek. An outdoor use site adjacent the channel can be reached via a walkway, through an interior courtyard in the mixed use buildings.

The senior apartment complex, Chateau Lafayette, has developed a garden area adjacent to the creek. A bridge crossing the creek from Golden Gate Way provides access to a private parking lot and pedestrian access to the Chateau Lafayette garden area.

The pedestrian creek experience is limited to the sidewalk area along Golden Gate Way.



*Pioneer buildings.*



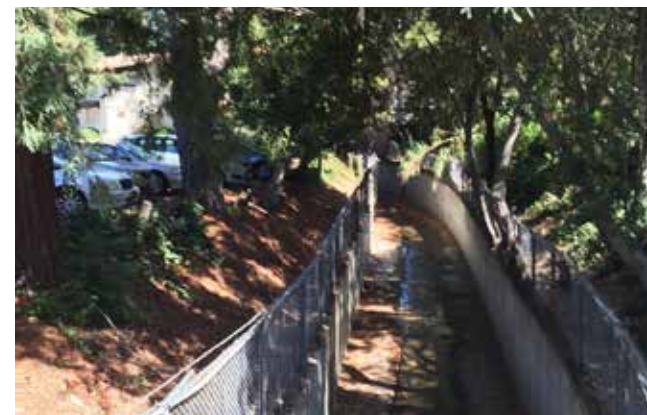
*Parking off Golden Gate Way*



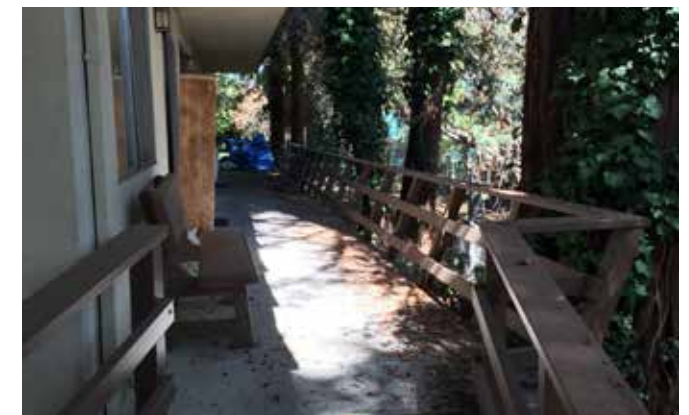
*Park Theater.*



*Lafayette Library and Learning Center.*



*Creek channel velocity is dangerous during rain events.*



*Pedestrian walk adjacent to creek is unused.*

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**EAST REACH 1 - LAFAYETTE CREEK (CHANNELIZED)**

**Biological Conditions and Features**

Mature tall trees, which demarcate the location of the creek, and which can be seen over the rooftops of buildings along Mt. Diablo Blvd. and Golden Gate Way, are integral to the character of East Reach 1 and its neighborhoods.

Trees located along this section of the creek include native as well as some non-native tree species. Similar to the North Reach which has an abundance of redwood trees, redwoods are fairly common along East Reach 1. There are also several significant valley oaks and live oaks in this segment.

Invasive non-native plant species are more limited along this section of the creek. The predominant invasive plant is English ivy (*Hedera helix*), located primarily along the north side of the creek.

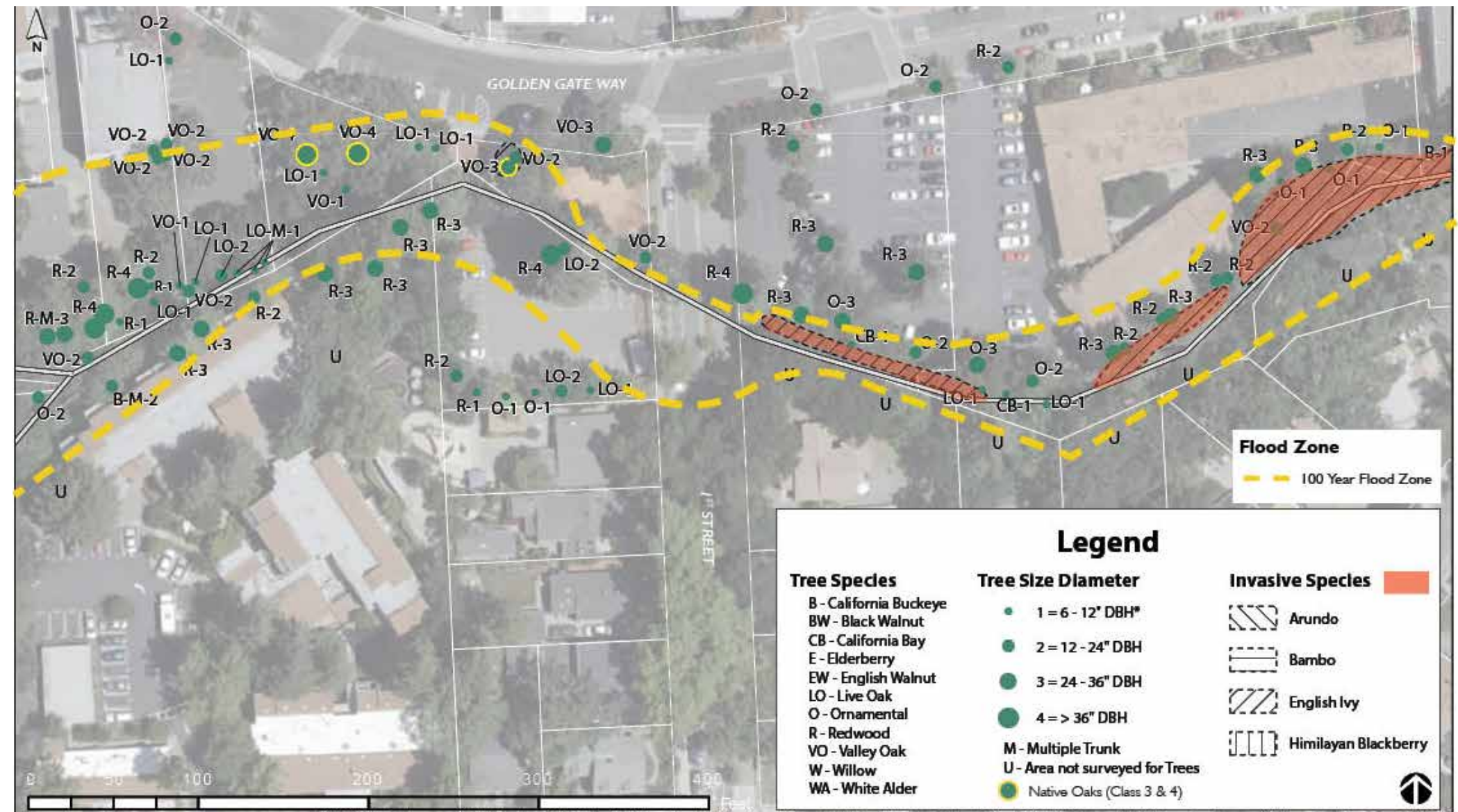


Figure 3-13: East Reach 1 Biological Conditions



Mature trees highlight presence of the creek



Treetops indicate creek corridor behind building



## EXISTING CONDITIONS, LAND USE AND ENHANCEMENT OPPORTUNITIES

### EAST REACH 1 - LAFAYETTE CREEK (CHANNELIZED)

#### OPPORTUNITIES

##### Public Access and Use

The Plaza Way Overlay District encompasses nine parcels between Lafayette Creek and Lafayette Plaza. This district encourages shared parking to improve parking circulation, make more efficient use of parking spaces, and provide opportunities for public access and outdoor use.

To align with the DSP pedestrian goals for East Reach 1, wayfinding elements could be incorporated along the sidewalks of Golden Gate Way to direct pedestrians to areas of historical, cultural or ecological significance. For example, wayfinding elements could direct pedestrians to a new park site proposed in the DSP in a portion of the existing parking lot south of Golden Gate Way, east of 1st Street, across from the Library. Wayfinding elements could also be used to direct pedestrians to a terrace overlooking a visually modified U-channel with walls that mimic natural rock walls of a creek. Interpretive signage at the terrace could provide natural history and ecosystem information about the creek. The Contra Costa County Flood Control and Water Conservation District would support a pedestrian path along the north side of their channel.

The senior community of Chateau Lafayette is located along this segment of the creek, and enhancing access to Golden Gate Way and the site of the proposed future park from Chateau Lafayette could enhance the outdoor and pedestrian experience for senior citizens. Improved pedestrian access could also improve access to the library for the senior citizen community. Specifically, east-west pedestrian pathways could be added along the north side of the creek to link Chateau Lafayette to both Moraga Road and Golden Gate Way. Linking Chateau Lafayette to the site of the future park and to the library via a creekside pathway would facilitate community involvement with the residents of Chateau Lafayette.

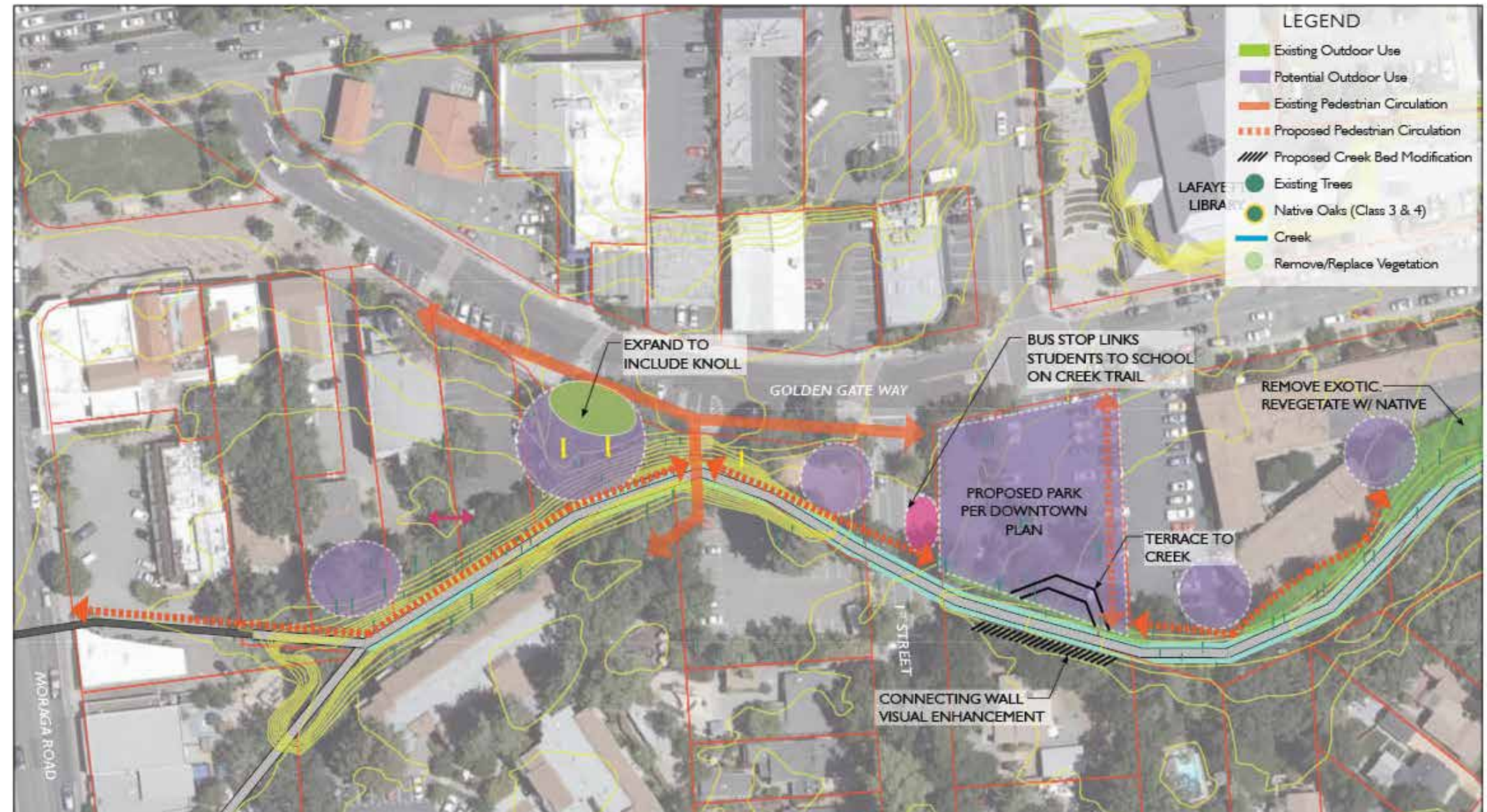


Figure 3-14: East Reach 1 Opportunities

In addition to the proposed park, there are two other outdoor use opportunities located along the north side of the creek where mini pocket parks could be created. The first opportunity is located along the creek in what is currently an empty lot along Golden Gate Way. The second site is where the circular bench and the Ginkgo Tree are located; this area could be expanded to include the knoll above the creek into a small pocket park. This potential knoll site has several significant valley oaks which could be integrated into a pocket park where people could meet either before or after visiting the downtown.



The concrete channel wall could be enhanced as shown here.



Unused space could be improved as a creek amenity



Two additional outdoor use areas exist near the mixed use buildings which could be expanded. At the end of the parking lot, and adjacent to the mixed used retail / housing buildings, a picnic table has been placed along the upper bank of the creek. This area could be enhanced by creating a larger green buffer zone between the picnic table and the parking lot, to provide a more serene outdoor experience; it is very easy to hear the creek from this location since the area is relatively quiet. There is an existing pedestrian path that extends along the backside of the buildings which could potentially be expanded to connect with an unused outdoor space beyond the inner courtyard of the mixed use buildings. Connecting the existing picnic area to the unused outdoor space could create a short greenery-filled walking loop which could be used by business customers and residents.

To align creek restoration activities with the DSP goal of creating a pedestrian and bicycle friendly area along Plaza Way and Golden Gate Way, raised crosswalks and intersections that were recently incorporated along Plaza Way could be extended into this area.

**Habitat Restoration**

The Flood Control District adopted “The 50-Year Plan” to convert its first generation infrastructure, such as the concrete flood control channel located in East Reach 1 and East Reach 2, to second generation facilities consisting of more natural creek conditions. The remaining service life of these first generation facilities is 30 to 50 years, and the objective of the Flood Control District is to begin the planning process to replace this essential infrastructure. Implementation of The 50-Year Plan is contingent on support of the affected jurisdictions and funding.

In 2014 the Flood Control District completed a Condition Assessment Report for their channelized section of Lafayette Creek, and assigned a condition rating of “3” (Good). Recommended actions included removing trees and debris away from the fencing and establishing an ongoing maintenance program for the fencing.

The 50-Year Plan supports the concept of replacing the channel with a more natural flood protection facility integrated into a redeveloped urban landscape. Such an enhancement plan for the East Reach could involve constructing a bypass pipe, an upstream detention basin, or increased upstream infiltration of storm runoff. Implementation would require an extremely long planning horizon.

A more near term opportunity could be converting the concrete channel bottom to a natural creek bed to support a more natural riparian environment. Such concepts have been implemented elsewhere and are supported by some of the regulatory agencies. A natural creek bed has a varied bottom, and typically contains pools of varying depth that support aquatic life, provide foraging opportunities, and allow for movement by fish, amphibians and other wildlife. It allows for establishment of native emergent vegetation and rooting of larger riparian trees and shrubs such as willow, that provide some level of stability to the natural creek system. A concrete channel bottom contributes to higher flow velocities during runoff periods, preventing establishment of any native vegetation, stripping and flushing native material that would otherwise move along and contribute to the complexity of the bottom of a natural creek channel, and leaving no pools or other refuge areas for fish and aquatic species to remain within the channelized reach. Complete removal of the concrete channel bottom may, however, create conditions leading to undercutting of the channel walls and destabilizing the channel in this area.

The quality of water inflows into the creek along East Reach 1 could be improved by creating bioretention areas along the upper banks near the parking lot areas closest to the creek banks. The bioretention areas could also serve as a visual buffer and screen of the barbed wire fence located along this segment of the creek, and possibly even a learning opportunity if interpretive signs were used to describe the vegetation used in the bioretention area, and the cleansing value a bioretention area provides.

In conjunction with development of paths on the north side of the channel, it may be possible to

explore options to create terraces along the banks of the channel, and modify the channel walls or bottom to create more visually appealing conditions. Terraces would allow people better visual access, and potentially, physical access to the creek, and would enable riparian plants to be planted along the banks, thereby restoring some habitat conditions. Similar proposals, endorsed by the Army Corps of Engineers, have been made as part of the master plan for the channelized Los Angeles River. This undertaking would require additional hydrology studies to evaluate the impact of any proposed changes.

The English ivy should be removed from this section of the creek, and the area subsequently should be replanted with native plants.



# EXISTING CONDITIONS, LAND USE AND ENHANCEMENT OPPORTUNITIES

## EAST REACH 2 - LAFAYETTE CREEK (CHANNELIZED)

### SUMMARY

#### Location

- The area between the creek and Golden Gate Way is located in the Plaza District.
- South of Golden Gate Way, near 2nd Street.

#### Creek Conditions

- The 100-year Flood Zone extends approximately 150 feet at its widest from the creek bank.
- Fenced concrete channel conditions; natural creek areas begin at the east end of this segment.

#### Land Use Context

- Retail, office and mixed-use buildings are located on the north side of the creek.
- Single-family residential is located on the south side of the creek.

#### Biological Conditions

- There is a significant oak tree at the 2nd Street intersection with the creek.
- Non-native ornamentals are the predominant tree species along this segment of creek, and redwood trees are the second most common tree.
- Non-native invasive plants are found predominantly on the north bank.

#### Outdoor And Pedestrian Use Space

- Existing outdoor public use space is located only along the north side of the creek.
- Backyard fences of homes are located along the south side of the creek.



Figure 3-15: East Reach 2 Existing Conditions

#### Opportunities

- Create new pedestrian access on the north side of the channel and connect to the creek via 2nd Street
- Create an overlook at 2nd Street
- Remove non-native vegetation
- Modify / enhance the surface of the concrete channel to more closely mimic a natural creek channel and/or create more natural creek bed conditions
- Celebrate the majestic oak located on the Coral Pool property



KEY MAP



**EAST REACH 2 - LAFAYETTE CREEK (CHANNELIZED)**

**Creek Conditions**

East Reach 2 is a section of Lafayette Creek that is a little more than two blocks from Mt. Diablo Blvd., between Golden Gate Way and Moraga Blvd. and runs parallel to these streets.

Continuing from East Reach 1, the majority of East Reach 2 is fenced off with a barbed wire-topped cyclone fence, and is contained in a concrete channel. At the east end, as it transitions to East Reach 3, the concrete channel ends and natural creek conditions begin. Commercial buildings block almost all visual access to the creek along East Reach 2.

The banks of the creek are quite steep, and mostly densely vegetated.

The 100-year Flood Zone extends approximately 100-150 feet from both creek banks at its widest points.

**Land Use Context**

The Contra Costa County Flood Control and Water Conservation District (Flood Control District), has an easement over the channelized section of East Reach 2, and maintains this section.

East Reach 2 is contiguous with East Reach 1, and creating pedestrian and bicycle friendly streets continues to be a DSP goal in this area. Although contiguous with East Reach 1, no single-family residential buildings are located along Golden Gate Way on the north side of the creek; only commercial, retail, mixed-use buildings and parking are located north of the creek, whereas the south side of the creek has residential properties.

Near the east end of East Reach 2, the creek transitions from channelized to natural creek conditions behind the parking lot of a multi-family building. There is an informal path to the creek bank at this location.

The public interface with the creek is primarily at the creek crossing under 2nd Street, and there is no sidewalk along the west side of 2nd Street, limiting creek views at this site.

Several residential structures and commercial buildings are located within the 100-year Flood Zone.

**Outdoor Use and Pedestrian Use Space**

The largest potential outdoor use spaces in East Reach 2 are located in parking lots. The Thrift Store parking lot is the only area that provides public access to the creek, however the creek is still inaccessible because of the flood control fence. The Thrift Store site has several large Redwood and pine trees which provide a nice canopy. Coral Pool, located at the corner of 2nd Street, uses its creekside location for parking, and the parking area is fenced off and not accessible by the public. There is some public interface with the creek where 2nd Street crosses the creek, but there is no sidewalk along the west side of 2nd Street.

This is a quiet area of downtown, and the sound of the creek moving through the channel can be easily heard.



*Tree cover at creek corridor near the Thrift Store parking lot.*



*Thrift Store outdoor sales area adjacent to the creek.*



*Fences block views and interaction with the creek.*



*2nd Street lacks a sidewalk.*



# EXISTING CONDITIONS, LAND USE AND ENHANCEMENT OPPORTUNITIES

## EAST REACH 2 - LAFAYETTE CREEK (CHANNELIZED)

### Biological Conditions and Features

There is ample tree cover along this segment of the creek, however non-native ornamental trees are the predominant tree type, comprising approximately 40% of the tree total. Redwoods are the second most prevalent tree type.

There are large valley oak trees located on the Coral Pool property, which are remnants of the riparian woodland, and a significant natural resource.

Invasive non-native plant species are not as prevalent along this section of the creek, and the predominant invasive plant is English ivy.

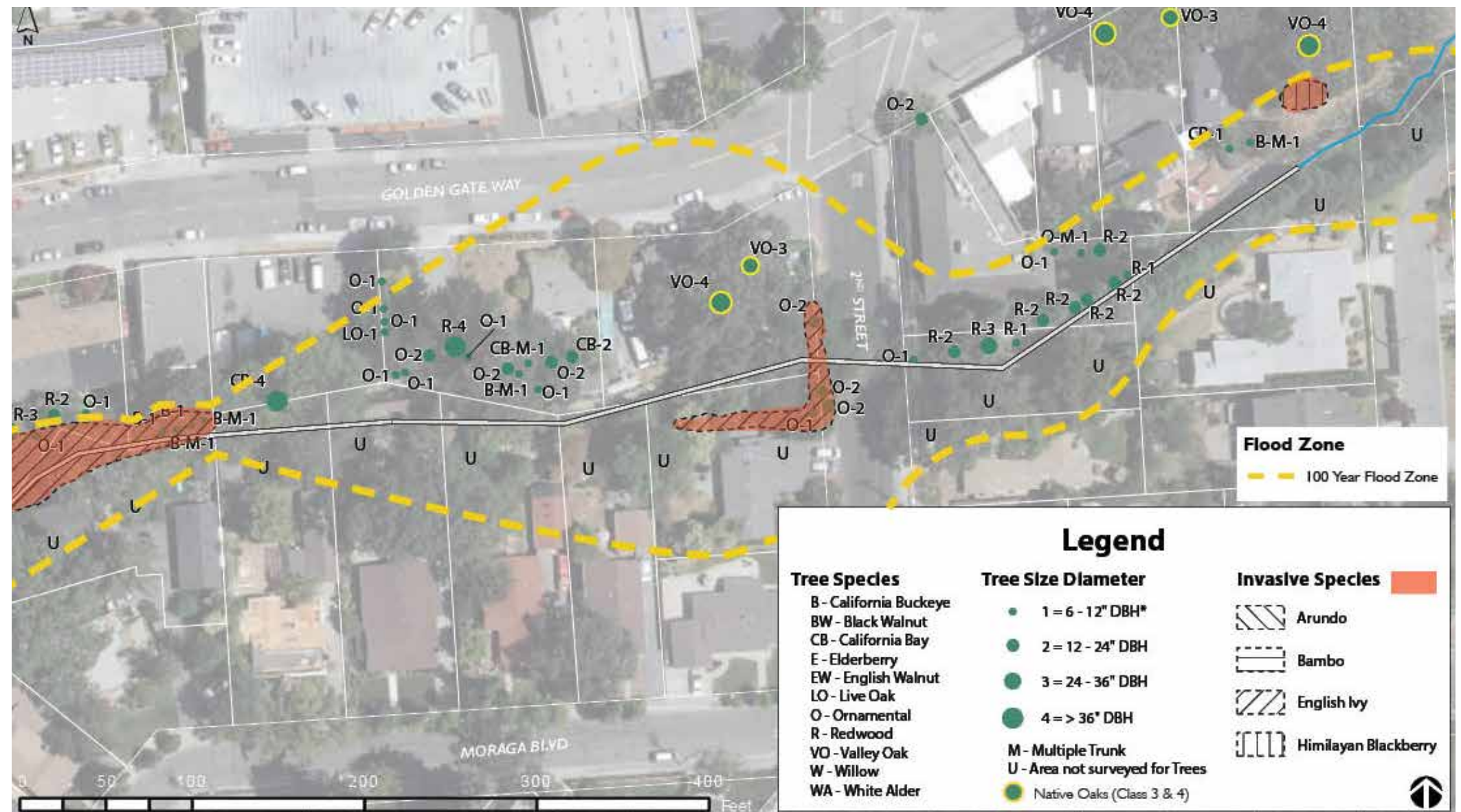


Figure 3-16: East Reach 2 Biological Conditions



Majestic valley oak along the creek on the Coral Pool property.



**EAST REACH 2 - LAFAYETTE CREEK (CHANNELIZED)**

**OPPORTUNITIES**

**Public Access and Use**

East Reach 2 is an important area that connects Lafayette’s eastern creek gateway, beginning with East Reach 3, to East Reach 1 which includes the historic Plaza Overlay District.

Adding a sidewalk along the west side of 2nd Street would help improve pedestrian circulation and access to the creek in this area. Improved pedestrian circulation with the addition of another sidewalk along 2nd Street could lead to an opportunity to create a pocket park near the southwest corner of 2nd Street and Golden Gate Way. The magnificent large oak tree located at this site would provide shade for a seating or picnic area. Additionally, this location might be ideal for a creek overlook with interpretive signage. Since the property is privately owned by Coral Pool, a public-private partnership would likely be necessary to develop this site for public use.

Modifying the surface of the concrete channel at the Golden Gate Way and 2nd Street intersection in some manner would improve the visual appeal of the creek, and maximize the creek experience for the community. Some type of visual barrier would also be important to minimize the visual impact of the barbed wire-topped cyclone fence, and to maximize the visual experience of the creek for the community.

The Flood Control District would support development of a pedestrian path along the north side of their channel as parcels are redeveloped. Opportunities should also be explored to create public use area near the Valley Oak trees when redevelopment occurs.

**Habitat Restoration**

The majority of this section of the creek is within a concrete channel or culvert, which presents a near-term habitat restoration challenge for the creek. Nonetheless, habitat restoration is possible along the



Figure3-17: East Reach 2 Opportunities

tops of creek banks; removal of the English Ivy and replacing it with native riparian plants would improve habitat and also increase visibility of the creek.

SF Bay Regional Water Quality Control Board and California Department of Fish and Wildlife support modifying the bottoms of flood control channels to expose the natural creek bed, as discussed in the previous section on East Reach 1.

Because the parcels along this segment of the creek are privately-owned, habitat restoration along the upper banks of this section of the creek would require the cooperation of private land owners.



# EXISTING CONDITIONS, LAND USE AND ENHANCEMENT OPPORTUNITIES

## EAST REACH 3 - LAFAYETTE CREEK & LAS TRAMPAS CREEK

### SUMMARY

#### Location

- Located at the eastern end of the Plaza District
- Eastern gateway into Lafayette; South of the Mt. Diablo Blvd. and Golden Gate Way intersection and Gazebo Park.

#### Creek Conditions

- Confluence of Lafayette and Las Trampas creeks
- The 100-year Flood Zone extends approximately 100 feet at its widest point from Lafayette Creek.
- Natural creek conditions exist along the entire length of this section except for the drop structure at the eastern end.

#### Land Use Context

- The City of Lafayette, Contra Costa County Flood Control District, and East Bay Regional Park District own several parcels along East Reach 3.
- Commercial, office, multi-family residential buildings and parking lots are located on the north side of the creek.
- Single-family residential parcels are located on the south side of the creek.

#### Biological Conditions

- Willows (*Salix lasiolepis*) are the most common species along this segment of creek.
- Non-native invasive plants are not very prevalent along this segment of the creek.

#### Outdoor And Pedestrian Use Space

- The Briones Las Trampas Trail crosses the creek south of Golden Gate Way.
- Leigh Creekside Park is located east of Las Trampas Creek, with no direct access from the trail.

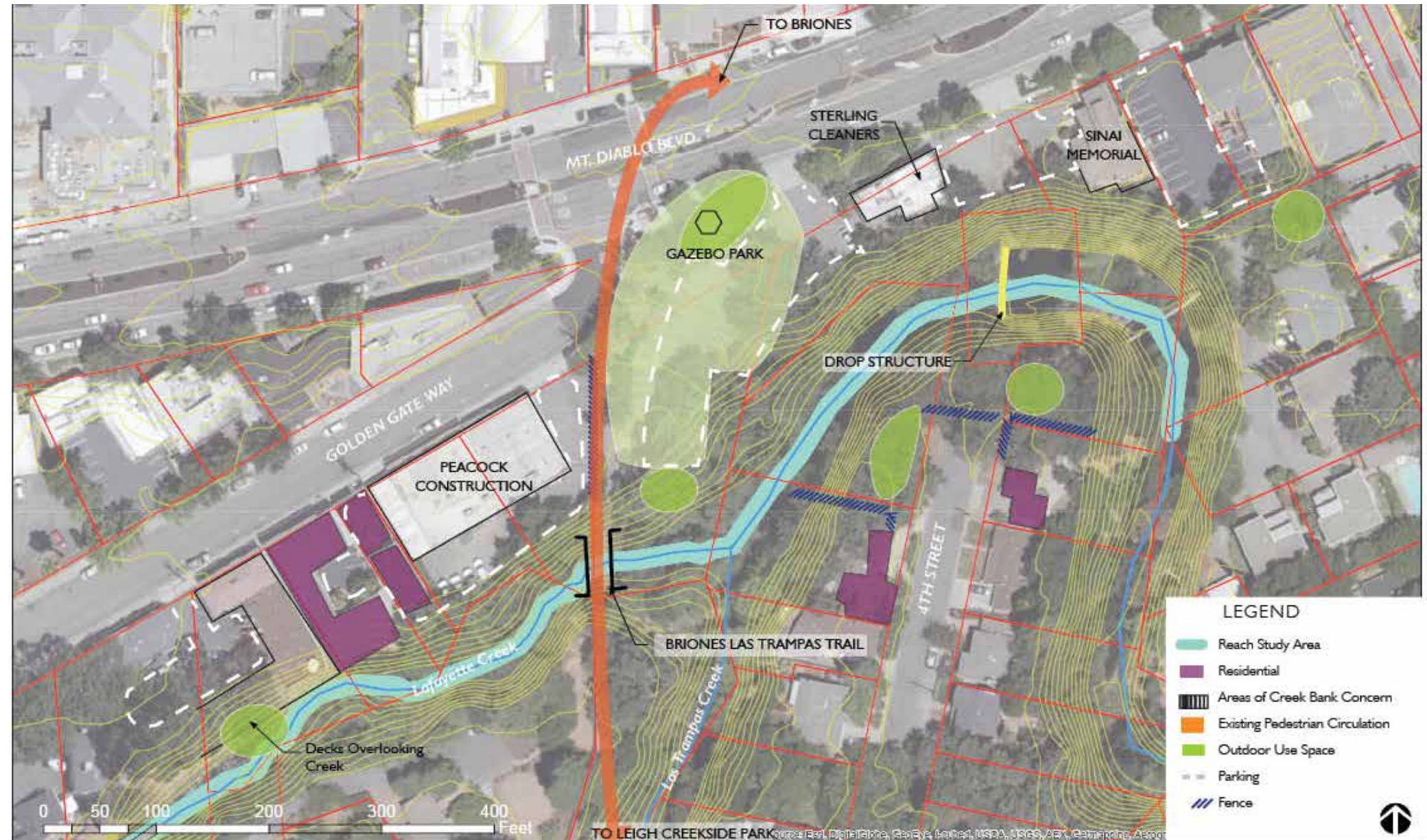
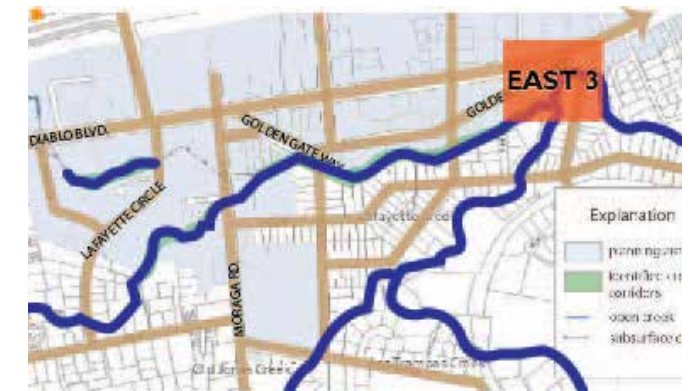


Figure 3-19: East Reach 3 Existing Conditions

#### Opportunities

- Create thematic wayfinding elements linking the gazebo to the creek
- Improve pedestrian access to the creek via stairs
- Connect pedestrians to the existing Briones/ Las Trampas Trail, and expand the trail network along the creek bank
- Reintroduce native species



KEY MAP



**EAST REACH 3 - LAFAYETTE CREEK & LAS TRAMPAS CREEK**

**Creek Conditions**

The confluence of Lafayette Creek and Las Trampas Creek is located in East Reach 3. East Reach 3 is the farthest east of the creek study areas, and is located near the intersection of Mt. Diablo Blvd. and Golden Gate Way.

East Reach 3 has natural creek conditions, and is highly vegetated with great tree overstory. It is also the only area along the creek that has a fairly flat floodplain area immediately adjacent to the creek. Above this floodplain, and leading from the parking lot behind Gazebo Park, the slope is relatively gentle, whereas in other areas further downstream, and above the Drop Structure, the slope is much steeper.

The 100-year Flood Zone extends approximately 100 feet from Lafayette Creek at its widest point.

**Land Use Context**

Commercial, office, apartment buildings and parking lots are located on the north side of the creek, whereas the south side of the creek is predominantly residential. At the confluence of Lafayette Creek and Las Trampas Creek, and along the west side of 4th Street, all the homes are within the 100-year Flood Zone. None of the businesses or apartments on the north side of the creek are within the Flood Zone, although some parking lots do fall within this zone.

Sinai Memorial Chapel is located on the north side of the creek near the drop structure. The sound of water running over the drop structure can be heard from the back of the Sinai Memorial parking lot.

The back area of the parking lot at Sterling Cleaners is close enough to the creek, and high enough, to provide nice views.

There is an undeveloped property owned by the

Contra Costa County Flood Control District at end of 4th Street.

Leigh Creekside Park is directly south of this reach.

**Outdoor and Pedestrian Use Space**

Along Mt. Diablo Blvd. at the intersection of Golden Gate Way, the Gazebo Park includes a small public use area, with a bike trail connecting to the East Bay Regional Park District bridge and the Las Trampas / Briones Trail.

The gazebo is a landmark along Mt. Diablo Blvd. The Lafayette Garden Club maintains the landscaping in this garden area, bringing members of the community together. A small creekside garden and seating area has been created adjacent to the parking lot near the Gazebo.

## EXISTING CONDITIONS, LAND USE AND ENHANCEMENT OPPORTUNITIES

### EAST REACH 3 - LAFAYETTE CREEK & LAS TRAMPAS CREEK

#### Biological Conditions and Features

Only one type of invasive plant was observed in this area, Himalayan blackberry (*Rubus armeniacus*), and it is concentrated near the bridge.

Several significant oak trees are located in this area; trees in this segment of the creek include willow (*Salix lasiolepis*), valley oak (*Quercus lobata*), live oak (*Quercus agrifolia*), and English walnut (*Juglans regia*).



Figure 3-20: East Reach 3 Biological Conditions.



**EAST REACH 3 - LAFAYETTE CREEK & LAS TRAMPAS CREEK**

**OPPORTUNITIES**

**Public Access and Use**

The parking lot area adjacent to the Gazebo is proposed as a future park site with picnic tables and other park facilities, as part of the Downtown Specific Plan. Thematic wayfinding elements and public art could be used to align the park entry to the creek area and trails from Golden Gate Way and Mt. Diablo Blvd.

The flat floodplain areas in East Reach 3 make it ideal for public use. This feature, combined with natural creek conditions, make it an ideal area to highlight local flora and fauna via interpretive signage and an extended network of pathways along the creek. A controlled access path could be created to allow the public to safely access the water near the confluence of Lafayette and Las Trampas Creeks.

Stairs could be created leading to a lower terrace adjacent to the bridge to expand access to the creek in this area. Views from the bridge could be enhanced by selectively pruning to open views to the creek.

At the back of the Sinai Memorial Chapel parking lot, the sound of the creek running over the drop structure is soothing, and perhaps a small garden area could be developed at this location, buffered from the parking lot with vegetation, which could allow the community to enjoy the sound of the water cascading over the drop structure from an easily accessible site.

**Habitat Restoration**

There are few non-native invasive plant species located along East Reach 3. As such, only limited restoration is required in this area, with the exception of the removal of a small area of Himalayan blackberry and selective pruning to improve views. It may be an ideal area for restoring habitat for the western pond turtle and other native wildlife, and reintroducing wildlife species to the area.

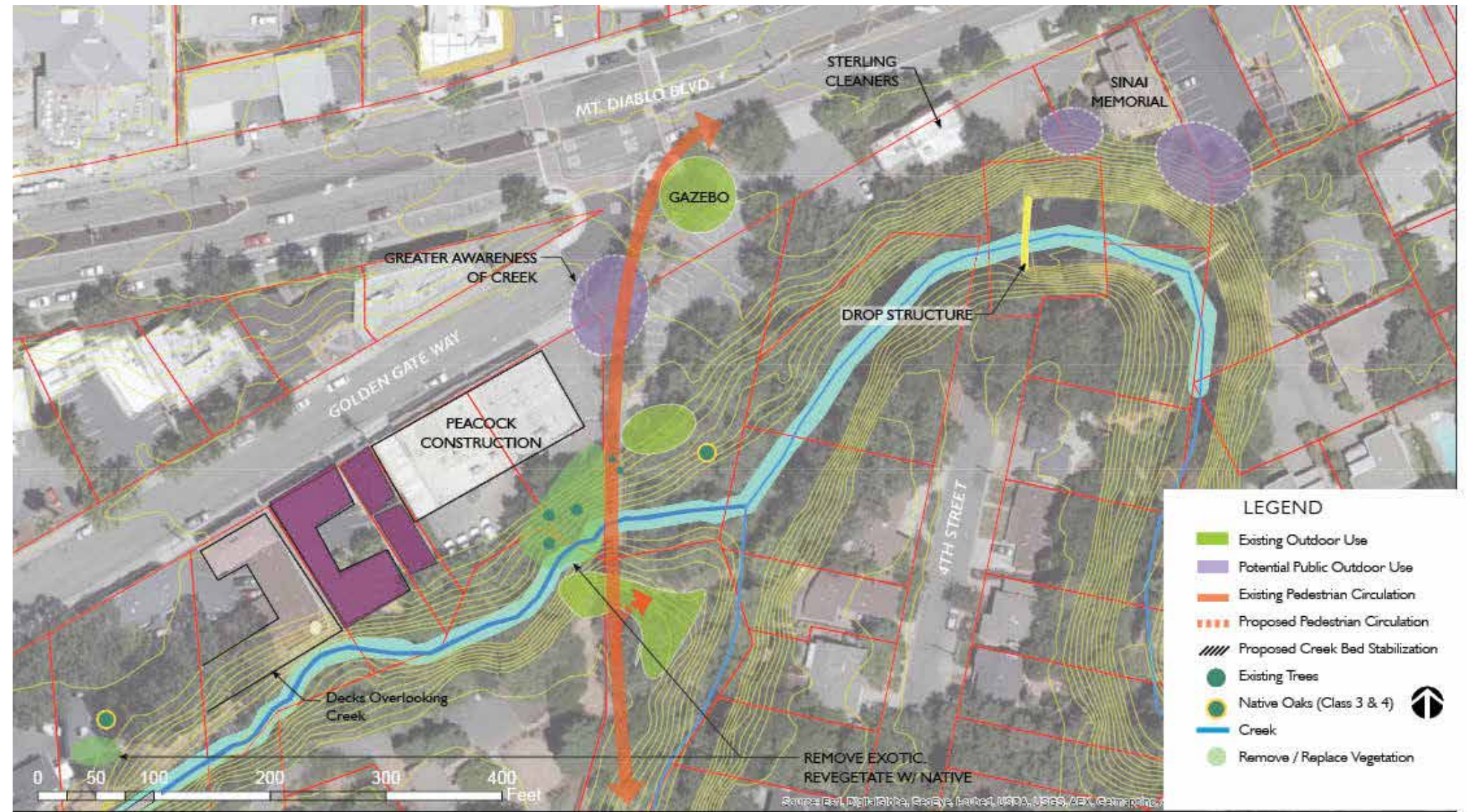


Figure 3-21: East Reach 3 Opportunities



Art can highlight presence of the creek



Possible creek access near EBRPD bridge.



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# APPENDICES

Appendix-A:  
Hydrologic & Geologic Assessment Summary  
Appendix-B:  
Biology & Habitat Assessment Summary

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## APPENDIX A:

## HYDROLOGIC &amp; GEOLOGIC ASSESSMENT SUMMARY

## INTRODUCTION

This appendix consolidates and summarizes much of the discussion that has been covered in the Context and Existing Conditions Chapters in this report. It also expands on the hydrologic and geologic analysis of the study area reaches, and presents hydraulic and hydrologic issues and recommendations that apply generally.

## SETBACKS FOR VARIOUS IMPROVEMENT CONSIDERATIONS

Each individual improvement will be analyzed to determine the setback requirements. Since the minimum setback is 12 feet from the top of bank, it is likely that exceptions will need to be applied for to the City Engineer.

## PUBLIC, RESIDENTIAL AND COMMERCIAL ZONING

This information is included in the maps in Chapter 3 – Existing Conditions.

## HYDRAULIC AND HYDROLOGIC ISSUES AND RECOMMENDATIONS

The creek reaches under study were broken up into four separate study areas. This report will refer to each reach study area by its geographic location; the West Reach, North Reach, South Reach, East Reach 1, East Reach 2 and East Reach 3. The West, South, and East Reaches are part of Lafayette creek, The North Reach is part of Happy Valley Creek.

Lafayette and Happy Valley Creek are both perennial streams with flow rates and volumes depending heavily on the season and precipitation events. Happy Valley Creek is fed by surface runoff and subsurface flows from the local watershed and tributary creeks and streams and discharges into Lafayette Creek. Lafayette Creek is also fed by surface runoff and subsurface flows from the local watershed and

tributary creeks and streams, including Hidden Valley Creek and Lafayette Reservoir. All of the reaches assessed are surrounded by low to mid density housing or commercial buildings.

Lafayette and Happy Valley Creek both contain relatively stable creek beds due to anthropomorphic interventions that have occurred over the last 100 years intended to stabilize and harden the channels due to their proximity to urban areas. However, most of the original fluvial geomorphic characteristics of the channels, including historic overbank floodplain areas, have been lost. As in many areas of the San Francisco East Bay, urbanization of the watersheds tributary to the creeks has likely led to declining water quality through the introduction of urban stormwater runoff constituents such as heavy metals, hydrocarbons, nutrients and pesticides among others. Also, urbanization tends to increase runoff volumes in storm events by increasing watershed imperviousness which, if unmitigated, can create erosional responses in the downstream receiving water often referred to as “hydromodification.” This has likely happened in both channels; however, erosion or scour potential related to hydromodification is minimized in the study reaches. In some areas, concrete and steel culverts, channels set within the creeks, and bank armoring have reduced erosion and scour, but it remains a problem (please see below for details).

The most effective strategy for the improvement of urban water quality runoff discharging to urban streams is the implementation of bioretention areas (or other biotreatment post-construction stormwater best management practices) between urban stormwater discharge points and the receiving water. Typically, bioretention areas are placed curbside, replacing conventional drainage inlets. They collect urban stormwater runoff during rain events at points of drainage concentration, treat the stormwater runoff, and then drain into the stream system. This solution also reduces the peak discharge of water entering the creek system during storm events, reducing flooding. In addition, removing concrete and rock from the creek and replacing with native riparian vegetation could also improve water quality, though it will probably have little effect on creek flooding.

The majority of the creeks are highly incised, having high banks, with little to no floodplain within the banks. The only exception is the portion of Lafayette Creek after the concrete channel and just prior to the drop structure, where the creek is only moderately incised. After the drop structure it returns back to having a highly incised channel.

The creeks were assessed during relatively low base flow levels. During the rainy season, when base flows are more substantial or after a large precipitation event, it is possible that there could be additional issues and recommendations not included in this report. Additionally, large portions of these reaches are within the 100-year FEMA floodplain. Flooding issues tend to occur just upstream of the culverts, which may be undersized in some areas. Once the culverts are overwhelmed the water backs up the creek causing flooding upstream. Specific flooding concerns are described with the specific channel details.

There are several slope stability issues. Along most of reaches there are buildings that may not conform with the current creek setback requirements. The slopes adjacent to the creek where buildings are not properly set back potentially could have slope stability issues.

English ivy (*Hedera helix*), an invasive species, has destroyed much of the native riparian species on many of the banks. Only the main trunk of the English ivy plant develops a deep root structure. The vines themselves create only superficial roots. Thus, on banks, they crowd out the native species with deep roots and instead, the vines drape over the banks, providing much less erosion protection. During large creek flow events with substantial flow velocity, the lack of an extensive root structure on the banks will increase erosion.

In most locations the easiest mitigation for bank erosion and channel stabilization is the removal of the English ivy and the introduction of native riparian species with extensive root systems. Additional mitigation methods for specific areas are discussed in the relevant sections below.

There is a historic earthquake fault that intersects portions of the North and South Reaches. This is the Southhampton fault and its age (over 1.6 million years old) is well constrained. Thus, it not considered of particular risk to any potential opportunity area.

## CHANNEL TYPE / CHARACTERISTICS

The map sections contain the specific locations of the issues discussed below.

## 5.1 LAFAYETTE CREEK – WEST REACH

The West Reach is bordered by residential units to the south and Mt. Diablo Boulevard to the north. A culvert crosses Risa Road acting as a flow restrictor for the creek, though during large flood events, it is possible that water will flow overland via the streets. The West Reach is fed by Lafayette Reservoir, Hidden Valley Creek and other tributary creeks. The reservoir should help mitigate some of the flood risk within this particular reach by being able to store some of the rainfall from large precipitation events.

The West Reach is highly incised with steep banks and little to no floodplain within its banks. There is a large amount of concrete and asphalt debris in the creek bed and bank. The creek is heavily wooded and contains a large amount of English ivy.

Adjacent to Mt. Diablo Boulevard across from the Veterans Memorial Center is the only bank showing significant amounts of erosion (please see maps for exact location). The tree (seen in the photograph on the next page) is visibly undercut with a substantial portion of the root system exposed. The erosion appears recent, and it is likely that erosion will continue when the creek elevations reach the level of the root system.

This bank erosion may affect the bank stability and possibly the integrity of the adjacent Mt. Diablo Boulevard, particularly should the tree fall and pull the embedded root system out from within the bank. This area is of immediate concern as the erosion will likely continue.

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Exposed tree roots at West Reach

It will be necessary to perform a bank stability analysis to accurately determine the extent to which erosion has affected the bank's safety and evaluate the best mitigation methods. Following are solutions which have successfully been implemented for bank stability issues and that have met the approval of the governing resource agencies in the local region. These solutions may not be appropriate in this particular case without further evaluation. It is possible that the tree will not be able to be removed due to its protected status. Any work in the creek will require federal, state and local permits and coordination with jurisdictional agencies.

These two solutions do not disturb the main channel of the creek, thus are more appealing to regulatory agencies.

- **Below Grade Pile Wall** – Pile walls are walls with the supporting structure driven or bored into the ground. They may be made of a variety of materials, including steel, concrete, wood, and vinyl. There are multiple types of pile walls, such as soldier, sheet, contiguous and secant pile walls. Typically, they are embedded within competent soil or bedrock, and can be worked into tight areas. Figure A-1 illustrates the concept for a soldier pile wall. It is unlikely that any type of pile wall will be able to be constructed without damaging the eroded tree.
- **Below Grade Buried Rip-Rap Fill** – This solution is a rip-rap filled keyway constructed at the top of bank.

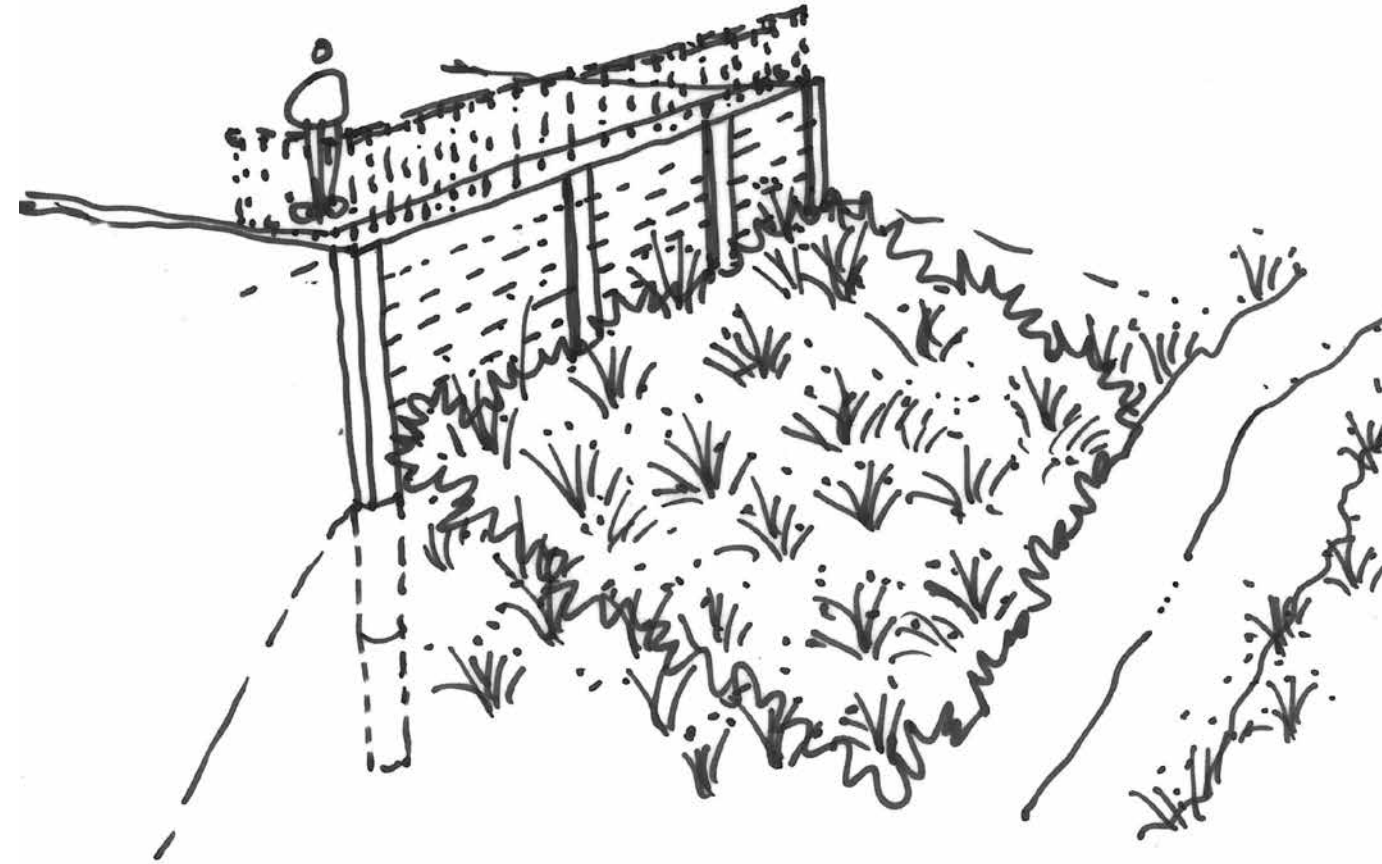


Figure A-1: Illustrative Example of Pile Wall

This option requires excavation of a keyway along the existing roadway near the top of bank. The keyway should extend to an elevation equal to the toe of the creek bank. The keyway is then backfilled with rip-rap so that if the creek bank fails it exposes the rip-rap which then forms a stable slope that can support the existing roadway. This solution has a low likelihood of being viable for this particular situation due to the proximity of the road to the top of bank.

The next two solutions do impact the main channel of the creek, thus are less appealing to regulatory agencies.

- **Creek Armoring** – This solution requires restoring the creek bank by reconstructing the slope using rip-rap or another product. This option includes grading within the creek. Prior to placement of the rip-rap a keyway is graded at the base of the proposed slope repair. Geotextile fabric is placed lining

the excavation to prevent the migration of fines through the rip-rap. Rip-rap is then used to backfill the keyway and rebuild the slope. This option is appropriate for slopes as steep as 1:1. If desired, the rip-rap can be covered by finer grained soil to conceal it.

- **Willow Stakes or Similar Biotechnical Protection** – This solution requires re-grading the slope, but instead of rip-rap or other hard armor scour protection, the re-graded slope will be protected by planting willows or other deep rooting native riparian vegetation in the area subject to scour.

The West Reach also contains a few additional areas with small amount of bank erosion that is typical of urban creeks. There are also a few unprotected storm water outflows with moderate amounts of erosion underneath. These can be easily mitigated with rock outfall.

### 5.2 LAFAYETTE CREEK – SOUTH REACH

The South Reach is bordered by a church and a parking lot to the south, and commercial, parking and medium density residential to the north. At the midpoint of the reach a road crosses the parking lot with a culvert underneath, and at the end of the reach another culvert crosses under Moraga Road.

Based on the Areas of Special Flood Hazard, as shown on FEMA flood hazard maps, both of these culverts act as flow restrictors during flooding and cause flood water to overtop the banks. This reach appears to have the largest area of property affected by the 100-year flood event due to a large watershed upstream and two culverts restricting the flow of water downstream.

The reach is highly incised, heavily wooded and contains a large amount of English Ivy. There is a newer large wooden wall support structure providing bank protection and stability along the left bank. Further east along the left bank, there are also the remnants of older wooden walls, now in disrepair. It is uncertain what the purpose of these older wooden walls were, but it is possible that they were constructed to provide bank stability and erosion control. If so, their disrepair could adversely affect bank stability and an analysis of the properties along Hough Avenue and Lafayette Circle that abut the creek would be necessary to determine the safety of the bank and if the buildings conform to the setback requirements.

### 5.3 LAFAYETTE CREEK – EAST REACH

The East Reach is the longest reach. It is bordered by mixed density housing, commercial buildings and parks. In the west portion of the reach study area the creek is conveyed through a concrete channel. After the concrete channel, the creek returns to a natural bed and bank and is moderately incised until it reaches the drop structure, after which it is highly incised.

The East Reach begins at the confluence of Happy Valley Creek and Lafayette Creek. Both creeks enter the reach through under-street culverts which act as flow restrictors to limit the volume of water entering the reach. Based on the Areas of Special Flood Hazard



map, the concrete channel portion of the reach shows only minimal amounts of flooding on property. After the concrete channel, the map outlines a much larger flood footprint with more property flooding until the drop structure, after which the flooding area narrows reducing the property area affected by flooding.

This reach shows the least amount of erosion. The concrete channel shows minimal wear, and the areas above it show no signs of erosion or damage. The reach area after the concrete channel has native riparian vegetation with good root structures and larger bank area with moderate entrenchment. This area appears less modified from its original form with better bank stability. The drop structure also causes the creek slope to decrease, reducing creek velocity and erosion. The bank 30 yards upstream and 50 yards downstream of the drop structure has sack concrete stabilized banks.

#### 5.4 HAPPY VALLEY CREEK – NORTH REACH

The North Reach is located downtown and is bordered by commercial buildings and parking lots. Upstream of the reach is a concrete culvert from under Mt. Diablo Boulevard Road, and downstream of the reach the water enters another concrete culvert under Lafayette Circle.

Based on the Areas of Special Flood Hazard, though the upstream culvert restricts the water flowing in, the downstream culvert restricts the water leaving, resulting in a large flood footprint in this reach. Anecdotal evidence indicates that Lafayette Circle floods and water flows overland through the parking lot and beyond.

The reach is highly incised with a moderate quantity of trees and a large amount of English Ivy. The parking lot at the downstream end of the reach on the left bank shows moderate erosion at the top of bank, probably due to foot traffic. Across on the right bank, the channel is bounded by a concrete wall. The wall has a small concrete walkway adjacent to the creek.

## APPENDIX B:

### BIOLOGICAL FEATURES ASSESSMENT SUMMARY

#### Vegetation and Wildlife Habitat

The Planning Area is dominated by a cover of suburban landscape, traversed by a band of riparian woodland and scrub along Lafayette Creek and tributary drainages. Most of the valley floor and lower hillsides through the downtown Lafayette area have been developed with urban and suburban uses, with primarily ornamental landscaping where vegetative cover remains. Mature native valley oaks (*Quercus lobata*) and coast live oaks (*Quercus agrifolia*) occur in scattered locations throughout the developed valley floor, particularly along the creek corridors. But the majority of the area away from the remaining open creek channels has been developed with roadways, parking lots, and structures, bordered by ornamental landscaping.

#### Urban Landscape.

In general, urbanized areas tend to have low to poor wildlife habitat value due to replacement of natural communities, fragmentation of remaining open space areas, and intensive human disturbance. The diversity of urban wildlife depends on the extent and type of landscaping and remaining open space, as well as the proximity to natural habitat. Nonetheless, trees and shrubs used for landscaping provide nest sites and cover for wildlife adapted to developed areas. Typical native bird species include mourning dove, scrub jay, northern mockingbird, American robin, northern flicker, brown towhee, and American kestrel. Introduced species include: rock dove, European starling, house finch and house sparrow. Urban areas also provide habitat for several species of native mammals such as California ground squirrel, raccoon, and striped skunk, as well as the introduced eastern fox squirrel and eastern red fox. Introduced pest species such as Norway rat, house mouse, and opossum are also abundant in developed areas, particularly along riparian corridors.

#### Riparian Woodland and Scrub.

The condition of vegetative cover along the creek corridors in the Plan Area varies greatly, but continues to provide high quality riparian habitat where native cover remains. Some reaches of the creeks remain intact, with a well-developed canopy of native trees and shrubs. Dominant cover in these reaches includes: valley oak, coast live oak, California bay laurel (*Umbellularia californica*), California buckeye (*Aesculus californica*), and willows (*Salix spp.*), with several other tree, shrub, and vine species contributing to the typically dense cover formed by riparian vegetation. These include: box elder (*Acer negundo var. californicum*), big leaf maple (*Acer macrophyllum*), wild grape (*Vitis californica*), and poison oak (*Toxicodendron diversilobum*).

Other reaches of Lafayette Creek have been channelized by flood control improvements installed in the late 1950s with a concrete bed and vertical walls. Mature native and planted trees remain along what was once the top of bank in the channelized reaches, and continue to provide habitat for birds and shade the creek channel. But the channelization has greatly reduced the habitat value of the creek and now limits opportunities for movement by native wildlife which typically use creeks as movement corridors.

Highly invasive, non-native English ivy (*Hedera helix*), Himalayan blackberry (*Rubus discolor*), and giant reed (*Arundo donax*) often form impenetrable thickets along segments of the creek corridors, even where intact canopy cover remains. These invasive species are replacing native riparian vegetation and reducing habitat values along much of the creek corridors. In some locations, the ivy and blackberry vines are so thick that they now preclude any other groundcover and are choking the canopy of some mature native trees. And invasive tree species such as tree-of-heaven (*Ailanthus altissima*), green wattle (*Acacia decurrens*), and blackwood acacia (*Acacia melanoxylon*) have also become established in many locations along the creek corridors and are compromising their habitat values.

Riparian corridors tend to serve as critical linkages for aquatic and terrestrial wildlife movement. Surface water is available for aquatic-dependent organisms,

and as a source of drinking water for terrestrial mammals and birds. Where barriers do not obstruct movement, the creeks serve as movement corridors for aquatic and terrestrial species that use the protective cover found along the creeks. Resident trout and other native and non-native fish species most likely continue to occupy perennial segments of Lafayette, Las Trampas, and Happy Valley Creeks. Pacific tree frog, California newt, western toad, ensatina, and other amphibians are dependent on the perennial and seasonal source of water for breeding, foraging, and dispersal. The aquatic habitat also supports large numbers of invertebrates, which serve as an important source of food for resident fish, amphibians, and wading birds. Terrestrial wildlife dependent on the cover provided by segments of the remaining well-developed riparian woodland and scrub in the Plan Area include: dusky-footed woodrat, deer mouse, eastern fox squirrel, red and grey fox, rufous-sided towhee, scrub jay, flycatchers, woodpeckers and warblers, common gopher snake, garter snake, and ringneck snake. Dense riparian growth provides essential cover utilized by larger mammals, such as striped skunk, raccoon, opossum, and occasionally black-tailed deer. And mature trees provide nesting and foraging opportunities for numerous species of birds, including raptors (birds-of-prey). Chinook salmon, steelhead, and other native fish species were historically known to migrate within the Lafayette Creek watershed, but major barriers now prevent successful migration into the Planning Area, including an approximately 15-foot vertical weir at the downstream end of the Plan Area.

#### Regulatory Agency Jurisdiction

In addition to local plans, policies and ordinances, State and federal regulations provide for the protection and management of sensitive biological and wetland resources, including creek corridors found in the Plan Area. Regulations pertaining to resource protection and management activities in the Plan Area are summarized below.

#### Waters of the United States.

The U.S. Army Corps of Engineers (Corps) regulates “Waters of the United States” under Section 404 of

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the Clean Water Act. "Waters of the U.S." are defined broadly as waters susceptible to use in commerce, including interstate waters and wetlands, all other waters (intrastate waterbodies, including wetlands) and their tributaries. Potential wetland areas, according to the three criteria used in delineate wetlands state in the Corps of Engineers Wetlands Delineation Manual, are identified by the presence of 1) hydrophytic vegetation, 2) hydric soils, and 3) wetland hydrology. Areas that are inundated for sufficient duration and depth to exclude growth of hydrophytic vegetation are subject to Section 404 jurisdiction as "other waters" and are often characterized by an ordinary high water mark (OHWM). Other waters, for example, generally include lakes, rivers, and creeks at or below the OHWM. The placement of fill material into "waters of the U.S." (including wetlands and other waters) generally requires an individual or nationwide permit from the Corps under Section 404 of the Clean Water Act.

Jurisdictional federal waters regulated by the Corps along the creeks in the Plan Area is limited to at or below the OHWM. The OHWM generally falls at or below a foot or two above the bottom of the creek channel, and is characterized by evidence of past flows, eroded banks, and accumulated debris. The width between the OHWM varies widely through the Plan Area from about 10 to 30 feet across the bottom of the creek channels, depending on the steepness of the banks, location in the watershed, and other variables.

### **Waters of the State.**

The term "Waters of the State" is defined by the Porter-Cologne Water Quality Control Act as "any surface water or groundwater, including saline waters, within the boundaries of the state." The Regional Water Quality Control Board (RWQCB) protects all waters in its regulatory scope, but has special responsibility for wetlands, riparian areas, and headwaters. These waterbodies have high resource value, are vulnerable to filling, and are not systematically protected by other programs. RWQCB jurisdiction includes "isolated" wetlands and waters that may not be regulated by the Corps under Section 404. "Waters of the State" are regulated by the

RWQCB under the State Water Quality Certification Program which regulates discharges of fill and dredged material under Section 401 of the Clean Water Act and the Porter-Cologne Act. Projects that require a Corps permit, or fall under other federal jurisdiction, and have the potential to impact "Waters of the State" are required to comply with the terms of the Water Quality Certification determination. If a proposed project does not require a federal permit, but does involve dredge or fill activities that may result in a discharge to "Waters of the State", the RWQCB has the option to regulate the dredge and fill activities under its state authority in the form of Waste Discharge Requirements.

Jurisdictional waters of the State regulated by the RWQCB extend to the top of bank and outer edge of woody riparian vegetation where present along creeks in the Plan Area. Distinguishing the edge of woody riparian vegetation beyond the top of bank is difficult in some locations in the Plan Area given that the riparian woodlands can integrate with the surrounding upland oak and bay woodlands, and that some of the dominant tree species found in the riparian woodlands along the creek corridors are found in non-riparian uplands as well, such as valley oak, coast live oak, California bay, and California buckeye. Native willows, alders, and box elder are typically restricted to riparian conditions and can be used to distinguish the limits of riparian habitat where it continues as non-regulated oak woodlands.

### **Streams, Lakes and Riparian Habitat.**

Streams and lakes, as habitat for fish and wildlife species, are subject to jurisdiction by the California Department of Fish and Wildlife (CDFW) under Section 1600-1616 of the State Fish and Wildlife Code. Alterations to or work within or adjacent to streambeds or lakes generally require a 1602 Lake and Streambed Alteration Agreement. The term stream, which includes creeks and rivers, is defined in the California Code of Regulations (CCR) as follows: "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other wildlife. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation".

In addition, the term stream can include ephemeral streams, dry washes, watercourses with subsurface flows, canals, aqueducts, irrigation ditches, and other means of water conveyance if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife. Riparian is defined by the CDFW as "on, or pertaining to, the banks of a stream," and riparian vegetation is defined as, "vegetation which occurs in and/or adjacent to a stream and is dependent on, and occurs because of, the stream itself". Removal of riparian vegetation also requires a Section 1602 Lake and Streambed Alteration Agreement from CDFW, even where it extends beyond the top of bank.

Like the State waters regulated by the RWQCB, jurisdictional waters regulated by the CDFW extend to the top of bank and outer edge of woody riparian vegetation where present along creeks in the Plan Area.

### **Special-Status Species.**

Special-status species include those plants and wildlife species that have been formally listed, are proposed as endangered or threatened, or are candidates for such listing under the federal Endangered Species Act (ESA) or California Endangered Species Act (CESA). These Acts afford protection to both listed and proposed species. In addition, CDFW Species of Special Concern and the National Marine Fisheries Service (NMFS) Species of Concern, which are species that face extirpation if current population and habitat trends continue, U.S. Fish and Wildlife Service (USFWS) Birds of Conservation Concern, sensitive species included in USFWS Recovery Plans, and CDFW special-status invertebrates are all considered special-status species. Although CDFW Species of Special Concern generally have no special legal status, they are given special consideration under the California Environmental Quality Act (CEQA). In addition to regulation for special-status species, most birds in the United States, including non-status species, are protected by the Migratory Bird Treaty Act of 1918. Under this legislation, destroying active nests, eggs, and young is illegal. Plants species on California Native Plant Society (CNPS) Lists 1 and 2, and possibly List 3 when of local concern, are also considered special-status plant

species. Impacts to these species must be considered under CEQA.

A search of records maintained by the California Natural Diversity Data Base (CNDDDB), together with other relevant information, indicate that occurrences of numerous plant and animal species with special status have been recorded from or are suspected to occur in central Contra Costa County and the Lafayette vicinity. Only a general occurrence record of pallid bat (*Antrozous pallidus*) extends over the Plan Area, based on an occurrence record from 1907. Numerous other occurrences have been reported from the surrounding area, primarily from undeveloped lands, but suitable habitat for these species is generally absent in the Plan Area. Below is a summary of the special-status plant and animal species known from central Contra Costa County and Lafayette vicinity, and conclusions regarding possible presence in the Plan Area.

**Plant Species.** A number of plant species with special status have been reported from the vicinity of the Plan Area, and based on recorded geographic range and preferred habitat, numerous other species may potentially occur in the central Contra Costa County vicinity. These have varied status, and many are considered rare (list 1B) by the California Native Plant Society and would be considered of special-status under CEQA regulations. However, none have actually been reported from the Plan Area, with six species have been reported within 2 miles. Existing urbanization on the valley floor greatly limits the likelihood of continued occurrence of any populations of special-status plant species within the Plan Area. Any occurrences of big tarplant (*Blepharizonia plumosa*), Contra Costa goldfield (*Lasthenia conjugens*), and Congdon's tarplant (*Hemizonia parryi ssp. congdonii*), which were once known from valley floors east of the Plan Area, were presumed extirpated as a result of urbanization. Many of the special-status plant occurrences in the protected open space lands north, south, and west of the Plan Area remain, including occurrences of Diablo helianthella (*Helianthella castanea*), bent-flowered fiddleneck (*Amsinckia lunaris*), and Mt. Diablo fairy-lantern (*Calochortus pulchellus*). California black walnut (*Juglans hindsii*) occurs in the riparian



woodlands along Lafayette Creek and other drainages in the Plan Area, but these are most likely originated from the root stock of the commercial English walnut once grown in the area, and are presumably not indigenous.

**Animal Species.** A number of bird, mammal, reptile, fish, and invertebrate species with special-status are known or suspected to possibly occur in the central Contra Costa County vicinity. Only pallid bat has actually been reported from the Plan Area by the CNDDDB. This occurrence was part of a vague record from 1907 which extends over the southern Lafayette area. An estimated 12 additional species are either known from or have occurrence reports within 2 miles of the Plan Area. These include: Cooper's hawk (*Accipiter cooperi*), sharp-shinned hawk (*Accipiter striatus*), golden eagle (*Aquila chrysaetos*), white-tailed kite (*Elanus caeruleus*), prairie falcon (*Falco mexicanus*), loggerhead shrike (*Lanius ludovicianus*), yellow warbler (*Dendroica petechia*), northwestern pond turtle (*Actinemys marmorata*), Alameda whipsnake (*Masticophis lateralis euryxanthus*), California red-legged frog (*Rana aurora draytonii*), Berkeley kangaroo rat (*Dipodomys hermanni berkeleyensis*), and mountain lion (*Felis concolor*). Many non-listed special-status species are not monitored by the CNDDDB and occurrence data is therefore not available.

Most of the special-status animal species known or suspected to occur within the Plan Area are bird species which forage in the remaining undeveloped habitats and natural habitats along the creek corridors. These include: Cooper's hawk, sharp-shinned hawk, white-tailed kite, prairie falcon, loggerhead shrike, and yellow warbler. The primary habitat available to these species occurs in areas of well-developed riparian woodland and scrub along the creeks through the Plan Area. No nesting locations have been identified by the CNDDDB in the Plan Area, but suitable nesting substrate occurs in the mature trees for these and other species of birds, including more common raptors such as great horned owl, red-tailed hawk, and American kestrel. Golden eagle may occasionally pass over the Plan Area, along with other special-status bird species such

as American peregrine falcon, but suitable nesting and foraging habitat is absent for these species that tend to be more sensitive to human activity. Nests of most bird species are protected under the Migratory Bird Treaty Act when in active use, and nests of raptors (birds-of-prey) are also protected under State Fish and Game Code when in active use.

Regarding special-status amphibians and reptiles, California red-legged frog and Alameda whipsnake are known from areas with suitable habitat to the south and north of the Plan Area. However, suitable habitat for these species is generally absent in the Plan Area itself and neither of these species are currently suspected to occur within the Plan Area. Alameda whipsnake is typically associated with dense chaparral and adjacent grassland and riparian habitat. Existing development on the valley floor precludes dispersal of Alameda whipsnake into the Plan Area. Occurrences of California red-legged frog have been reported from the undeveloped hillsides about 1.5 miles south of the Plan Area. This species is typically associated with ponds and creeks, utilizing the surrounding grasslands and woodland habitats for foraging and seasonal dispersal. Because the creek corridors on the valley floor have been fragmented and adjacent habitat has been impacted by adjacent urbanization, populations of California red-legged frog are not expected to occur within the Plan Area, although there is a remote potential for individuals to be washed down or occasionally disperse through some reaches where protective cover remains. But predation by raccoons and other predators limits the potential for permanent occupation in the Plan Area.

#### **Sensitive Biological Communities.**

Sensitive natural communities include habitat that fulfill special functions or have special values, such as wetlands, stream and riparian habitat, or are considered rare enough by the State to receive consideration under CEQA. State and federal waters are regulated as described above. Natural communities considered sensitive are those identified in local or regional plans, policies, and regulations, or by the CDFW. CDFW monitors sensitive natural communities as part of the California Natural Diversity Database (CNDDDB), and are ranked with

a high inventory priority in the List of California Natural Communities. Impacts to sensitive natural communities must be considered under CEQA. The riparian scrub and woodlands along the creek corridors in the Plan Area are considered a sensitive natural community type, where they continue to be dominated by native species. While reaches supporting a tree cover of naturalized coast redwood and other non-indigenous species still provide important shade and foraging opportunities for birds and other wildlife, they do not qualify as a sensitive natural community type.

## APPENDIX C:

### REFERENCES

*Contra Costa County Watershed Atlas*, 2003. Contra Costa County Community Development Department

Leidy, R.A., G.S. Becker, B.N. Harvey. 2005. *Historical distribution and current status of steelhead/rainbow trout (Oncorhynchus mykiss) in streams of the San Francisco Estuary, California*. Center for Ecosystem Management and Restoration, Oakland, CA

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