Executive Summary

The Citywide Creek Master Plan presents a set of creek-related policies and recommendations for site-specific improvements to the nearly one hundred miles of creeks that flow through Santa Rosa. The plan was originally adopted in 2007 and was updated in 2013.

Development of the Master Plan was guided by an enormous amount of community interest and input, from public workshop and creek tour participants, creek stewards, neighbors, educators, activists, local businesses, non-profit organizations, and local, state, and federal agencies. This plan represents the project team’s efforts to remain faithful to the vision expressed by the community.

The updated Citywide Creek Master Plan incorporates creek-related policies from several previous planning documents, including the Santa Rosa Creek Master Plan (1993), Santa Rosa Waterways Plan (1996), and the Santa Rosa 2035 General Plan (2009).

The Master Plan will be periodically updated and amended to reflect changing conditions and new opportunities that would increase the benefits that creeks provide to the community.

Recommended habitat preservation, enhancement, and restoration projects, and improvements to the creekside trail system are presented conceptually and specifically by watershed. Project recommendations are based on community input, literature reviews, and extensive field survey work. Site-specific recommendations are presented in the text and on a set of Geographical Information System-based maps, organized by watershed area.

Implementation of the Master Plan will occur over several years, perhaps decades, and will be accomplished through partnerships with citizens, organizations, agencies, and the development community. Project funding will come primarily from grants or other funding sources designated for restoring fish and wildlife habitat and for improving creekside recreation, access, and transportation opportunities.

Our local creeks have the potential to enhance our hearts, our minds, our health, our connections to each other and with the natural world. It is up to all of us who live, work, and play in Santa Rosa to each do our part to help make the vision expressed in this Plan become a reality.
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## Citywide Creek Master Plan

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“Rivers run through our history and folklore, and link us as a people. They nourish and refresh us and provide a home for dazzling varieties of fish and wildlife and trees and plants of every sort. We are a nation rich in rivers.”

~ Charles Kuralt
Chapter 1. Introduction

We have the tremendous fortune of living along a network of creeks and waterways, rich with plant and animal life and cultural history. No matter where you live in Santa Rosa, creek waters flow nearby. Keeping these riparian corridors healthy and clean is important for all of us. Our creeks are habitat for native plants and wildlife, including otters, turtles, insects, and steelhead trout. Our creeks also carry rainwater from winter storms to the Russian River and out to the Pacific Ocean. Santa Rosa is unique in that the majority of our creeks remain above ground, serving as welcome greenways and open spaces within a growing urban area. Pathways along creeks provide opportunities for walks, bike rides, and educational outings. Healthy and natural creek areas enhance the economic value of neighborhoods, and provide a peaceful place for urban dwellers to relax and unwind. People have been drawn to creeks for centuries, and our local waterways have supported many generations and different cultures. Our community takes great pride in our creeks, and we are intent on keeping them healthy and vital.

1.1 General Plan Implementation

The Open Space and Conservation Element of Santa Rosa General Plan 2035, adopted by the City Council in 2009, incorporated key policies from the Citywide Creek Master Plan and supports implementation of the Plan.

The purpose of the Citywide Creek Master Plan is to implement the General Plan and to provide guidelines, policies, and criteria for the protection, care, management, restoration, and enhancement of waterways in Santa Rosa. This document, and the Santa Rosa Design Guidelines, should be consulted any time a question of protecting, restoring, or enhancing waterways arises, and whenever development is proposed adjacent to a waterway. The Citywide Creek Master Plan, superseded the Santa Rosa Creek Master Plan (1993), and the Santa Rosa Waterways Plan (1996) when it was initially adopted in 2007. The purpose of the 2013 update was to recognize completed projects and changed conditions along creeks, incorporate additional creeks and rename certain existing creeks for consistency with other agencies, and to establish a new prioritization system for creek projects to ensure that the Citywide Creek Master Plan continues to be consistent with and implement General Plan 2035 and effectively guide development and restoration activities adjacent to creeks.

In addition, the Master Plan is intended to integrate with other Citywide planning efforts, including the updated Bicycle and Pedestrian Master Plan (2010).

This Master Plan embraces the concept that waterways are important for multiple uses: drainage and flood control, fish and wildlife habitat, recreational and educational opportunities, and open space and alternate transportation routes. It also acknowledges that many waterways are located on private property, and that private landowner rights must be respected.
1.2 The Vision

Santa Rosa’s creeks are a vital, central focus of the community; a place where fish, plants, and animals thrive; a place where children can play safely and where busy adults relax; a place where people walk, jog, and ride bicycles and horses; a place where recreation, shopping, and dining merge and flourish; and a place where residents gather for celebrations, entertainment and to learn more about their environment.

1.3 Creeks in Santa Rosa

The Citywide Creek Master Plan area includes the portions of the Laguna de Santa Rosa watershed that are within the 45.5 square mile Urban Growth Boundary surrounding the City of Santa Rosa in Sonoma County, California (Figure 1). The Master Plan addresses the nearly one hundred miles of creeks that flow through Santa Rosa. Generally, creeks begin in the eastern foothills, drop down to the urban area, and gradually make their way across the Santa Rosa Plain to join the Laguna de Santa Rosa, and ultimately the Russian River and Pacific Ocean. A notable exception is that creeks that drain the eastern portion of the Oakmont neighborhood drain to the Sonoma Creek Watershed, and eventually into the San Francisco Bay.

Santa Rosa Creek headwaters are on the northwestern slope of Hood Mountain and then tumble through a canyon which roughly parallels Los Alamos Road. The creek enters the Valley of the Moon and begins its westerly journey through the City of Santa Rosa and then through agricultural lands before joining the Laguna de Santa Rosa north of Sebastopol outside the City of Santa Rosa’s Urban Growth Boundary. From headwaters to its confluence with the Laguna, Santa Rosa Creek flows approximately twenty-two miles. Main tributaries include Brush Creek, Matanzas Creek, and Piner Creek. Smaller tributaries include Ducker Creek, Austin Creek, Skyhawk Creek, Oakmont Creek, Rincon Creek, College Creek, Russell Creek, Steele Creek, Coffey Creek, Paulin Creek, Poppy Creek, Pomo Creek, Cooper Creek, Indian Creek, Peterson Creek, Forestview Creek, Spring Creek, Sierra Park Creek, and Lornadell Creek.

There are several creeks that flow through the southern portion of the Master Plan area, including Colgan and Roseland Creeks. Colgan Creek begins in the foothills near Taylor Mountain as Kawana Springs Creek, across Petaluma Hill Road, and then flows westward under Highway 101 towards the Laguna de Santa Rosa. Roseland Creek begins near the Northwest Pacific Railroad, and flows westward until it meets the Laguna. Naval Creek, Gravenstein Creek, Irwin Creek, Countryside Creek, and Old Cooper Creek also flow through Southern Santa Rosa towards the Laguna. Todd Creek, along with tributaries Hunter Creek and Moorland Creek, flows south before turning west towards the Laguna.

Human populations have settled near creeks throughout the history of the Santa Rosa area. At the time of European settlement, this area was populated by the Southern Pomo. The Southern Pomo were hunter-gatherers and settled in permanent villages near some of the creeks described in the Plan. In 1837, Maria Carillo settled in an adobe house on Santa Rosa Creek near present-day Farmers Lane. This was the first enduring non-Native American residence in the area. The City of Santa Rosa is built on land designated for the establishment of a city by Julio Carrillo (Maria’s son) and Barney Hoen, an early settler. Luther Burbank, noted horticulturalist, made his home at the confluence of Santa Rosa and Matanzas Creeks.

Santa Rosa’s creeks have changed a great deal over the past century. After the devastating 1906 earthquake, which leveled several blocks of downtown, debris and rubble were pushed
Some waterways in Santa Rosa have remained relatively natural. However, historic flooding during the 1950s and 1960s resulted in the channelization of many miles of Santa Rosa's waterways as part of the Central Sonoma Watershed Project. The Soil Conservation Service (now the Natural Resources Conservation Service), Santa Rosa Resource Conservation District (now Sonoma Resource Conservation District) and the Sonoma County Water Agency (SCWA) partnered on the project. Flood control detention basins constructed upstream of the urban area, such as Spring Lake and Matanzas Creek Reservoir, reduced peak flows. The project's creek modifications also reduced potential flooding impacts but placed little emphasis on protecting the ecological functions of streams. As a result, water moves quickly through channelized waterways, but at a cost to bank stability and fish and wildlife habitat, particularly the steelhead trout which is listed as Threatened under the federal Endangered Species Act. In the mid-1990's SCWA revised its stream maintenance practices to promote habitat while still maintaining the designed level of flood protection.

The creeks that flow through the Master Plan area are predominantly classified as either riparian woodland or riverine habitat. Riparian woodland occurs where the creeks are more natural, with a dense canopy cover comprised of large, mature native trees such as big-leaf maple, cottonwood, willows, box elder and alder. These areas provide resting and rearing habitat for steelhead trout, and support other native fish and wildlife. Riverine habitat occurs in channelized reaches, which are for the most part located west of Highway 101. The viable creek ecosystem in these reaches has been confined to the aquatic environment in the channel bottom – basically, flowing water with unvegetated shores or fringe marshes. Where intensive channel maintenance has not occurred, riparian vegetation has grown in along the toe of each bank. In many areas the tree canopy, however, remains sparse due to the immaturity of the vegetation. Beyond the channel banks, adjacent habitats are largely urban within town, changing to cropland, pasture, and seasonal wetlands outside of the Urban Boundary. Native fish diversity is low in these reaches, but a number of introduced species have adapted to the warm water.

Some creeks within the Master Plan area are considered 'impaired' by the North Coast Regional Water Quality Control Board, and are included on the 2010 Clean Water Act Section 303(d) list of water quality limited segments, approved by the U.S. Environmental Protection Agency in 2003. Santa Rosa Creek is listed for indicator bacteria, sedimentation/siltation, and temperature. The latter two listings cover almost the entire Russian River watershed, including all the creeks in the Master Plan area. The Laguna de Santa Rosa (downstream of the Master Plan area) is listed for indicator bacteria, low dissolved oxygen, mercury, Nitrogen, Phosphorus, sedimentation, and high water temperature.

Today, despite the channelization, local creeks do still support an abundance of life. Pockets of undisturbed habitat remain, and channelized reaches that have been left alone or carefully maintained have started to recover. River otters, egrets and herons, and steelhead trout all make their home along local waterways.

Access roads occur along most of the approximately 35 miles of creeks within the project area, maintained for flood control by the Sonoma County Water Agency. The primary purpose of the access roads is for the Agency's stream maintenance activities. However, many of these access
roads are open to the public and serve as pathways for pedestrians and bicyclists. Some creek stretches have soft paths that wind along some portions of the creek, veering from the floodplain terrace at times towards the water’s edge. These paths are open for walking, mountain biking, and nature watching. These less traveled paths provide unique opportunities for people living in an urban setting and offer a quick escape into more natural areas that include a diversity of trees to skip stones in the water and watch birds.
The Creek Revival

In 1969, the City of Santa Rosa published the Natural Waterways Study as an element of the Santa Rosa Area General Plan. This study stated: “The removal of a major portion of the natural waterways in the planning area makes mandatory the retention of the remaining waterways in as near their natural state as possible.” Unfortunately, additional creeks, including portions of Roseland Creek, were channelized after the release of this study. However, there was an awareness of the harm caused by such activities to the natural riparian ecosystem. The study goes on to state: “While the retention of all waterways in a natural conditions is a worthy goal, a system of priorities has been developed which recognizes outstanding natural qualities, multiple use potential, and relationship to existing public lands.” Then, as now, local decision-makers were faced with balancing the needs of the growing urban community with those of fish and wildlife.

A growing appreciation for what Santa Rosa had lost through a singular focus on the flood control role of creeks began to build over the next twenty years. A ‘creek revival’ of sorts began to gather steam in 1989, when a group of citizens gathered along the grouted rip-rap banks of Santa Rosa Creek near Pierson Street and decided that things could change for the better. Creeks could be restored for fish and wildlife, creekside trails could be constructed, and flood control capacity could be maintained. The economic revitalization of downtown Santa Rosa could be focused around a thriving and healthy creek ‘greenway’. The Citizens for Restoring Santa Rosa Creek, along with local, state, and federal agency staff, community leaders, elected representatives, local businesses, and countless volunteers joined together to develop the Santa Rosa Creek Master Plan, adopted in 1993. The Santa Rosa Waterways Plan followed in 1996, the Brush Creek Restoration Project was completed in 1999, and construction of the Prince Memorial Greenway project through downtown Santa Rosa (1999 to 2005). In 2007, the Citywide Creek Master Plan was adopted by the City Council.

Over the past fifty years, a shift in community awareness and local government policy towards the protection and enhancement of creeks has occurred. An active citizenry, multiple stakeholders, and government agencies have collaborated to create a new vision for local creeks. The Citywide Creek Master Plan effort builds on this previous work, expanding planning efforts to cover all creeks that flow within and around Santa Rosa.

1.4 Creek Stewardship

There have been many caretakers of local creeks, those that pick up litter, remove invasive plants and take care of newly planted native species, and generally watch over their neighborhood creek. In 2002, the Sonoma County Water Agency and City of Santa Rosa partnered to create an official Creek Stewardship Program, to support individuals, businesses, neighborhoods, and community groups who volunteer as Creek Stewards to help keep local creeks clean and safe.

The program’s objectives are to:

- Increase the public's awareness of the values provided by local creeks by providing creek restoration, education, and recreation activities in conjunction with local community and environmental organizations.
- Support volunteer Creek Stewards who serve as additional “eyes and ears” to identify and report undesirable conditions and activities. Creek Stewards also perform minor maintenance and monitoring tasks and provide suggestions to enhance creek areas.
Chapter 1. Introduction

- Provide timely and effective response to citizens’ concerns regarding creek related maintenance, environmental, safety, and recreational issues.

The Creek Stewardship Program draws from the multitude of community resources to increase the public’s appreciation and support for the environmental and social benefits provided by urban creeks. Planned activities include walks, bike rides, nature interpretation, youth outings, tree planting, restoration workdays, presentations on creek topics, and creek activities in Summer Youth Camps. A Program Coordinator assists Creek Stewards’ activities and expedites follow through on reports regarding trash removal, water quality, natural habitat, recreational opportunities, trail maintenance, neighborhood safety and other situations that arise.

The Creek Stewardship Program promotes creek protection and restoration in a manner that maximizes amenities offered to the public. A populace that values the benefits of healthy creeks will naturally take pride in their creeks and regard them as part of their “backyard.” Working together, the City and its citizens can enhance creek corridors to provide efficient transportation routes, safe neighborhoods, scenery, wildlife habitat, recreation and social interaction.

1.5 Organization of the Plan

The Citywide Creek Master Plan is organized into five chapters. Chapter 2 discusses the goals, policies, and objectives for creeks in Santa Rosa. General policies and objectives are presented for each Master Plan goal. Habitat preservation, enhancement, and restoration concepts as well as ideas for creek-related improvements and creekside trail connections are discussed in Chapter 3. Chapter 4 includes recommendations for specific creek reaches within each watershed planning area, as well as information about map products and the integration of the Master Plan data into the City’s Geographical Information System (GIS). A strategy for implementation of the Master Plan is described in Chapter 5. Appendices are included to provide supporting materials for the Master Plan.
2. Goals, Objectives & Policies

“Like dreams, small creeks grow into mighty rivers.”

- Anonymous
Chapter 2. Goals, Objectives and Policies

2.1 General Plan Implementation

Santa Rosa General Plan 2035, adopted in 2009, incorporated key policies from the 2007 Citywide Creek Master Plan into the Open Space and Conservation Element of the General Plan. These policies focus on preservation and enhancement of local creeks for wildlife, development of trails and recreational opportunities, and educational opportunities along Santa Rosa’s creeks. The General Plan recognizes that the Citywide Creek Master Plan is the City’s leading document that ensures creek conservation and restoration.


Whenever a question arises about protecting, enhancing, or restoring creeks, about the creekside trail system, or whenever development (private or public) is proposed adjacent to a creek, the following documents should be consulted:

- Santa Rosa General Plan 2035 for general guidance.
- Santa Rosa Zoning Code for creek setback requirements.
- Santa Rosa Design Guidelines for policies applicable to projects involving creeks, riparian corridors, and storm drainage.
- Santa Rosa Creek Design Guidelines Manual. In the future, the Santa Rosa Creek Design Guidelines should be revised to include broader language that reflects conditions found along other local creeks. Until this revision occurs, the following sections of the Manual will apply to all creeks within the Master Plan area:
  - site planning (Section II B-1)
  - grading (Section II B-2)
  - creek crossings (Section II B-3)
  - architecture (Section II B-4)
  - pathways (Section II B-7)
  - landscaping (Section II B-12)
  - fencing (Section II B-13)
- Citywide Creek Master Plan for general guidance (Chapter 2 policy) and recommended treatments of specific creek reaches (text and maps) in Chapter 4, and detailed creek restoration concept plans, including Pierson Reach of Santa Rosa Creek (Appendix B), Kawana Springs (Upper Colgan) Creek (Appendix D), Lower Colgan Creek (Appendix E), and Roseland Creek (Appendix C).

Compliance with these policies is strongly encouraged since ensuring healthy and vital local creeks is the collective responsibility of all members of the Santa Rosa community.
2.2 Citywide Creek Master Plan Goals, Objectives and Policies

The following eleven goals were developed for the Citywide Creek Master Plan after a comprehensive review of current creek-related planning documents. Together, these goals represent a complete vision for an integrated and healthy creek system that provides many benefits to our local community.

HABITAT (HA) - Local creeks and riparian corridors are preserved, enhanced, and restored as habitat for fish, birds, mammals, and other wildlife.

STORM WATER (SW) - The ability of waterways to carry storm water runoff and surface drainage is protected and improved to alleviate flood risk.

ECONOMIC (EC) - The economic value of areas adjacent to creeks is enhanced.

OPEN SPACE (OS) - The urban environment is enhanced with natural and open space features.

RECREATION (RT) - Trail corridors and other recreational opportunities are provided along some waterways.

EDUCATION (ED) - Educational opportunities are provided along some waterways.

AESTHETICS (AE) - Aesthetic qualities of creeks are enhanced.

WATER QUALITY (WQ) - Water quality of creeks is protected and enhanced.

PRIVATE PROPERTY (PR) - Private property rights are respected.

HEALTH AND SAFETY (HS) - Public health and safety is protected.

CULTURAL RESOURCES (CR) - Cultural and archaeological resources are protected.

Objectives and supporting policies are presented for each Citywide Creek Master Plan goal.

HABITAT (HA) - Local creeks and riparian corridors are preserved, enhanced, and restored as habitat for fish, birds, mammals, and other wildlife.

Santa Rosa General Plan 2035 recognizes that open spaces and natural resources contribute to Santa Rosa’s “enviable quality of life”. The Citywide Creek Master Plan presents recommendations for preservation of the healthy parts of creeks, enhancement of all creeks for fish and wildlife, and restoration of modified channels to a more naturally functioning hydrologic and ecological state. Habitat preservation, enhancement, and restoration concepts are discussed further in Chapter 3.

Objective HA-1. Preserve healthy and/or environmentally sensitive creek areas.

Many of Santa Rosa’s creeks have been channelized or compromised in some way. It is important to preserve remaining natural creek channels and riparian corridors. The Citywide Creek Master Plan proposes to preserve intact and environmentally sensitive reaches for fish and wildlife habitat and to protect the riparian ecosystem from pollution, bank erosion, and other impacts.
Policy HA-1-1. Avoid channelization of additional creeks to preserve remaining wildlife habitat.

Policy HA-1-2. Meet or exceed the required creek setback distance to provide ecological buffers, recognize the 100 year floodplain, and allow for stream corridor restoration. Development shall locate outside the creek setback, as defined within the Santa Rosa Zoning Code.

Objective HA-2. Enhance creek areas that require some remediation to reach a healthy condition.

Habitat enhancement includes removal of non-native invasive species and replanting with native riparian vegetation. Native species effectively stabilize banks, filter pollutants from runoff before it enters the channel, and shade the channel, providing cooler water for native fishes. Riparian trees form a multi-layered creekside forest that shelters many bird and small mammal species. Vegetation also contributes leaf litter and detritus that will be used by aquatic macroinvertebrates, restoring nutrients to the ecosystem and providing food for fish.

Policy HA-2-1. Remove non-native invasive species from riparian corridors and adjacent areas.

Policy HA-2-2. Revegetate riparian corridors with native species to enhance aquatic and terrestrial habitat. Select native, locally available and genetically appropriate riparian plant materials for enhancement projects. This is discussed further in Chapter 3.

Policy HA-2-3. Allow streambank and waterway stability repairs as necessary and reasonable to protect the integrity of adjacent properties and public health and safety. Repairs should be sensitive to the natural environment. Use bioengineering techniques, where possible.

Policy HA-2-4. Utilize in-stream habitat structures including large branches, logs, root wads, and boulders where appropriate to improve aquatic habitat substrate complexity. Large scale or restoration project-level changes to the creek cross-section are discussed under Objective HA-3.

Objective HA-3. Restore creek areas that have become degraded due to channelization, erosion, or removal of creekside vegetation.

Creek restoration methods are discussed further in Chapter 3: Plan Concepts.

Policy HA-3-1. Restore channelized waterways to a more natural condition which allows for more natural hydraulic functioning, including development of meanders, pools, riffles, and other stream features. Remove concrete linings where feasible to allow for a connection with the stream channel and the natural water table.

Policy HA-3-2. Consider “daylighting” underground creeks where feasible to restore the biological and ecological functions of the creek.
Objective HA-4. Maintain creek areas using practices that protect and support fish and wildlife as well as help retain hydraulic capacity.

Appropriate stream maintenance procedures are described in Chapter 3.

Policy HA-4-1. Plan and perform stream maintenance activities that respect the balance of flood protection and environmental protection.

Objective HA-5. Focus preservation, enhancement, and restoration efforts on habitat that supports one or more special-status species, including those species that are state or federally listed as Threatened or Endangered, or as a Species of Special Concern.

Several special-status species depend on local creeks for survival.

Policy HA-5-1. Protect habitat for Endangered Species, through preservation, enhancement, and restoration of riparian corridors (as discussed above) and prevention of storm water pollution (discussed under Goal WATER QUALITY (WQ).

Policy HA-5-2. Reestablish populations of special-status species as ecologically appropriate.

Objective HA-6. Obtain and comply with all necessary regulatory agency permits.

Regulatory agencies include the North Coast Regional Water Quality Control Board, California Department of Fish and Wildlife, the U.S. Army Corps of Engineers, the National Oceanic and Atmospheric Administration Fisheries Service, U.S. Fish and Wildlife Service, as well as local agencies including the Sonoma County Water Agency, County of Sonoma, and City of Santa Rosa.

Policy HA-6-1. Coordinate, as appropriate, with regulatory agencies on Master Plan projects.

Policy HA-6-2. Consistent with federal, state, and local regulations, impacts to existing habitat will be avoided if possible. Minimization and mitigation of any unavoidable impacts will be required.

Objective HA-7. Use the ‘best available science’ when planning and implementing a creek project.

Creek habitat improvement projects should not be developed in a vacuum, but with awareness of current and past efforts in similar conditions.

Policy HA-7-1. Consult with knowledgeable experts as appropriate, including natural resources agency staff and other jurisdictions or organizations that have successfully completed similar projects.

Objective HA-8. Conduct pre-and post-project physical and biological habitat monitoring to measure success as part of preservation, enhancement, and restoration projects.

Monitoring before and after a creek habitat improvement project allows for assessment of project success, and adaptation of management actions as appropriate.
**Policy HA-8-1.** Include monitoring in project planning and list as a separate task in grant funding applications.

**Policy HA-8-2.** Collect existing conditions data for later comparison with post-project conditions. Utilize repeatable, scientifically sound methods for measurements.

**Policy HA-8-3.** Projects should be monitored on an annual basis for the first few years after construction, and on a less often but still regular basis thereafter.

**STORM WATER (SW) - The ability of waterways to carry storm water runoff and surface drainage is protected and improved to alleviate flood risk.**

Creeks in Santa Rosa comprise a significant portion of the storm drainage system. The General Plan calls for managing, maintaining, and improving storm water drainage and capacity. The Storm Water Low Impact Development Technical Design Manual developed by the City of Santa Rosa and County of Sonoma provides technical guidance for projects that require implementation of permanent storm water Best Management Practices (BMPs) as part of compliance with the City’s National Pollutant Discharge Elimination System (NPDES) permit for municipal stormwater. The Citywide Creek Master Plan is intended to complement, but not duplicate or replace, the Storm Water Low Impact Development Technical Design Manual.

**Objective SW-1. Maintain hydraulic capacity of creeks.**

As a consequence of channelization, local creeks were confined, no longer allowed to meander or affect nearby lands through the natural stream processes of erosion, deposition, and vegetative succession that occur with periodic flooding. The constraints placed upon Santa Rosa’s creeks limit their restoration potential. Restoration opportunities consist of re-creating as much of the natural functioning of the creek system as possible, given the constraints of existing structures and adjacent land uses, and the need to maintain an adequate level of flood control protection.

**Policy SW-1-1.** Cooperate with partner agencies to conduct regular assessment of storm water drainage facilities to ensure that adequate drainage capacity is maintained throughout the system.

**Policy SW-1-2.** Maintain current flood hazard data, and coordinate with responsible agencies to coordinate flood hazard analyses and management activities.

**Policy SW-1-3.** Balance habitat restoration and hydraulic capacity. Provide a detailed hydraulic analysis for every project component affecting flood conveyance prior to implementation to identify allowable “roughness” values and to interpret those values in the form of a vegetation planting and monitoring plan. Consider use of detention basins and diversion channels where appropriate to maintain hydraulic capacity.

**Policy SW-1-4.** Work cooperatively with partnering agencies to obtain data from stream gauges within the Master Plan area that will increase the accuracy of estimates of “roughness” assumed to represent existing conditions.

The Storm Water Low Impact Development Technical Design Manual provides technical guidance for projects that require implementation of permanent storm water Best Management Practices (BMPs) as part of compliance with the City National Pollutant Discharge Elimination System (NPDES) storm water permit for municipal storm water.

The manual recognizes that creeks and riparian habitat areas are a beautiful aspect of our community, and are home to a wide range of aquatic and terrestrial species. Land development typically increases impervious surfaces and decreases water infiltration. Storm water, or runoff generated from rain, that is not absorbed into the ground accumulates debris, chemicals, and other polluting substances harmful to water quality. Polluted storm water entering creeks is a significant concern to public health as well as a threat to plant and animal life that inhabit waterways. Additionally, land development typically increases the flow rate and decreases the duration of runoff from land causing hydromodification in creeks, which contributes to erosion, flooding, loss of habitat, and decreased aquatic biological diversity. The manual provides design guidance to mitigate or reduce negative water quality impacts due to new development and redevelopment projects.

Development projects within the City of Santa Rosa that are subject to storm water BMP requirements are submitted to the Community Development or Transportation and Public Works Department for review and approval.

Policy SW-2-1. New development and redevelopment projects shall comply with the City NPDES storm water permit and with the Storm Water Low Impact Development Technical Design Manual.

Policy SW-2-2. Storm water treatment measures that involve small scale landscape based Low Impact Development Best Management Practices (BMPs) that treat storm water as close to the source as possible shall be prioritized over other BMPs.

Policy SW-2-3. Future storm water offset projects which fulfill City NPDES storm water permit hydromodification requirements shall implement projects identified in the Citywide Creek Master Plan where feasible.

Objective SW-3. Perform channel maintenance in an environmentally sensitive manner and only where needed.

Stream maintenance activity is primarily for flood protection. Vegetation is selectively removed to maintain the water-carrying capacity of the channel, thereby maintaining protection against floods. However, consideration is given to the habitat value that vegetation provides to fish and wildlife. Trees, in particular, provide protection for fish while also shading the water, which helps to keep the temperature cool.

Policy SW-3-2. Maintain channels and vegetation with hand tools, where possible.

Certain maintenance activities should be done with hand tools to protect the creek environment, for example, removal of small debris, low branches, selective thinning of vegetation, and stabilization of some eroded stream banks. Heavy equipment may be necessary to remove tree limbs and problem debris. Staff conducting vegetation
management should be in communication with Environmental Specialist staff regarding proper methods and regulatory compliance.

**Policy SW-3-3.** Maintain the channel by performance, not schedule.

Sonoma County Water Agency has established stream maintenance guidelines (described in Chapter 3) for balancing environmental protection with the flood carrying capacity on more than 80 miles of improved flood protection channels countywide. On a regular basis, an inventory compares each site's estimated water-carrying capacity against its design capacity. Based on the results, streams are prioritized for maintenance activities.

**ECONOMIC (EC) - The economic value of areas adjacent to creeks is enhanced.**

The Citywide Creek Master Plan encourages creek-compatible land uses on properties adjacent to creeks, and integration of development project features with creek improvements.

**Objective EC-1.** Implement policies for development adjacent to waterways as stated in the City's General Plan, Zoning Code, Design Guidelines, Santa Rosa Creek Design Guidelines Manual, and the Citywide Creek Master Plan.

Required improvements by developers of public pathways and related amenities shall be considered by the Waterways Advisory Committee and decision-making bodies. The proportionate share of the cost of such improvements may reflect the benefit to the development of immediate access to the creek trail system, the number of dwelling units in a residential project or the size of an industrial or commercial project, regardless of the length of property frontage along the creek.

**Policy EC-1-1.** Where discretionary approval for new development is sought adjacent to the creek, that development shall, to the extent possible, be consistent with and support the Master Plan. Planners and decision-makers will look for consistency between proposed projects and the Master Plan. The overall intent of this policy is to incorporate the creek into the project design.

**Policy EC-1-2.** Conditions of approval for development should include dedication (per fee-title and/or easement) of land and construction of Master Plan improvements as appropriate, and where a nexus can be demonstrated.

**Policy EC-1-3.** The design of new development adjacent to the creek shall, to the extent possible, allow for future public improvements consistent with the Master Plan.

**Objective EC-2.** Encourage healthy, clean, and safe creeks, thereby increasing economic value of areas adjacent to creeks.

Several City departments have responsibilities that contribute to the prevention of crime, graffiti, water pollution, unlawful encampments, and other illegal activities and unsafe conditions along creeks. In addition, projects such as the Prince Memorial Greenway are restoring creeks and contributing to the revitalization of City neighborhoods and economic and cultural centers.

**Policy EC-2-1.** Continue to support efforts towards healthy, clean, and safe creeks.
OPEN SPACE (OS) - The urban environment is enhanced with natural and open space features.

The General Plan supports maximizing the benefits of open space, conserving the City’s open spaces and significant natural features, and creating a framework of public spaces at the neighborhood, city, and regional scale. When a community’s natural resources are conserved and incorporated into the design of new development, and multi-use trails provide access to community and regional open space areas, this results in a higher quality of life. The Prince Memorial Greenway project along Santa Rosa Creek is an example of a riparian corridor providing open space amenities for residents and visitors.

Objective OS-1. Provide for new open space opportunities throughout the city, especially in neighborhoods that have less access to open spaces.

This includes exploring the potential for creek restoration, bicycle and pedestrian ways, as well as new parks and conservation areas.

Policy OS-1-1. Provide an open space network that is linked by pedestrian and bicycle paths, and that preserves and enhances Santa Rosa’s significant visual and natural resources.

Policy OS-1-2. Encourage the Sonoma County Agricultural Preservation and Open Space District to appropriate funds for the acquisition of open space within and surrounding Santa Rosa. Priorities for acquisition would include lands adjacent to creeks, such as the Santa Rosa Creek Greenway corridor and Colgan Creek.

Policy OS-1-3. Coordinate with public and private entities to link open spaces with a network of paths and trails, including Sonoma County Water Agency access roads, Sonoma County Regional Parks Department trails, Sonoma Marin Area Rail Transit trail, and the Bay Area Ridge Trail.

Objective OS-2. Utilize open space areas for preservation, enhancement, and restoration of creeks, as well as flood plain protection.

Open space areas are valuable for fish and wildlife habitat and for flood plain protection.

Policy OS-2-1. Maintain connectivity of corridors to protect natural resources and support fish and wildlife populations.

Policy OS-2-2. Ensure flood plain protection by retaining existing open areas and creating new open areas needed to retain storm water, recharge aquifers, and prevent flooding.

RECREATION (RT) - Trail corridors and other recreational opportunities are provided along some waterways.

The General Plan calls for multi-use paths along creeks, providing off-street linkages and alternatives to vehicular transportation. The Master Plan includes recommendations for creekside pathways for a variety of recreational trail users including pedestrians, cyclists, equestrians, wheelchair users, and pedestrians with strollers, enhanced access to these trails, and creation of trailheads and publicly accessible open spaces adjacent to creeks.

Trails would be part of an open space network that in many places would function as linear
parks or greenways and provide off-street linkages to locations of interest. Connections to regional trails and locations of interest such as schools and parks would be indicated by signage. The system would be designed to be safe and convenient, and to be consistent with City and County policies and comply with the Americans with Disabilities Act.

The General Plan also calls for a network of parks and open spaces in Santa Rosa. The locations of future Community Parks and Neighborhood Parks are indicated on the General Plan land use diagram. Public plazas and gathering places, which are typically privately owned and maintained but publicly accessible, are encouraged within one-quarter mile of all residential neighborhoods and are intended to be developed where there is an opportunity to do so. These features should be incorporated near creeks and creek trails whenever feasible to provide passive recreation opportunities and eyes on the creek.

**Objective RT-1. Develop multi-use paths.**

“Soft” and “hard” refer to the surface of the path, suitable for different intended users. While new pathways must comply with Americans with Disabilities Act (ADA) requirements for accessibility, which typically involves a hard paved surface, soft paths adjacent to or near ADA-compliant paths provide an additional amenity favored by equestrians, all-terrain bicyclists, and pedestrians.

**Policy RT-1-1.** Provide and maintain multiple-use, hard-surface paths constructed to Class 1 Bicycle Path standards. Pervious and/or alternative paving materials may be considered provided that the pathways meet City standards and comply with ADA.

**Policy RT-1-2.** Provide and maintain multiple-use soft paths for pedestrians, equestrians, and all-terrain bicyclists where there is an opportunity to provide these facilities in addition to ADA-compliant hard paths.

**Policy RT-1-3.** Utilize on-street connectors such as existing sidewalks and bike lanes where it is infeasible to construct new creekside trails to connect trail segments.

**Policy RT-1-4.** Construct new on-street pedestrian and bicycle facilities such as sidewalks and bicycle lanes to connect creekside trail segments where Class 1 bicycle paths are not feasible.

**Objective RT-2. Provide public, neighborhood, and private access to creekside trails as appropriate.**

Access points to the creek trail system will be designed to comply with the Americans with Disabilities Act (ADA) and admit pedestrians, bicyclists, and equestrians. Entry by unauthorized motorized vehicles would be prohibited while Police, Fire, and maintenance vehicles would access through keyed entryways.

**Policy RT-2-1.** Provide access to the creek trail system for people and authorized vehicles from neighborhoods.

**Policy RT-2-2.** Support private access to the creek trail system as allowed by the Sonoma County Water Agency.
Objective RT-3. Develop public plazas and gathering places near creeks including trailheads and passive recreation areas to support General Plan policies which call for public plazas and gathering places within one-quarter mile of residential neighborhoods.

Trailheads act as public access points to the creek trail system and may provide facilities such as vehicle and bicycle parking, restrooms, benches, interpretive displays, and other amenities for trail users. Public plazas and gathering places located along the creek trail system can enhance these areas by providing spaces for people to enjoy creeks and passive recreation.

Policy RT-3-1. Develop trailheads to provide access into the creek trail system.

Policy RT-3-2. Develop public plazas and gathering places along creeks. These small open spaces along creeks serve as rest areas for trail users and gathering places for local residents.

Policy RT-3-3. Expand equestrian facilities in Santa Rosa and consider development of trailheads with adequate parking to support equestrian access to these facilities.

Objective RT-4. Accommodate connections to regional trail systems that enhance or support the creek trail system network.

Trails through Santa Rosa provide a link between regional parks and trail systems.

Policy RT-4-1. Cooperate with various public and private entities to create, where appropriate, new public access trails along creeks to parks and open spaces within the Urban Growth Boundary, as well as connections to regional trail systems.

Objective RT-5. Provide a signage program that clearly identifies the path system.

There is a need for four main types of signage along the creek trail system: directional, interpretive, regulatory, and locational. Directional signage directs trail users to their destination. Objective ED-2 relates to interpretive signage, which includes educational information on topics such as vegetation, wildlife habitat, flood control and hydrology, storm water pollution prevention, creek restoration, history and culture, and creek stewardship. Objective HS-1 relates to regulatory and location signage to support emergency personnel by implementing a system for signage or other distinctive structures to identify creeks.

Policy RT-5-1. Develop and implement a system for directional signage to direct trail users.

Objective RT-6. Identify potential creek restoration projects at City-owned public parks and other publicly owned parcels.

There are many City-owned properties adjacent to creeks, especially Community and Neighborhood Parks. Restoration projects at these sites would be beneficial to the creeks, may be easier to implement due to property ownership, and could provide opportunities for public education about the importance of restoring creeks due to existing public access to these sites.

Policy RT-6. Prioritize creek restoration projects on City-owned lands such as public parks.
EDUCATION (ED) - Educational opportunities are provided along some waterways.

Achieving the goals of the Citywide Creek Master Plan greatly depends on the support of Santa Rosa’s citizens. This support can be strengthened by providing residents, businesses, and visitors with information that increases their awareness of the many benefits that creeks provide to our community and the issues faced by stewards of these public lands. Addressing their concerns and offering opportunities to help take care of creeks will instill a sense of ownership, responsibility, and pride. Schools are a natural place to implement creek education, but educational opportunities should be available to everyone of any age group, cultural background, and social status.

Objective ED-1. Continue to implement Creek Stewardship Program.

The Creek Stewardship Program offers citizens who live, travel, and recreate along Santa Rosa’s creeks the opportunity to protect and enhance the creeks they enjoy. An informed, supportive, and proactive community strengthens desirable qualities such as wildlife protection and public safety while reducing problems such as illicit dumping, water pollution, illegal camping, bank erosion and growth of non-native invasive plants.

Policy ED-1-1. Increase the public’s awareness of the values provided by local creeks by providing creek restoration, education, and recreation activities in conjunction with local community and environmental organizations.

Policy ED-1-2. Support volunteer Creek Stewards who serve as additional “eyes and ears” to identify and report undesirable conditions and activities. Creek Stewards also perform minor maintenance, restoration, and monitoring tasks and provide suggestions to enhance creek areas.

Policy ED-1-3. Provide timely and effective response to citizens’ concerns regarding creek related maintenance, environmental, safety, and recreational issues.

Policy ED-1-4. Prepare a Creek Stewardship guide that addresses, in part, erosion control techniques, vegetation management, and water quality. The guide should also explain how an individual or organization can protect and enhance the creek environment.

Objective ED-2. Install signage (as part of an integrated and comprehensive signage program) including interpretive and educational displays at some trailheads and open spaces near creeks, and creek markings at bridge crossings.

Interpretive displays should include topics such as vegetation, wildlife habitat, flood control and hydrology, storm water pollution prevention, creek restoration, history and culture, and creek stewardship. Locational signage helpful for emergency personnel purposes is discussed in Objective HS-1, directional signage for trail users is discussed in Objective RT-5.

Policy ED-2-1. Develop and implement a system for signage or other distinctive structures to identify creeks. Markings could be placed at bridge crossings and at significant watershed boundaries.

Policy ED-2-2. Create, install, and maintain interpretive displays.

Objective ED-3. Encourage use of the creek as a living museum and a natural laboratory.
Many of Santa Rosa’s schools are located next to, or are within a short walk of a creek. Access to creeks will allow schools and other organizations (e.g. 4-H and Scouts) to have a natural laboratory for many subjects including science, math, art, and writing programs. For the general public, the creek is also a living museum where they can learn about natural processes and habitat.

**Policy ED-3-1.** Encourage schools, community groups and the general public to integrate creeks in their daily activities. The Creek Stewardship program would provide support in the form of curriculum and opportunities for participation in creek-related outings and events.

**Policy ED-3-2.** Encourage the adoption and stewardship of local creeks.

**AESTHETICS (AE) - Aesthetic qualities of creeks are enhanced.**

The General Plan calls for creeks to be preserved and enhanced as they are part of Santa Rosa’s scenic character. Creeks not only serve ecological and flood control functions but also provide aesthetic values in the urban environment. Goal HABITAT (HA) includes policies focusing on enhancement of riparian habitat.

**Objective AE-1. Revise the Santa Rosa Creek Design Guidelines Manual to apply to all creeks within the Master Plan area.**

The Santa Rosa Creek Design Guidelines Manual includes information for design of developments adjacent to creeks that encourages integration of creeks into new and redeveloped neighborhoods. Language in the Manual is specific to Santa Rosa Creek but could be revised and updated to apply to all creeks in the Master Plan area.

**Policy AE-1-1.** Revise the Santa Rosa Creek Design Guidelines Manual. In the future, the Santa Rosa Creek Design Guidelines should be revised to include broader language that reflects conditions found along other local creeks.

**Policy AE-1-2.** Until the revision to the Manual occurs, the following sections of the Manual will apply to all creeks within the Master Plan area:

- site planning (Section II B-1)
- grading (Section II B-2)
- creek crossings (Section II B-3)
- architecture (Section II B-4)
- pathways (Section II B-7)
- landscaping (Section II B-12)
- fencing (Section II B-13)

**WATER QUALITY (WQ) - Water quality of creeks is protected and enhanced.**

The General Plan calls for protection of water quality through storm water management and preservation and restoration of riparian habitats. Protecting the water quality of Santa Rosa’s creeks is a significant factor in determining the survivability of native plant, fish and animal species as well as the health and safety of citizens. See Goals HABITAT (HA) and STORM WATER (SW) for additional policies that protect and improve water quality. The Citywide Creek...
Master Plan is intended to complement, but not duplicate or replace, the Storm Water Low Impact Development Technical Design Manual and other existing programs that address water quality.

**Objective WQ-1. Use education and community involvement to protect water quality.**

Education can take the form of distributed printed materials or a media campaign, and participation in creek walks, community creek clean ups, and other Creek Stewardship Program events.

**Policy WQ-1-1.** Preserve waterways by informing residents of the environmental effects of dumping yard waste, pet waste, or pollutants such as motor oil into creeks or into storm drains that empty into creeks as well as littering. The Storm Water and Creeks section of the Utilities Department has created several brochures about storm water pollution prevention and the benefits of local creeks.

**Policy WQ-1-2.** Support educational programs, creek walks, community creek clean ups, and opportunities to engage in creek restoration activities that would allow citizens to learn about their creeks while taking care of them. See Goal EDUCATION (ED).

**Objective WQ-2. Use a combination of Storm Water Best Management Practices (BMPs), constructed devices, and biological systems, to remove pollutants and protect water quality.**

Implementation of effective storm water BMPs helps to protect creeks and storm water from pollutants. Examples of constructed devices include porous pavement, storm drain inlet filters, deflecting separators for trash and sediment, and trash racks. Rain gardens, bioretention facilities, constructed wetlands, buffers, and grassy swales are types of low impact development biological treatments. These BMPs could be phased in and are not necessarily dependent on implementation of any other proposed improvements to be successful.

**Policy WQ-2-1.** Require implementation of Best Management Practices to reduce drainage system discharge of non-point source pollutants originating from streets, parking lots, residential areas, business, industrial operations and those open space areas involved with the application of chemicals. Continue implementation of the Integrated Pest Management program.

**Policy WQ-2-2.** Implement the Storm Water Low Impact Development Technical Design Manual to reduce pollutants and runoff flows from new development and redevelopment projects. See Objective SW-2.

**Policy WQ-2-3.** Future storm water offset projects which fulfill City NPDES storm water permit low impact development requirements shall implement projects listed in the Citywide Creek Master Plan, where feasible.

**Objective WQ-3. Enforce and update as necessary the City’s Storm Water Ordinance to protect water quality.**

The City’s Storm Water Ordinance stipulates that only storm water is allowed to enter the storm drain system yet contains provisions to allow prohibited non storm water discharges when properly managed.
Policy WQ-3-1. Ensure that construction and other activities adjacent to creek channels are sensitive to the natural environment. Avoidance of work adjacent to creek channels is always preferred but if necessary, impacts to the natural environment shall be minimized or mitigated. Ensure that these activities do not disrupt or pollute the waterway.

Policy WQ-3-2. Continue to educate the public about the connection between storm drains and local creek health (see Objective WQ-1).

PRIVATE PROPERTY (PR) - Private property rights are respected.

The Citywide Creek Master Plan includes recommendations for some improvements that are located on private property. See Goal ECONOMIC (EC), the Santa Rosa Design Guidelines, and the Santa Rosa Creek Design Guidelines Manual for policies pertaining to land development adjacent to creek corridors.

Objective PR-1. Where discretionary land use approvals are sought, development shall, to the extent possible, be consistent with the Master Plan.

To realize the Santa Rosa community’s vision for healthy creeks and an integrated creekside trail network, public and private development projects should reflect the Master Plan’s recommendations for each creek reach. Decision-making bodies should require that proposed improvements be consistent with the Master Plan.

Policy PR-1-1. Proposed improvements associated with development projects should be consistent with the Master Plan.

Objective PR-2. Respect the rights of private property owners as the Citywide Creek Master Plan is implemented.

Private property owners are an essential partner in creating healthy and sustainable creeks and usable creekside trails. The City will work with private property owners to accomplish implementation of the Master Plan.

Policy PR-2-1. Easements or fee title shall be obtained, if possible from willing property owners, before trails are constructed or the creek channel is restored or any other creek improvement is installed on private property in implementation of the Plan.

Willing landowners may, if they wish to participate, donate (in exchange for tax or other benefits) or sell land or easements for the project. In addition, to encourage landowner participation, public agencies may offer additional incentives such as fences or native vegetative buffers to provide screening between paths and private land use on public and/or private land, depressing the grade of the path, and land swaps.

Policy PR-2-2. Every effort will be made to avoid exercising the power of eminent domain for the purpose of implementing the Plan.

Where possible, the Plan includes an alternative (located within public right-of-way) to proposed improvements shown on private property. The alternative of choice would be determined at the time of Plan implementation. This determination would be made by
decision-making bodies, considering recommendations by the Waterways Advisory Committee.

**Policy PR-2-3.** The power of eminent domain would be invoked only as a last resort, after all other alternatives have been exhausted. The Santa Rosa City Council would consider the use of eminent domain on a case-by-case basis, and only after extensive negotiations with the property owners.

Three main requirements would need to be met to begin an eminent domain proceeding. First, the Santa Rosa City Council must adopt a resolution that describes the property in question and the intended public use, and a declaration that the project is needed for the public interest, the project was designed to result in the greatest good and least harm as possible, and a hardship would be caused without the project. The property owners would be properly noticed and would have an opportunity to be heard at a public hearing on the issue. Lastly, the resolution would need to be adopted by a vote of two-thirds of all the members of the Santa Rosa City Council. Property owners would be compensated for the fair market value as determined by an appraisal.

Eminent domain would only be pursued in a manner consistent with the California Code of Civil Procedure (including sections 1245.330-360).

**Objective PR-3.** Encourage access from private property to public creek trails where desired by the property owner and where appropriate.

Access to creek trails often leads to increased awareness of the intrinsic value of riparian areas, a renewed sense of creek stewardship, and also adds to property values.

**Policy PR-3-1.** Support landowners’ requests to allow gates from private property to creek trails along flood control channels, where approved by Sonoma County Water Agency. Encourage participation in the Creek Stewardship Program.

**Policy PR-3-2.** Discourage public access to waterways where it would significantly degrade sensitive environmental habitats, archaeological sites, Native American sacred or traditional lands, or private property of existing land uses. See Goals HABITAT (HA), CULTURAL RESOURCES (CR).

**HEALTH AND SAFETY (HS) - Public health and safety is protected.**

The General Plan calls for a healthy and safe environment for the Santa Rosa community. Protection of life, property, and the environment through coordinated actions of several City Departments, combined with preparedness for and minimization of known potential hazards, are intended to create such an environment. Further, maintenance and enhancement of the creek trail system provides opportunities for residents to improve physical fitness which contributes to better public health.

**Objective HS-1. Provide for public health and safety.**

Public health and safety can be improved through the minimization of known and potential hazards, thoughtful design of site improvements, and development of a signage system for use by emergency personnel. Directional signage for trail users is discussed under Objective RT-5, and interpretive signage is discussed under Objective ED-2.
Policy HS-1-1. Minimize hazards associated with storm flooding. See Goal STORM WATER (SW).

Policy HS-1-2. Enhance pedestrian activity and safety by designing streets, buildings, pathways, and trails to provide a visual connection with public spaces. The creation of more opportunities for legitimate use of public areas decreases illegitimate use of these areas.

Policy HS-1-3. Develop a system of signage along creek trails and at street crossings to assist emergency personnel when an incident occurs.

Objective HS-2. Develop and promote the creek trail system to enhance its use for exercise.

Public health can be improved through provision of accessible recreation opportunities.

Policy HS-2-1. Develop trail maps to provide information about trail locations and travel distances as a resource to trail users.

CULTURAL RESOURCES (CR) - Cultural and archaeological resources are protected.

The General Plan calls for protection of Native American heritage, and preservation of Santa Rosa’s historic structures and neighborhoods. Since Native American archaeological sites tend to be located near waterways, projects proposed along creeks present an increased risk of impact to cultural resources.

Objective CR-1. Protect known and probable historic and prehistoric sites.

Where improvements are proposed along creeks, cultural resources may be present and must be protected.

Policy CR-1-1. Comply with all local, state, and federal regulations regarding cultural resources.

Policy CR-1-2. Consult with potentially-affected Native American tribes, the Northwest Information Center at Sonoma State University and other sources prior to or during the entitlement or project planning process to determine whether project sites contain or have the potential to contain Native American resources.

Policy CR-1-3. Require that areas found to contain significant artifacts be examined by a qualified consulting archaeologist for recommendations concerning protection and preservation.

Objective CR-2. Increase awareness of and appreciation for cultural resources through incorporation of culturally-important aspects into Master Plan projects.

Culturally important sites should be respected, and recognized as appropriate. Many traditions and rituals continue to be practiced today, and as appropriate, could be shared with other Santa Rosans in an effort to increase awareness of these traditions.
Policy CR-2-1. Encourage interpretive educational signage, located so as to not interfere with or draw unnecessary attention to sacred sites.

Policy CR-2-2. Include culturally important plant species in enhancement and restoration projects. See listed plants in Table 1.

Policy CR-2-3. Encourage use of and accommodate access to culturally important sites by present day tribe members.
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“Every child should have mud pies, grasshoppers, water-bugs, tadpoles, frogs and mud-turtles, elderberries, wild strawberries, acorns, chestnuts, trees to climb, brooks to wade in, water-lilies, woodchucks, bats, bees, butterflies, various animals to pet, hayfields, pine-cones, rocks to roll, sand, snakes, huckleberries and hornets; and any child who has been deprived of these has been deprived of the best part of her education.”

—Luther Burbank
Chapter 3. Plan Concepts

This chapter describes in general the categories of physical modifications that can be expected with Master Plan implementation. These include habitat restoration concepts such as preservation, enhancement, and restoration, as well as recreation concepts such as paths, bridge undercrossings, creek crossings, trailheads, and public plazas and gathering places near creeks.

3.1 Creek Channel Types

For the purposes of the Plan, five general types of physical creek channel configurations occur in Santa Rosa. These include Natural, Restored, Modified, Modified Natural, and Culvert (Figure 3-1).

**Natural.** Creeks that remain relatively unaltered would be considered natural. Most natural creeks can be characterized by the presence of native riparian vegetation, a natural meander stream pattern, pools and riffles, and shelter for fish such as overhanging banks, tree roots, or boulders (Figure 3-2).

**Restored.** Portions of two creeks in Santa Rosa have been partially or completely restored to a relatively natural habitat and hydrological condition. These include Brush Creek downstream of Highway 12 and Santa Rosa Creek between Santa Rosa Avenue and Railroad Street. Areas that are planned or proposed for restoration are noted on the maps and in the text.

**Modified-Natural.** A creek that has been channelized as above, but with re-established natural vegetation resulting in a relatively natural appearance and reintroduction of habitat functions and values, would be considered a modified-natural creek type (Figure 3-3).

**Modified.** A modified creek type has been channelized, with a cross-section generally as illustrated in Figure 3. Most of the modified creeks in Santa Rosa have this design, with access roads on one or both sides, including some that serve as trails. Access roads typically have drainage ditches along the outside edges that conduct water to culverts that discharge into the creek (Figure 3-4).

**Culvert.** A creek that is routed underground in a pipe or box culvert is considered a culvert creek type. This typically requires a creek trail to follow an on-street route to bypass the underground portion. It may be possible to ‘daylight’ some culverted sections of creeks.

3.2 Habitat Restoration Concepts

The citizens of Santa Rosa are committed to protecting and restoring the health of local creeks. A survey of existing biological studies and current field conditions confirmed that some of our creeks are healthy, but many others are not, and all local creeks could benefit from protection and restorative action. The latest scientific evidence shows that protecting and restoring creeks and adjacent riparian areas are cost-effective methods to provide many ecosystem services that benefit society.

Healthy creeks improve water quality by naturally filtering pollutants out of storm water runoff, and increase groundwater supply by infiltration through natural creek channel bottoms. Given
enough width/capacity, creeks can contain flood waters within their channels, protecting the community from damage to homes and infrastructure during storm events.

In addition, healthy creeks support the community’s quality of life. Properties in neighborhoods with healthy creeks are more valuable, and research has shown residential home prices increase after creek restoration projects occur near the property. Sightings of wildlife such as river otters and egrets remind the people who live and recreate along creeks that they are part of a larger ecosystem, and are tasked with the long-term care of the creek network.

Due to disruption of natural processes, many of our local creeks lack in-stream habitat complexity. In natural systems, large trees may fall into the channel, which redirects water to scour the creek bottom creating deep pools followed by riffles that help oxygenate the water. In addition, natural creeks support a moderate level of sediment transport that helps to keep the channel bottoms full with a mix of cobble, gravel, and finer sediments. Channelized reaches disturb these natural processes. These impaired creeks have fewer trees and limited capacity to allow fallen trees to remain in the channel while protecting the adjacent properties from flooding. In addition, the lack of dense multi-storied canopies over these creeks lead to higher summertime water temperatures and invasion by non-native plants.

The disruption to the natural sediment transport of creeks can cause creek bottoms to drop deeper and increase bank instability, or cause large amounts of sediment to accumulate which decreases the flood control capacity of the channel. Shallow channels with flat silt bottoms provide few hiding or resting places for fish, no gravel for spawning, nor cobble for benthic macroinvertebrates (aquatic insects) to colonize. Some culverts and grade control structures can prevent fish from migrating to historic spawning areas upstream of the urban area or can prevent safe passage of wildlife through the riparian corridor.

Higher temperatures in streams diminish the solubility of dissolved oxygen which decreases its availability to fish and other aquatic organisms. In addition, many pollutants exhibit increased toxicity at elevated temperatures.

Steps that can be taken to improve the health of local creeks include preservation, enhancement, and restoration. Depending on the existing condition of a particular reach, varying levels of treatment are recommended. Each has a specific purpose when included as part of a habitat improvement project, and application of one concept does not necessarily exclude the use of another (see Table 3-2).

**Preservation.** Preservation means that no physical changes are proposed, and the reach would be protected through an adequate creek setback or ultimately a conservation easement. Regular stream maintenance and management tasks would be conducted as needed in a preservation reach (Figure 3-5).

**Enhancement.** Enhancement would include removal of invasive species and replanting with natives, including understory sedges, grasses, and shrubs, as well as tree species to form a stream canopy. Enhancement could also include minor bank repair or erosion control using ‘soft’ non-structural methods, including willow plantings (Figure 3-6).

**Restoration.** Restoration requires changing the physical characteristics of the channel in some way to return it to a past condition, ideally an ecologically healthier and self-sustaining state. This may involve removal of concrete and riprap, relocation of access roads, channel recontouring to restore meanders, installation of instream habitat structures such as rock or log weirs or anchored rootwads, bank stabilization with willows and other plants, and other plantings
Chapter 3. Plan Concepts

of native species (Figure 6). Also included may be removal or replacement of culverts to improve passage of fish and wildlife species through riparian corridors.

For habitat restoration and enhancement projects, a list of suggested plant species is included as Table 3-1. For the purposes of revegetation projects, the riparian zone can be divided into upper bank, mid-bank, low bank, and instream areas. Each riparian species is adapted to one or more of these areas.

When possible, plant material originating from the same watershed should be used to maintain the genetic integrity of each watershed. Species appropriate for projects located in foothill areas will differ slightly from species appropriate for projects located on the Santa Rosa Plain. Consult the Milo Baker Chapter of the California Native Plant Society for further information on species appropriate to particular site conditions.

Where appropriate, native plant species of particular significance to Native American tribes should be incorporated into the revegetation plan, to support tribe members in their continued practice of traditions, including source material for baskets, medicines, and canoes. Ease of access for elder tribe members to sites for plant collection and ceremonies should be considered when deciding where the incorporation of culturally important plant species is appropriate.

Any riparian revegetation plan should be submitted to and approved by the appropriate regulatory agencies prior to implementation, which may include the North Coast Regional Water Quality Control Board, California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and the National Oceanic and Atmospheric Administration. The following guidelines are from A Guide to Restoring Native Riparian Habitat in the Russian River Watershed (Sonoma County Water Agency and Circuit Rider Productions 1998), and would apply to any revegetation project within the Citywide Creek Master Plan project area:

- Revegetation should attempt to replicate the natural system.
- Seeds, cuttings or transplants should be collected as close as possible to the project site.
- Propagation of plant material in containers needs to begin up to 18 months prior to planned installation.
- Installation of containerized and direct seeded plants should take place in the fall or winter, after several significant rainstorms have resulted in high soil moisture levels.
- Broadcast seeding of native grasses and forbs should take place in the fall of each year to ensure adequate time for seed germination prior to the rain and cold weather.

Application rates and planting densities vary according to type of vegetation and the specific target habitat type. It is best to identify a local reference site to determine the proper target densities. Plants may require irrigation during the establishment period. Because some revegetation plantings may not survive, the area will need to be evaluated post-implementation and unsuccessful plantings replaced to reach a target density.

Native plants used for the revegetation projects should ideally be contract-grown by a qualified nursery. Seed collection should be conducted by a qualified botanist and/or nursery staff. With supervision, school groups or creek stewards could collect seed as well. Seed should be collected locally from selected sites and from several different individual plants to maintain the genetic integrity of the native plant species. Seeds should be propagated for planting during the fall dormant season.
### Table 3-1 List of Plants Appropriate for Revegetation Projects

**Suggested plant selections for creek enhancement and restoration projects in Santa Rosa**

*plants used in Native American cultural practices

<table>
<thead>
<tr>
<th>Native species</th>
<th>Common Name</th>
<th>Location within Riparian Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grasses</strong></td>
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<tr>
<td>Agrostis scabra</td>
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<tr>
<td>Bromus carinatus</td>
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<td>Calamagrostis purpurascens</td>
<td>Purple reed grass</td>
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<tr>
<td>Danthonia californica</td>
<td>California oatgrass</td>
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</tr>
<tr>
<td>Deschampsia cespitosa ssp. cespitosa</td>
<td>Tufted hairgrass</td>
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</tr>
<tr>
<td>Deschampsia danthoniodes</td>
<td>Annual hairgrass</td>
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<tr>
<td>Distichlis spicata</td>
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<tr>
<td>Elymus glaucus</td>
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</tr>
<tr>
<td>Elymus triticeoides</td>
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<td>Festuca rubra</td>
<td>Red fescue/molate</td>
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<td>Hordeum brachyantherum ssp californicum</td>
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<td>Hordeum jubatum</td>
<td>Foxtail barley</td>
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<td>Melica imperfecta</td>
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<td>Stipa pulchra</td>
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<td>Orcuttia tenuis</td>
<td>Slender orcutt grass</td>
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<tr>
<td><strong>Groundcovers, sedges and rushes</strong></td>
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<td>Acmispon glaber</td>
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<tr>
<td>*Apoecynum cannabinum</td>
<td>Dogbane</td>
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<tr>
<td>*Artemisia douglasiana</td>
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</tr>
<tr>
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<tr>
<td>Carex barbarae</td>
<td>Santa Barbara sedge</td>
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<tr>
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<td>Dense sedge</td>
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<td>Carex deweyanna</td>
<td>Dewey sedge</td>
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<td>Carex obnupta</td>
<td>Slough sedge</td>
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<tr>
<td>Carex nudata</td>
<td>Torrent sedge</td>
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<tr>
<td>Carex sp</td>
<td>Sedge species</td>
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<td>Castilleja campestris</td>
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<tr>
<td>*Chlorogalum pomeridianum</td>
<td>Soap root</td>
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<tr>
<td>Clinopodium douglasii</td>
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<td>Eleocharis spp.</td>
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<td>Epilobium canum ssp canum</td>
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<td>*Iris douglasiana</td>
<td>Douglas iris</td>
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<td>*Isolepis cernua</td>
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<tr>
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<td>Baltic rush</td>
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<td>*Juncus bufonis</td>
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<td>Pacific rush</td>
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<td>Juncus ensifolius</td>
<td>Dagger leaf rush</td>
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<td>Juncus patens</td>
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<td>Juncus tenuiss</td>
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<td>Juncus xiphoides</td>
<td>Iris-leaved rush</td>
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<td>Mimulus guttatus</td>
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<tr>
<td>Orthocarpus spp.</td>
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<tr>
<td>Plantago subnudata</td>
<td>Plantain</td>
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</tr>
<tr>
<td>Polystichum munitum</td>
<td>Western sword fern</td>
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</table>
### Table 3-1 List of Plants Appropriate for Revegetation Projects

*plants used in Native American cultural practices

<table>
<thead>
<tr>
<th>Native species</th>
<th>Common Name</th>
<th>Location within Riparian Zone</th>
<th>upper</th>
<th>mid</th>
<th>low</th>
<th>instream</th>
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<tbody>
<tr>
<td>Potentilla anserina ssp. pacifica</td>
<td>Cinquefoil</td>
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<td>Rubus ursinus</td>
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<tr>
<td>Schoenoplectus acutus</td>
<td>Hardsetem bulrush</td>
<td></td>
<td></td>
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<tr>
<td>Schoenoplectus californicus</td>
<td>California tule</td>
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<tr>
<td>Schoenoplectus fluviatilis</td>
<td>River bulrush</td>
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<tr>
<td>*Typha latifolia</td>
<td>Broad-leaved cattail</td>
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#### Vines

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<td>Marah fabacea</td>
<td>Manroot</td>
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<td>Viitis californica</td>
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#### Shrubs

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<td>Acer circinatum</td>
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<tr>
<td>Aralia californica</td>
<td>Elk clover</td>
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<td>Manzanita</td>
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<td>Morella californica</td>
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<td>Oemleria cerasiformis</td>
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<td>Rubus parviflorus</td>
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<td>Salix exigua</td>
<td>Sandbar willow</td>
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<td>Salix lasiolepis</td>
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<td>Salvia leucophylla</td>
<td>White sage</td>
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<td>Salvia mellifera</td>
<td>Black sage</td>
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<tr>
<td>*Sambucus nigra ssp caerulea</td>
<td>Blue elderberry</td>
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</table>
# Table 3-1 List of Plants Appropriate for Revegetation Projects

<table>
<thead>
<tr>
<th>Suggested plant selections for creek enhancement and restoration projects in Santa Rosa</th>
<th>Location within Riparian Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>*plants used in Native American cultural practices</td>
<td>upper</td>
</tr>
<tr>
<td><strong>Native species</strong></td>
<td><strong>Common Name</strong></td>
</tr>
<tr>
<td>Symphoricarpos albus var levigatus</td>
<td>Snowberry</td>
</tr>
<tr>
<td>Vaccinium ovatum</td>
<td>California huckleberry</td>
</tr>
<tr>
<td><strong>Trees</strong></td>
<td></td>
</tr>
<tr>
<td>Acer macrophyllum</td>
<td>Big leaf maple</td>
</tr>
<tr>
<td>Acer negundo</td>
<td>Box elder</td>
</tr>
<tr>
<td>Aesculus californica</td>
<td>Buckeye</td>
</tr>
<tr>
<td>Alnus rhombifolia</td>
<td>White alder</td>
</tr>
<tr>
<td>Arbutus menziesii</td>
<td>Madrone</td>
</tr>
<tr>
<td>Fraxinus latifolia</td>
<td>Oregon ash</td>
</tr>
<tr>
<td>Juglans hindsii</td>
<td>Northern California black walnut</td>
</tr>
<tr>
<td>*Populus trichocarpa</td>
<td>Black cottonwood</td>
</tr>
<tr>
<td>*Populus fremontii ssp fremontii</td>
<td>Fremont cottonwood</td>
</tr>
<tr>
<td>Quercus agrifolia</td>
<td>Live oak</td>
</tr>
<tr>
<td>Quercus douglasii</td>
<td>Blue oak</td>
</tr>
<tr>
<td>*Quercus lobata</td>
<td>Valley oak</td>
</tr>
<tr>
<td>*Salix laevigata</td>
<td>Red willow</td>
</tr>
<tr>
<td>*Salix lucida ssp lasiandra</td>
<td>shining willow</td>
</tr>
<tr>
<td>Umbellularia californica</td>
<td>California bay laurel</td>
</tr>
</tbody>
</table>

**Zones**

- instream - in bottom of channel, wet year round
- low - close to channel bottom, seasonally wet
- mid - on terrace or slope/bank, intermediate moisture
- upper - at top of slope/bank, dry
## Table 3-2 Creek Habitat Management Categories

<table>
<thead>
<tr>
<th>Action</th>
<th>Preservation</th>
<th>Enhancement</th>
<th>Restoration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creek Setback</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Conservation Easement</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Regular Stream Maintenance</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Remove Invasive Plants</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Plant/Protect Native Species</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Protect Riparian Forest Buffers</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Livestock Exclusion or Management</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Minor Bank Stabilization (e.g. fiber roll installed on bank, brush mattress, willow sprigging)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Major Bank Stabilization (e.g. Bank shaping, vegetated gabions, live cribwalls, log, rootwad and boulder revetments)</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Grade Stabilization Structure</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wing Deflectors to Protect Bank</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remove Rip Rap</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remove Concrete Lining</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remove (Daylight) Creek from Culvert</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recontour Channel</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase Channel Width</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor Fish Passage Project</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Major Fish Passage Project</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Install Sediment Basins</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restore Stream Meander</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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Figure 3-1 Creek Channel Type Photographs

- **Natural** – Paulin Creek near Chanate Road
- **Modified** – Roseland Creek at Stony Point Road
- **Modified-Natural** – Santa Rosa Creek at Stony Point Road
- **Restored** – Brush Creek Restoration Reach downstream of Highway 12
FIGURE 3-2  NATURAL CHANNEL
FIGURE 3-3 MODIFIED NATURAL CHANNEL
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FIGURE 3-4  MODIFIED CHANNEL
Figure 3-5 Preservation Photographs

Wildlife habitat – Badger Creek

Multi-story vegetation habitat – Kawana Springs Creek

Riparian canopy – Cooper Creek

Shaded pool – Paulin Creek
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Figure 3-6 Enhancement Photographs

Creek clean up – Colgan Creek

Ivy removal – Matanzas Creek

Restoration planting – North Ducker Creek

Restoration planting - Roseland Creek
Figure 3-7 Restoration Photographs

Brush Creek at Highway 12 - 2001

Brush Creek at Highway 12 - 2010

Santa Rosa Creek at A St - 2012

Santa Rosa Creek at A St - 2003
3.2.1 Flood Hazards and Flood Control

To reduce flood risk within the community, the City of Santa Rosa complies with National Flood Insurance Program regulations which apply to all areas of special flood hazard within the city. In 2012, new flood hazard maps became effective in southwestern Santa Rosa within the Naval, Roseland, and Colgan Creek watersheds. These maps indicate the level of risk for flooding within these watersheds and provide a good foundation from which to make key decisions for future developments and for Creek Master Plan projects. Elsewhere in the city, areas adjoining Spring Creek and Matanzas Creek are designated as flood hazard zones. Flood studies are currently underway along Naval Creek and within the Santa Rosa Creek and Todd Creek watersheds. Once complete, these studies will provide flood risk determinations for these areas.

Many creeks within Santa Rosa function as flood control channels providing flood conveyance capacity while offering various ecological and biological benefits associated with creeks and providing opportunities for recreation. Creek restoration projects must consider the flood carrying capacity of the creek channels and, where necessary and feasible, may have to increase the flood carrying capacity of the creek. Many of the proposed improvements (such as trails on access roads) will not impact the flood carrying capacity of the creeks. Proposed restoration actions (such as removing concrete and adding trees and other vegetation to channels) have the potential to reduce the flood carrying capacity below existing levels.

In 2007, master plan levels of preliminary hydraulic analyses were performed for the creek reaches where recommended actions have the potential to impact flood carrying capacity. When the designs of these reaches are developed prior to implementation of a restoration project, detailed hydraulic analyses must be completed to consider every project component affecting flood conveyance. This will allow project designers to identify allowable “roughness” values and to interpret those values in a vegetation planting and monitoring plan. Detailed hydraulic analyses should be based on the results of any current drainage studies.

3.2.2 Stream Maintenance

Stream maintenance is appropriate for most reaches within the Master Plan area, since it is unusual in an urban area for streams to be self-sustaining. The minimization of mosquito production is an additional concern in urban areas. Over the years the City and Sonoma County Water Agency’s stream management perspectives has expanded to include multiple objectives including resource protection and environmental sustainability in addition to just flood control.

Sonoma County Water Agency has developed a comprehensive Stream Management Program to provide an efficient and organized program to conduct stream maintenance activities. The Program employs a comprehensive watershed approach that manages streams and channels with an understanding of the overall stream system and its physical and biological processes. The City is emulating this approach to comply with all relevant environmental regulations, avoid and minimize impacts, identify suitable mitigation and maintain flood capacity while enhancing natural resources.

The central tenet of the Stream Maintenance Program is that activities are conducted using an informed and systemic approach to minimize stream impacts while providing necessary flow conveyance. A thorough understanding of the physical and biological stream system is at the core of this approach. The Program utilizes an analytic and targeted approach to understand the degree of maintenance work actually required for a given situation. For example, hydraulic and
field analysis can be used to assess and guide sediment removal activities whereby flood control channel cross sections can be compared to as-built designs to determine when sediment removal is necessary.

Stream maintenance activities include:

**Sediment Management**

Accumulated sediment reduces flow capacity and increases the potential for flooding. In general, sediment management refers to the removal of excess sediment from engineered flood control channels, around bridges and other structures such as outfalls of storm drain pipes. While the goal of sediment management activities is to maintain flow capacity, sediment removal projects also provide an opportunity to create low flow channels that more closely resemble the cross section of a natural creek.

**Vegetation Management**

Vegetation management refers to the trimming, mowing, and removal of flow-constricting vegetation within the flood control channels and other constructed facilities. Vegetation management activities are conducted to maintain flow conveyance capacity, establish a canopy of riparian trees, and control invasive vegetation. Vegetation management also includes the planting of new trees and shrubs.

Maintenance of creek plantings as part of enhancement or restoration projects would include weeding, watering, pruning, and other necessary care.

**Bank Stabilization**

The repair and stabilization of stream or reservoir banks is undertaken when a bank is weakened, unstable, or failing. Bank stabilization activities are generally conducted June 15th to October 31st when streams are at their driest.

**Other Activities**

Other stream maintenance activities include:

- Maintaining channel access roads;
- Maintaining proper drainage along access roads;
- Maintaining proper functioning of drop-inlet culverts which direct local surface flow toward the flood control channels;
- Maintaining culverts free of sediment and vegetative blockages; and
- Repairing fences along creeks.
<table>
<thead>
<tr>
<th>Vegetation management – Santa Rosa Creek</th>
<th>Bank stabilization – Peterson Creek</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debris removal at bridgehead – Santa Rosa Creek</td>
<td>Sediment removal at culvert crossing – Ducker Creek</td>
</tr>
</tbody>
</table>
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3.3 Recreation, Access and Transportation Concepts

The overall concept for the creek trail system is to create a continuous system of access along the creeks where feasible, and connections from the creeks to major generators and destinations of bicycle and pedestrian traffic, such as schools, employment centers, community and government centers, parks, downtown and shopping districts, and residential neighborhoods. The creek trail system is much more than a recreational facility; it is intended to support walking and bicycling as viable alternative modes of transportation to the automobile. This will reduce roadway congestion, improve air quality, provide convenient and comfortable pedestrian and bicycle access, help conserve increasingly scarce and expensive fossil fuel resources, improve public health, increase social interaction, and impart a sense of community identity and pride. These benefits are especially valuable to children, seniors, and other populations with limited ability to drive.

Using creek corridors as a greenway and recreation amenity is a highly desirable concept that allows all citizens to enjoy nature and low-impact recreation close to their homes and workplaces. In statewide and national polling on recreation needs and desires, trails for walking and bicycling consistently rank as the highest overall public recreation activity and priority (USDA Forest Service 2000).

The creek trail system is intended to be multi-use, accommodating bicycles, pedestrians, wheelchair users, runners, rollerbladers, and at least in rural areas, mountain bicyclists and equestrians. The Master Plan does not determine the type of users that would be allowed in any particular location. The goal is to accommodate as many users as possible in compliance with the Americans with Disabilities Act (ADA).

Santa Rosa is fortunate to have an extensive network of creeks extending through nearly all its urban areas. The channelization of most of the creeks has largely addressed flooding problems. The negative impact of this creek modification on wildlife habitat is being addressed by restoration activities already completed and proposed in the Master Plan. Channelization provided opportunities for creek trail access because it resulted in the acquisition of public creek corridors and the construction of bank-top access roads that can also serve as trails.

From a transportation and recreation standpoint, ideally all creeks should be opened up to trail access. However, the Master Plan recognizes that public access may be in conflict with wildlife habitat and other natural resources and processes. Access may be limited to one creek bank or excluded from certain areas for this reason. The other major constraint to access is private property and associated existing structures. A key goal of the Master Plan is to respect private property rights. Many creek reaches are entirely in private ownership, with structures and improvements constructed near the creek. Proposed trails are shown on private property in some cases. Establishment of these proposed trails would in most cases require acquisition of fee title (outright ownership) or an access easement. This issue is discussed further in Chapter 2: Goals, Objectives, and Policies, under Goal PRIVATE PROPERTY (PR).

In other cases the creek is in a publicly owned corridor, backed by residential or commercial properties. Existing greenway and creek trail systems in many communities have demonstrated that trails can be compatible with adjacent development, improve the neighborhood quality of life, and can add significantly to property values.
3.3.1 Transportation Facility Design Guidelines

The creek trail system serves as an important transportation facility for bicycles and pedestrians, as well as a multi-use recreational facility. It is an important part of the City’s overall bicycle and pedestrian circulation network. As a public transportation facility the creek trail system must meet transportation design guidelines.

Intersections between trails and roadways are often the most critical locations in the design of shared use paths. Due to the potential conflicts at these junctions, careful design is of paramount importance to the safety of path users and motorists alike. There are various federal and state guidelines and other criteria that are used to select appropriate crossing designs including the Caltrans Highway Design Manual (HDM), the Manual on Uniform Traffic Control Devices (MUTCD), the California Supplement to the MUTCD, Institute of Transportation Engineers (ITE) publications, and Federal Highway Administration (FHWA) publications.

The Caltrans design guidelines are the definitive source for the development of transportation facilities in California, and all other guidelines are considered as design resources, to be supplemented by the judgment of professional engineers and designers. The intersections identified in this plan are recommended for further study because each intersection is unique and will require development of a design and review by the Department of Transportation and Public Works prior to implementation of improvements.

3.3.2 Access for People with Disabilities

The City of Santa Rosa will design new trails and outdoor areas in compliance with applicable guidelines. New trails, and improvements to existing unpaved trails, may be required to accommodate people with disabilities as required by the Federal Americans with Disabilities Act (ADA) and by the California Building Code (Title 24). The California Building Code includes requirements for outdoor occupancies such as trails, paths, and nature walk areas. The federal ADA guidelines pertaining to outdoor developed areas on Federal lands such as trailheads and trails have been in a draft form since 2007 but are a useful design resource for projects.

Parts of the existing creek trail system, and the creek access road system that may be converted to paved trails in the future, may have slopes or other existing grade changes which do not meet the standards that would be applicable if these facilities were constructed under current federal and state standards for trails. As the Master Plan is implemented, new trails and improvements to existing trails will comply with the Americans with Disabilities Act.

Corridors for the Creek Trail System. Most of the creek trail system exists along modified/engineered channels with bank-top access roads that also serve (or may serve) as trails. Many other reaches are in a natural condition but fully developed private properties afford no opportunities for access. However, there are many locations where development will occur along the creek or on a connecting route, or where street extension projects are planned.

In these locations an adequate trail corridor is needed to accommodate the trail and provide a buffer from adjacent development and to protect the creek habitat. To protect the riparian habitat, the trail corridor should be located outside the zone of existing riparian vegetation if possible.

To provide a buffer between the creek and the trail, and a buffer between the trail and the adjacent development, a setback from the top of bank or edge of existing riparian vegetation is
necessary. Additional buffer/setback should be provided where there are residential front or rear yards abutting the trail corridor. The development-side buffer may consist of landscaping or open space that is not part of active use areas. The City’s Zoning Code includes specific creekside development regulations that projects must implement; these regulations provide minimum set back distances between new development and the creek.

### 3.3.3 Trail and Path Types

The following types of trails (the term is generally interchangeable with “path”) and related access features are conceptually defined for the Master Plan. Examples of trail types are shown in Figure 3-9. There are existing improved sections, such as the Prince Memorial Greenway, that have special design features. The 1993 *Santa Rosa Creek Master Plan*, and the accompanying *Santa Rosa Creek Design Guidelines* provided a substantial amount of detail regarding the design of creek trail facilities specific to Santa Rosa Creek. A more general level of design guidance is provided here, focusing on resolving system-wide design approaches.

**Paved Trails.** A new or existing asphalt paved path (or concrete in case of some special project areas) 8’ to 12’ wide. Most of these trails occupy the alignment of access roads along a modified creek channel. To minimize impacts upon fish, wildlife and vegetative habitat, and reduce maintenance costs, this type of trail would be kept out of environmentally sensitive creek channels, except potentially at bridge undercrossings. Where feasible, the use of porous pavement shall be encouraged.

**Cantilevered and Retained Trails.** Where channels have steep banks and no available level trail corridor beyond the bank, trails supported by retaining walls or cantilevered boardwalks may be appropriate, provided there are no environmental impacts or they are appropriately mitigated. This type of trail exists in the Prince Memorial Greenway. Alternatively it could be constructed as a cantilevered boardwalk or pier-supported structure which would occur within the confines of restricted channel sections. These types of structures would be designed to avoid hydraulic impact and minimize maintenance.

**Unpaved Access Road/Trails.** In the context of the Master Plan, most unpaved trails were originally constructed and are still used and maintained by Sonoma County Water Agency for its stream maintenance activities. These access roads/trails are typically 12’ wide with a gravel (base rock) surface.

**Dirt or “Soft” Trails.** A subtype of unpaved trails, these are improved pedestrian (and potentially mountain bike and/or equestrian) paths with compacted earth or other “soft” surface. The width is typically 4’ to 8’, with an assumed average of 6’.

**Foot or Bridle Paths.** An informally created or minimally improved dirt path, often created by users, typically 2 to 3 feet wide. These may exist parallel to a paved trail.

**Trail Bridges.** Trail bridges are non-vehicular bridges allowing the trail to cross the main creek or side channel. Many such bridges currently exist on the creek trail system, and additional bridges are proposed. Bridges would typically be prefabricated steel on a drilled concrete pier foundation. They would accommodate all types of trail users, as well as small patrol and maintenance vehicles. A typical trail bridge is shown in Figure 3-10.
Figure 3-9 Trail Type Photographs

- Paved trail (Class I) and access road – Brush Creek
- Unpaved access road/trail – College Creek
- Dirt or “soft” trail – Santa Rosa Creek
- Sidewalk adjacent to creek – Steele Creek
Figure 3-9 Trail Type Photographs (cont’d)

- Trail bridge – Brush Creek
- Typical undercrossing – Santa Rosa Creek
- Retaining wall/cantilevered trail – Santa Rosa Creek
- Informally created foot path – Santa Rosa Creek
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3.3.4 On-Street Connections

The creek trail route will need to follow streets where access along the creek is not feasible. This must include provisions for bicycles and for pedestrians, including people with disabilities. Most existing on-street connections are not depicted in the Master Plan as they typically would be included in trail maps. Where connections are needed between creek trail segments and no sidewalks or pathways exist, the map depicts the need for an on-street connection.

**Bicycle Facilities.** Three class definitions of bicycle facilities are consistently used by Caltrans and other transportation agencies:

**Class 1** bicycle facilities are off-street paved paths. These are similar to the “paved path” type described above, except that there are very specific design standards for Class 1 bike routes, including radius of curves, slopes, transitions, etc. that do not apply to generic paved paths.

Two types or classes of bicycle facilities may occur on streets:

**Class 2** bicycle facilities consist of striped and signed lane for bikes along the street, typically five (5) feet wide minimum.

**Class 3** bicycle facilities consist of a bike route along the street, marked by signs.

For the purposes of the Master Plan, where paved trails are proposed, they will meet the design standards of Class 1 bicycle facilities. Some of the on-street routes will follow existing designated and improved bikeways that may provide all or part of such connections. The City maintains an adopted Bikeways Map showing designated routes and facilities by type/class.

**On-Street Pedestrian Facilities.** Where pedestrians must follow an on-street route there should be sidewalks to accommodate them, including curb ramps to accommodate people in wheelchairs and others.

The broad scope of the Master Plan and the limited extent of available data about the on-street routes does not allow for a determination of whether on-street connections currently feature sidewalks to accommodate pedestrians, whether the sidewalk has curb ramps and slopes to accommodate wheelchairs, or whether the desirable/feasible bicycle facility is Class 2 bike lanes or a Class 3 signed route. These details will be resolved by subsequent site-specific studies and plans during the development review process, or by future public street improvement projects.

3.3.5 Trail Traffic and Transportation Design

Multi-use trails have certain design standards, which vary depending on the agency that is constructing or managing them. Paved trails on the creek trail system should be designed to meet the standards for a Caltrans Class 1 Bikeway, which are defined in the California Department of Transportation Highway Design Manual Section 1003.1. Generally, converting existing Water Agency access roads to paved multi-use trails will result in trails that comply with these standards. The configuration of points where the creek and associated trail system cross a street or a rail line are important to resolve. Street crossing types include various types of surface crossings, undercrossings, and in certain instances, overcrossings. This section identifies general transportation design principles for these crossings, and further specifies how they should be configured for the creek trail system.
Trail Intersection Operations. Based on research conducted by the University of North Carolina Highway Safety Research Center, the following principles were developed for the operation of trail intersections.

- Four-way stops are ineffective and may create a potential conflict. Motorists tend to stop, and bicyclists rarely do. This creates a false sense of security that can lead to a collision.
- High Speed Roadways – Assignment of right-of-way is critical. For crossings on roadways with speeds of 40 mph and greater, right-of-way is always assigned to the motorist.
- Medium Speed Roadways – Right-of-way can be assigned to trail users when their volumes exceed vehicular volumes and motorist speeds are at about 30 mph. Traffic calming devices should supplement the right-of-way assignment and be used to further slow the speed of motorists.
- Low Speed Roadways – Right-of-way can be assigned to trail users when their volumes exceed vehicular volumes and motorist speeds are 20 mph or less. In this case supplemental traffic calming devices are not necessary.

The volume of trail users in the City of Santa Rosa is rarely higher than the conflicting vehicular volume. Therefore, right-of-way is generally assigned to the motorist rather than the trail users.

The following are suggested techniques for enhancing crossing safety at trail/roadway intersections.

- Provide adequate stopping sight distances for motorists and trail users.
- Reduce conflict speeds by controlling the approach speed for either or both the trail user and the motorist.
- Reduce conflicts at intersections by routing trail crossings through existing crosswalks, or placing crossings outside of the influence of intersections.
- Even on 2-lane roads, medians can help by acting as a traffic calming feature and separating conflicts in time and space.
- Trail crossings should be perpendicular. But, when needed, it is possible to skew the crossing to 75 degrees and still only lengthen the crossing distance by about 4 percent.
- Properly placed overpasses on trails will be well used, especially if at-grade crossings are complex, require excessive waits, or pose high speed conflicts. Long approaches to overpasses may be needed to meet ADA requirements.
- Signal cycles must be responsive to bicyclists, and should not require an excessive wait.

MUTCD. The Manual on Uniform Traffic Control Devices (MUTCD), the national standard for designing, applying, and planning traffic control devices, includes guidelines for typical signs and markings for shared use paths as well as appropriate right-of-way and traffic control. Federal law requires all public agencies to conform to the MUTCD. The MUTCD provides standards for use of a stop or yield sign and guidelines for assigning right-of-way.

Surface Street Crossings. This is a case where trail users must cross a street to enter or continue on the trail system. Surface crossings also function as potential creek trail entry points, typically with potential entries at the four corners of the street/creek crossing (upstream and
downstream on the right bank and the left bank). There are approximately 200 roadway crossings in the citywide creek path system. Traffic volumes on the intersecting roadways range from low to moderate to high-volumes.

Features for all proposed roadway crossings include warning and/or control signs both for vehicles and pathway users. The type, location, and other criteria are identified in the Manual for Uniform Traffic Control Devices (MUTCD). At each crossing location, consideration must be given for adequate warning distance based on vehicle speeds and sight distance. On higher volume roadways, catching the attention of motorists desensitized to roadway signs may require additional high visibility devices such as flashing light systems, pavement legends, roadway striping, or changes in pavement texture. Signing for path users includes a standard “STOP” sign and pavement marking combined with bollards, and in some cases where adequate space is available, a curve in the path to slow bicyclists on their approach to the street crossing. Care must be taken not to place too many signs at crossings or they will result in sign clutter and will negate their impact. The final design of the crossing shall be determined by the Transportation and Public Works Department.

Directional signing may be useful for path users and motorists alike. For motorists, a sign reading “Santa Rosa Creek Pathway Xing” along with a path emblem or logo helps to both warn and promote use of the path itself. For path users, directional signs and street names at crossings help direct people to their destinations.

Many of the existing and proposed pathway segments emerge near a controlled roadway intersection. In these cases, a determination must be made regarding the need to route pathway users to the existing intersection, or to develop a new mid-block crossing. A distance of approximately 200 to 300 feet may be useful in this evaluation because it is an estimate of the maximum distance pedestrians would travel out of their way to use an existing crossing and this distance is generally outside of the influence of existing intersections.

Where pathway users are expected to route to an existing intersection, a barrier and directional signing should be required to keep them from crossing at the unmarked location. At the existing intersection crosswalk, all path users will technically become pedestrians.

Signs warning motorists of the presence of bicycles may be needed, as well as right turn on red prohibitions “when pedestrians and bicyclists present.” High-speed curve geometry and free right turns should be replaced with tighter radii to help slow vehicles, or enhanced with pavement texture or slightly raised speed tables.

One of the key problems with using existing intersections is that it requires bicyclists to transition from a separated two-way facility to pedestrian facilities such as sidewalks and crosswalks, normally reserved for pedestrians. Widening and striping the sidewalk (if possible) between the path and intersection may help to alleviate some of these concerns. Ultimately, users will cross at the trailhead unless there is a significant reason for them to divert to the closest crossing.

**Surface Rail Crossings.** Creek trail crossings at a rail line should, if possible, be redirected to the nearest existing public street. Establishment of a new public crossing requires approval by the California Public Utilities Commission.

**Undercrossings.** Ideally, in order to reduce potential conflicts between trail users and vehicles at points where the creek trail crosses existing streets, and if there is physical space, trails should pass under bridges. There are a variety of existing undercrossing types on the existing
creek trail and access roads. Some of these are “dry season undercrossings”, where trail users can cross under the street below a bridge only when water levels are low. Undercrossings should be designed or modified to meet ADA standards, with slope gradients a maximum of 5%, or up to 8.33% if resting platforms are provided at the intervals specified in detailed access standards. All ramps should be paved, even if they are connecting unpaved trail segments. Railings should be provided where there are steep drop-offs (e.g. over 2 feet and over 1:1 side slope). Ideally undercrossings should feature good visibility of the trail from the adjacent road and nearby trail for security purposes, which is primarily a function of design of the vehicular bridge that creates the undercrossing.

**Trail Entries.** Most of the trail system entry points occur where a public street intersects with a creek trail. If trails occur on both banks of the creek, entries could occur at the four corners of the street/creek crossing (upstream and downstream on the right bank and the left bank). Figure 3-18 illustrates various types of existing entry structures. The standard configuration of these entries from a traffic circulation standpoint is discussed earlier in this chapter. Other entry points occur where public streets dead end at or abut the creek. Still others are in public parks or school grounds. Generally, providing new public access entails removing chain link gates or creating openings in chain link fences and placing removable locking bollards (posts) in the opening to prevent entry by unauthorized vehicles. In the case of mid-block entries, many creek reaches will require installation of a culvert to allow the entry to cross the drainage ditch that typically occupies the outside of the Modified or Modified Natural Creek corridor. Where there is a significant grade drop between the adjacent land or public road a ramp would be needed to accommodate trail users at an ADA compliant grade. The ramp might also need to accommodate emergency vehicles, or at least small maintenance and patrol vehicles. An adjacent or nearby entry point or ramp that has a steeper grade than the public access ramp could be provided.
Figure 3-10 Entry Structure Photographs

- Bollards
- Chain link gate with pedestrian walkaround
- Curb barrier
- Chain link gate, no access
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Figure 3-10 Entry Structure Photographs (cont'd)

- Open channel access
- Sidewalk adjacent to creek
- Stepover gate
- Walkaround structure
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3.3.6 Support and Recreational Facilities

There are many sites along the creeks where there are existing features or potential opportunities for support facilities, parks and open space, and other features that would complement the creek trail system. There are also physical and land use constraints that will be barriers to the trail system unless they can be resolved.

Restrooms. Trail users will need access to restrooms. Existing public restrooms in parks or other public facilities or building close to the trail could also serve trail users. No new restrooms are proposed directly in conjunction with the Master Plan, but new restrooms may be provided in conjunction with park projects identified as part of the overall greenway system, or in conjunction with other public projects.

Parking. Most of the trail traffic is expected to be local, but in some cases users may drive to the trail system to embark on recreational or commute trips and will need parking. Some existing public parking areas are located close to the trail and could serve trail users.

Parks and Open Space. Parks along or near creek trails are vital components for recreational use, and also help support transportation use of the trail system. Trailside parks may serve as rest areas for trail users and quiet “walk-in” parks for local residents. Parks may provide parking lots to allow people who don’t live close to the trail system to begin their recreational or commute trip. Parks along creek trails could provide restrooms, picnic facilities, play equipment, usable landscaped open space, trash receptacles, and interpretable displays.

In addition to existing public parks and open space, two types of future parks are identified on the maps and in the descriptions: 1) “Planned” parks that are shown on the General Plan land use diagram. These sites may or may not have been acquired, and are typically not yet improved. 2) Potential Public Plaza and Gathering Places. These are sites that may have special environmental qualities and/or are undeveloped, and may warrant consideration for acquisition or designation as protected open space or improved parks in the future. Some of these sites are in public ownership, and some are private. These concepts may or may not be feasible for the City Recreation and Parks Department to implement, and are not currently among the parks prioritized for acquisition or development.

Existing public parks, including Annadel State Park, Spring Lake Park, and Howarth Park, in the eastern portion of Santa Rosa, provide important trail links and destinations for creek trail visitors. The creek trail system also includes links to nearby parks, such as Doyle Park, Finley Park, Olive Park, Juilliard Park, Northwest Community Park, Rinconada Park, Place to Play, and Burbank Home and Gardens.

Historic Sites. Sites with identified historic significance or adjacent to historic structures may warrant special interpretive signage or installations.

3.3.7 Signage

The creek trail system needs signage and trail identification features to make it easy for people to find their way on the system and to use it to reach major destinations around the city, such as schools, shopping, and community and government service centers. The Master Plan, in Objective RT-5, specifies: “Provide a signage program that clearly identifies the path system.” Policies and objectives specify directional signage to direct trail users to their destination, interpretable signage, and signage to support emergency personnel response. In addition,
signage will be needed to inform trail users of rules and regulations and to support enforcement of laws.

There are several current creek trail signage design efforts underway or in place in and around Santa Rosa that will need to be referenced or coordinated to provide the signage program.

The Sonoma County Agricultural Preservation and Open Space District has commissioned a sign program for the Santa Rosa Creek Greenway. This is currently underway. A separate effort is underway to design a series of signs for where the creek trail crosses streets. The *Santa Rosa Creek Design Guidelines Manual* included a series of standard designs for signs and creek trail markers, including a graphic logo for the Santa Rosa Creek Trail that could be adapted to the citywide system.

The Master Plan does not include design of signs, or determining the locations of any specific signs, since it is anticipated that a subsequent revision of the Santa Rosa Creek Design Guidelines Manual will serve that purpose. The following concepts are provided for sign types, designs and locations.

**Directional Signage.** There should be a consistent graphic design and logo for signs that identify the creek trail system. Signs should identify each entry point for trail users, including identifying the entry from outside and from within the trail system, and key destinations such as major streets, parks, or public facilities. These signs or markers should continue on any on-street connections to make it easy to follow the route. A consistent system of naming and numbering of the creeks and corresponding trail segments should be used on the signs, and reflected on creek trail maps.

Bollards or pylons could be used to identify the trail entries and route. Painted symbols or marking on the pavement and/or plaques embedded in the pavement could also be used to mark the route.

Mapboard signs should be provided at major entry points such as downtown or public parks to provide overall orientation. These are typically a kiosk or signboard with an enlarged graphically-designed map showing the location in relation to the overall or watershed trail system. In addition to parks on or near the trail system, the maps should highlight major destinations such as schools, community centers, government offices, and shopping districts to support use of the trail system for transportation as well as recreation. The kiosks or signboards should provide information about highlights along the trail system, current events, issues, volunteer projects, etc. Special informational signs may be posted at specific locations, such as at a new or changed trail or when a trail rule or policy is changed.

**Interpretive Signs.** There are numerous opportunities along the creek trail system to interpret nature, including riparian habitats, wildlife, and hydrologic processes, as well as prehistoric and historic local history. Interpretive signs and installations should be designed to be consistent with the overall signage design theme, but each could and should be somewhat unique.

**Location Signage for Emergency Personnel.** The Santa Rosa Fire Department has requested that an organized system of creek trail segment numbers and names be created and signed, and that the name of each creek be stenciled or signed on each undercrossing to facilitate rescues. The Master Plan reach and segment number provide an organized naming system that could be used for these markings, which should be consistent with the trail and crossing designations in directional and informational signs.
Locational Signage for Creeks. Beginning in 2010, colorful “Ours to Protect” creek identification signs have been installed at locations where a creek intersects with a public street in Santa Rosa. These signs will be installed in all feasible locations. Besides helping the community learn the names of their creeks and imparting a better sense of geography, the signs also help spill response, police, and fire personnel respond to incidents at an accurately described location.

Rules and Regulations. The Santa Rosa Police Department has asked that regulations pertaining to the creeks and the creek trail system be posted to support law enforcement. Signs with standard rules and regulations for the creeks and creek trail system should be posted at major entry points. These would address hours of use, types of use, any prohibitions such as trespassing, smoking, littering, damage to public or private property, disturbance of wildlife or habitat, camping, dogs off leash, etc. Special specific regulation signs may be posted in locations that are known or expected to experience specific issues.

Traffic Control and Warnings. The creek trail system and its connecting on-street routes will be part of the City’s bicycle and pedestrian transportation system, and will intersect with vehicular and rail transportation in many instances. Signs are needed to warn and control trail traffic as it approaches crossings, and to warn drivers as they approach the trail. These signs, and other traffic information and control methods, are discussed earlier in this chapter.

Signs and markings will also be needed on the trail system in some cases to control trail users traffic, particularly bicycles. Speed limit, yield and stop signs may be required on more heavily used paved trail reaches. Pavement markings and signs should be provided to clarify right-of-way for different trail user groups, especially when more groups are mixed (e.g. bikes yield to hikers, both yield to horses).

General Sign Design and Construction Standards. Signs, markings and monuments must be constructed of extremely durable materials, construction methods, and installation to resist weather, vandalism, and normal wear and tear. They should be easy to read and understand, carefully coordinated with the overall system of creeks and trails, and of a consistent design throughout the system. Preparation of a sign design manual is an appropriate next step, building on the Santa Rosa Creek Design Guidelines and details from the various prior and current sign design efforts.
“I am beginning to understand that the stream the scientists are studying is not just a little creek. It’s a river of energy that moves across regions in great geographic cycles. Here, life and death are only different points on a continuum. The stream flows in a circle through time and space, turning death into life across coastal ecosystems, as it has for more than a million years. But such streams no longer flow in the places where most of us live.”

~ Kathleen Dean Moore and Jonathan W. Moore
Santa Rosa Citywide Creek Master Plan

Chapter 4. Watershed-Specific Recommendations

For the purposes of the initial 2007 Master Plan, creeks were grouped into seven watershed planning areas and divided into reaches. Each creek reach served as the study unit for assessment purposes. The 2013 plan update adds two additional watershed planning areas for a total of nine (Table 4). Existing conditions and recommendations resulting from the Natural Resources Assessment and Recreation, Access, and Transportation Component are presented for each reach.

4.1 About the Maps

The initial Master Plan included a series of sixty 11” x 17” maps at 1” = 400’ scale covering all the creek reaches. The updated Master Plan includes 16 maps covering all nine watershed planning areas using data from the City’s Geographic Information System (GIS). The maps are available in a dynamic GIS-based format or as downloadable PDFs on-line through the City’s GIS web page.

In the text, locations of the various existing and proposed conditions within each reach are identified as being either on the left or right creek bank (from the perspective of looking downstream) and/or are given a cardinal direction, i.e. north, south, etc.

Each PDF map includes a legend that lists the features that are shown on the maps. These map features and their importance to the creek trail system are explained in detail below.

Creek Types. Indicates the five types described in Chapter 3, including Natural, Restored, Modified, Modified-Natural, and Culvert.

Creek Reaches. Creek reaches within the nine watershed planning areas are numbered moving downstream. The reaches are mapped and described starting from the headwaters of each main channel, and then each tributary in the watershed consistent with the watershed and creek mapping system described in Table 4-1.

Ownership/Land Use. The ownership adjacent to the creek is important to the feasibility of access and recreational use. The creek may occupy a separate elongated parcel or “corridor”, or may be within a larger parcel that straddles the creek. Ownership and land use types shown on the maps include:

- **City.** Owned by the City of Santa Rosa.
- **SCWA.** Owned by the Sonoma County Water Agency.
- **Other Public.** Owned by other public agencies.
- **School Properties.** Owned by a school district.
- **Private.** This may mean that access rights along the creek do not exist, or there could be an existing or proposed easement that allows access.
- **Urban Growth Boundary.** This is the currently designated limit for urban growth and the ultimate potential city limit line. It was initially used as the planning area boundary for the
Master Plan but the updated Plan depicts planning outside of the boundary to be consistent with related planning efforts in the adjacent unincorporated County.
## Table 4-1 Creeks and Watersheds in Master Plan Area

<table>
<thead>
<tr>
<th>Creek</th>
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<th>Start</th>
<th>End</th>
<th>Reach Length (Feet)</th>
</tr>
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### Table 4-1 Creeks and Watersheds in Master Plan Area

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<th>Creek</th>
<th>Reach</th>
<th>Start</th>
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<th>Reach Length (Feet)</th>
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</table>
4.1.1 Existing Roads and Trails

Many of the publicly owned creek reaches have some type of existing access road for stream maintenance activities. Most of these access roads have been opened to the public and serve as unpaved trails. Some stretches of access roads have been paved to function as multi-use trails. In many cases, existing access roads can be used as public trails with little or no change. In other cases an existing footpath, or gravel road, will need to be upgraded to a paved trail to implement the plan. The following conditions are depicted on the maps:

**Paved Trail.** Typically an asphalt surface access road/trail 8’ to 12’ wide, which is suitable for use as a multi-use (bicycle and pedestrian) trail and may meet the design standards of a Class 1 bike path.

**Unpaved Access Road/Trail.** An improved access road, typically 12’ wide surfaced with gravel/base rock surface, but may include dirt roads. Access roads proposed for paving are overlaid with a series of “P”s.

**Closed Access Road.** An existing Water Agency access road (typically 12’ wide gravel, or base rock surface) that is closed to public access. Access roads that are currently closed but proposed to be open are overlaid with a series of “O”s.

**Dirt/Soft Surface.** An existing pedestrian (and potentially mountain bike and/or equestrian) path with compacted earth, decomposed granite, or other “soft” surface. Width typically is 3’ to 6’ but this category may include narrower informal dirt paths created by use.

**Trail Bridge.** An existing bridge that allows the trail to cross the main creek or side channel. This does not include vehicular or rail bridges over the creek, or bridges that allow bikes and pedestrians to cross over roads or rail lines, which are counted as “crossings.”

4.1.2 Existing Bikeways

The Bicycle and Pedestrian Master Plan (2010) includes maps showing designated routes and facilities. These include important connections to the creek trail system, and in some cases provide on-street alternative routes where access along the creek isn’t feasible. Three types, or classes, of bicycle facilities are shown on the maps. These class definitions are consistently used by Caltrans and other transportation agencies:

**Class 1 Bike Path.** An existing paved bike path separated from roadways that is 8’ to 12’ in width, at least 8’ wide with a 2’ shoulder. These typically function as multi-use paths, and many comprise parts of the creek trail system, and trail systems in parks and other public facilities.

**Class 2 Bike Lane.** An existing striped and signed lane for bikes along the street, typically 5’ wide minimum.

**Class 3 Facilities/Bikeway.** An existing bike route on the street, marked by signs.
4.1.3 Proposed Trails and Connections

These are proposed improvements to complete the creek trail system. Detail on the design standards for these improvements is provided in Chapter 3. They include new trails, on-street routes, opening maintenance access roads that are currently closed, and upgrades of existing unpaved paths to be paved. Upgrades to existing trails, and construction of new trails, must be designed to meet current ADA standards.

**Planned Street Extension.** A new road proposed in the General Plan or other document. These future routes may include bicycle and pedestrian facilities to provide connections along or between creek trail reaches. The maps depict the general location of the proposed extension, not a specific alignment.

**Planned Paved Trail.** A new asphalt paved path (or concrete in case of some special project areas) 8’ to 10’ wide (proposed to meet design standards of a Class 1 bike path). This category includes upgrades of informally created footpaths to formally improved paved trails.

**Paved Access Road/Trail.** An existing unpaved gravel access road/trail 8’ to 12’ wide that is proposed to be paved and meet the design standards of a Class 1 bike path. This is indicated by a series of “P”s overlaid on the route.

**Planned Trail Bridge.** Proposed trail bridge to allow the trail to cross a creek or side channel.

4.1.4 Street/Trail Crossings and Trail Entries

The Citywide Creek Master Plan adopted in 2007 identified basic crossing types and numbered the crossing locations on the maps with detailed tables identifying conditions at each crossing included in Appendix E. Many of the identified street/creek crossing points would function as trail entry points, as detailed in the tables. Locations for mid-block entry points, where the creek system may be entered from a side street or public site, were numbered on the map for reference to the tables and text.

The street/trail crossings diagrams included in the 2007 CCMP were determined to be out-of-date and inconsistent with current design guidance for these features. The Bicycle and Pedestrian Master Plan (BPMP), adopted on February 15, 2011, is expected to be updated in 2014 to include updated design guidelines for street crossings and other similar features. Until the BPMP is updated, it is recognized that the 2007 CCMP includes reference information and interim design guidelines for these facilities and that the guidelines are not to be considered design standards. The final design of any street crossing will need to be further evaluated at the project design stage in consultation with City engineering staff.

**Surface Crossing.** Trail users must cross a street or railroad to continue.

**Under-Crossing.** Trail users can cross under railroad tracks or streets. Some of these are Dry Season Under-Crossings, where trail users can cross under the street only when water levels are low.

**Proposed Under-Crossing.** A proposed point where trail users will cross under railroad tracks or a street.
Existing Off-Street Entry. An existing point where the creek trail can be accessed other than at a street crossing such as the end of a dead-end street or public property such as a park or public plaza and gathering place.

Planned Off-Street Entry. A proposed entry where the creek trail will be accessed from a point other than a street crossing.

4.1.5 Existing and Proposed Facilities
These are existing and proposed recreational and environmental facilities that would enhance the trail system, as noted on the maps.

Parks/Open Space. Existing public parks and open space lands, and proposed Community and Neighborhood Parks as designated by the General Plan.

Potential Public Plaza and Gathering Place. Sites adjacent to creeks that have special environmental qualities and/or are undeveloped, may warrant consideration for development as publicly accessible open spaces such as public plazas and gathering places. Public plazas and gathering places are typically privately owned and maintained but publicly accessible through public access easements. These features are encouraged within one-quarter mile of all residential neighborhoods and are intended to be developed where there is an opportunity to do so. These features should be incorporated near creeks and creek trails whenever feasible to provide passive recreation opportunities and eyes on the creek.

4.2 Watershed Specific Recommendations

4.2.1 Santa Rosa Creek Watershed

Watershed Setting. Santa Rosa Creek is the major collector stream in the City, central to the hydrologic system. Santa Rosa Creek has received the most attention in prior plans and improvements, including the Santa Rosa Creek Master Plan, Santa Rosa Creek Design Guidelines, and the Prince Memorial Greenway Project, constructed where the creek passes through the heart of downtown.

The Santa Rosa Creek Watershed drains approximately 78.6 square miles, including agriculture, parks and open space, and urban land uses. The headwaters are on the northwestern slope of Hood Mountain. The creek tumbles through a canyon which roughly parallels Los Alamos Road, then begins its westerly journey through the urban area and then agricultural lands before joining the Laguna de Santa Rosa north of Sebastopol. The Laguna flows northerly to its confluence with Mark West Creek and on to the Russian River at Mirabel. From headwaters to its confluence with the Laguna, Santa Rosa Creek flows approximately 22 miles. Elevation varies from approximately 2,000 feet to about 40 feet above sea level. Tributaries of Santa Rosa Creek that are considered in the Master Plan as part of the Santa Rosa Creek Watershed area include Skyhawk Creek, and College Creek.

Vegetation within the watershed ranges from mixed evergreen forest and chaparral in the east, to riparian woodland and riverine within the creek corridor, ornamental landscaping within the urban area, to oak savannah grasslands with vernal pools and other seasonal wetlands on the Santa Rosa plain. In the eastern reaches, there is dense canopy cover with large, mature native trees such as big-leaf maple, cottonwood, willows, box elder and alder. Steelhead and resident rainbow trout are present. Chinook salmon have been observed in multiple years in the 2000s.
In the western reaches, a riparian forest has begun to develop in the absence of intensive channel maintenance. To increase habitat value for steelhead trout within Santa Rosa Creek, the Sonoma County Water Agency has instituted stream maintenance methods such as selective vegetation removal that promote canopy cover yet maintain hydraulic capacity.

The Citywide Creek Master Plan area includes ten creek reaches within the Santa Rosa Creek Watershed, including the College Creek and Skyhawk Creek tributaries.

**Santa Rosa Creek.** For the purposes of the Master Plan, Santa Rosa Creek is organized into eight reaches, which are covered in five maps moving downstream.

**Santa Rosa Creek Reach 1: Urban Growth Boundary to Calistoga Road**
Maps: Oakmont 2
Type: Natural Creek
Length: 13,345 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** Most of this reach is natural with aquatic habitat consisting of pools and riffles, shelter provided by boulders, roots, and undercut banks, and good stream canopy cover. This reach supports steelhead trout. There is a diversion structure located at the eastern end of Montgomery Drive, where high flows are diverted to Spring Lake (Santa Rosa Creek Detention Reservoir) for flood control. A spillway allows return of water to Santa Rosa Creek to prevent the reservoir from filling beyond capacity. A concrete apron upstream of Melita Road and a historic weir upstream of the Spring Lake diversion structure may present barriers to juvenile fish. Tree species include alder, willow, big leaf maple, walnut, cottonwood, bay, and live oak. Invasives include vinca, ivy, Himalayan blackberry, and pampas grass.

This reach of Santa Rosa Creek is recommended for preservation, due to its value as fish and wildlife habitat. Enhancement including removal of invasive species and replanting with natives is also recommended.

**Recreation, Access, and Transportation.** The parcels through which the creek passes are mostly private. No direct creek trail access is proposed, but on-street routes are proposed on the north bank along Melita Road and Queen Anne Drive to existing signed bike routes and/or bike lanes on Highway 12. On the south side of the creek, Channel Drive and Montgomery Drive provide an on-street connection to Calistoga Road and Reach 2 although sidewalks do not exist along most sections of these roadways. At the southern end of Calistoga Road, a road extension and bridge are planned which would provide an on-street connection from Montgomery Drive to Highway 12. A connection from the route on Melita Road to the Channel/Montgomery route would be provided by a surface crossing of Montgomery Drive and the existing trail bridge (#2) crossing the Spring Lake Diversion Channel to an existing parking area near Annadel State Park. The Sonoma Valley Trail along Highway 12 between Sonoma and Santa Rosa would provide an important east-west connection roughly parallel to Santa Rosa Creek.

**Santa Rosa Creek Reach 2: Calistoga Road to Farmers Lane**
Maps: Santa Rosa Creek Maps 1 & 2
Type: Natural Creek
Length: 13,103 linear feet
Existing Conditions and Recommendations:

**Natural Resources.** This reach is natural, with pools and riffles and good stream canopy cover. Large woody debris, boulders, and tree roots provide shelter. Spawning Chinook salmon have been seen within this reach during multiple years in the 2000s. Several parcels along this reach are owned by the City of Santa Rosa, providing access for education programming and restoration work. Tree species include alder, Oregon ash, big leaf maple, willow, and box elder. Invasives include Himalayan blackberry, ivy, periwinkle, and giant reed.

This reach of Santa Rosa Creek is recommended for preservation, due to its value as fish and wildlife habitat. Enhancements including removal of invasive species and replanting with natives is also recommended.

**Recreation, Access, and Transportation.** The parcels through which the creek passes are mostly private upstream of Trailhead Park and mostly public upstream of the park to Farmers Lane. No creek access exists or is proposed east of Trailhead Park. A Class 3 bike route and sidewalks along Sonoma Highway (State Route 12) west of Calistoga Road and then south on Acacia Lane connect to the existing Class 1 bike path along the north side of the creek that begins at Trailhead Park. The paved path crosses Mission Boulevard at a signalized intersection. A new section of Class 1 bike path is proposed to connect this path to the existing Class 1 bike path that extends upstream from Flat Rock Park, an existing Neighborhood Park. A proposed trail bridge (#5) and paved trail would lead to Montgomery Drive and existing Class 2 bike lanes on Summerfield Road that connect to Howarth Memorial Park. Shadow Lane could serve as an on-street connector until completion of the proposed paved trail.

An existing trail bridge over Brush Creek (#29) connects to the Brush Creek trail and to an existing Class 1 bike path that continues along Santa Rosa Creek to a point 250 yards downstream from Yulupa Avenue, where it becomes a dirt/soft path. The paved path has a surface crossing at Yulupa Avenue near Yulupa Circle. The parallel dirt/soft trail, the Farmers Lane Trail, is below the top of the creek bank and was built by the California Conservation Corps in 1991. It begins at Flat Rock Park, crosses under Yulupa Avenue, and continues to the end of the reach at Farmers Lane.

Yulupa Avenue and Hartley Drive on the south side of the creek connect to a proposed paved trail that would extend from a future Neighborhood Park near the Carrillo Adobe at Montgomery Drive and Franquette Avenue, west to Farmers Lane. A proposed trail bridge (#6) would cross just upstream of Farmers Lane. A new trail undercrossing (#9) is proposed on the south/left bank at Farmers Lane.

Existing street crossing treatments include using the crosswalk at Mission Circle to cross Mission Boulevard and crossing Yulupa Drive at Yulupa Circle.

**Santa Rosa Creek Reach 3: Farmers Lane to E Street**
Maps: Santa Rosa Creek Map 2
Type: Natural Creek
Length: 8,625 linear feet

Existing Conditions and Recommendations:

**Natural Resources.** This reach is fairly natural, with pools and riffles and good canopy cover. Some banks are steep, with existing development (homes, businesses, commercial buildings)...
occurring close to the top of bank. Tree species include alder, willow, cottonwood, redwood, and box elder. Invasives include Himalayan blackberry, ivy, periwinkle, and giant reed.

This reach of Santa Rosa Creek is recommended for preservation, due to its value as fish and wildlife habitat. Enhancements including removal of invasive species and replanting with natives is also recommended.

**Recreation, Access, and Transportation.** Parcels are predominately privately-owned in this reach. The proposed paved trail on the south bank would cross under Farmers Lane and continue west to Shortt Road with access also possible from Gilbert Drive. From Shortt Road, a proposed trail bridge (#7) would connect north across the creek to an on-street route following an existing Class 3 signed bike route along 4th Street. On-street connections would extend south on Shortt Road and on Gilbert Drive (#216), then west on Leonard Avenue and Montgomery Drive, and north-south on Doyle Park Drive, connecting to Doyle Park at the south end, and to Memorial Hospital at the north. At Memorial Hospital a trail bridge (#8) is proposed to cross Santa Rosa Creek to Leland Street. Between Memorial Hospital and Brookwood Avenue a proposed paved trail would be located on the south/left bank of the creek. Trail undercrossings are proposed at Montgomery Drive and Brookwood Avenue. West of Brookwood Avenue the proposed paved trail would be on the north/right bank of the creek. Between Memorial Hospital and E Street, the trails can be located on either side of the creek as an alternate.

Existing street crossing treatments include the signalized intersection of Farmers Lane at Fourth Street.

**Santa Rosa Creek Reach 4: E Street to Pierson Street**
Map: Santa Rosa Creek Map 2
Type: Culvert, Restored, and Modified Creek
Length: 5,578 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** This reach of Santa Rosa Creek has been altered significantly. From E Street to Santa Rosa Avenue, the creek flows through a pair of box culverts with a fish ladder. At Santa Rosa Avenue, the creek resurfaces and continues through what was once a grouted, rip-rap channel down to Pierson Street. The creek has been restored from Santa Rosa Avenue to Railroad Street and is known as the Prince Memorial Greenway. The adopted Pierson Reach Concept Plan (Appendix B) would enhance and restore the remaining stretch of creek between Railroad Street and Pierson Street.

The restoration work involved removal of most of the grouted riprap, construction of instream habitat structures including rock weirs, placement of root wads to encourage pool formation, and planting of native sedges, rushes, and trees to increase shade to the channel. What was once a denuded, barren channel now supports fish, birds, and other wildlife, including Western pond turtle and river otter.

The restored portions of this reach are regularly monitored for colonization by invasive species. Invasives are removed as soon as possible and replaced with native plantings. Adaptive management is used if when the planted vegetation or other aspects of the project are not performing as expected.
At some point in the future, the government center of Santa Rosa is expected to be redeveloped. When that occurs, consideration should be given to the daylighting and restoration of Santa Rosa Creek and Matanzas Creek through this area. Fish and wildlife would benefit from a healthier creek, and people would also benefit, in terms of recreation opportunities and aesthetics. The success of the Prince Memorial Greenway project has shown that the community supports habitat restoration and enjoys spending time along creeks.

**Recreation, Access, and Transportation.** The conceptual daylighting project described above could include a Creek Walk, connecting the proposed trail to the east of this reach to the Prince Memorial Greenway. The Prince Memorial Greenway begins at Gateway Park and the Greenway extends to the end of the reach. The Greenway is a fully-improved urban amenity, with decorative concrete paths, benches, seat walls, art installations, and lighting on both sides of the creek to Railroad Avenue, and continuing on the north bank to Pierson Street. A Neighborhood Park is planned east of Pierson Street. Access to the creek trail will be provided at West 3rd Street (#33) and the Railroad Square water tower site (#34).

A series of three trail bridges cross the creek: downstream of Santa Rosa Avenue (#12), at Olive Park (#13), and downstream of the railroad bridge (#14). The latter trail crossing connects Prince Memorial Greenway to the Joe Rodota Trail. The Joe Rodota Trail is proposed to be extended through to West 3rd Street. The SMART trail system route diverts from the Northwest Pacific Railroad right-of-way at Santa Rosa Creek, follows the Prince Memorial Greenway west to Pierson Street, then follows West 6th Street, Jefferson Street, and West 7th Street to rejoin the Northwest Pacific Railroad north of Railroad Square. There are trail undercrossings under U.S. 101 located on the north and south banks. The north bank trail also has existing undercrossings at “A” Street, Railroad Street, the Northwest Pacific Railroad tracks, and West 3rd Street.

There is potential for additional street crossings treatments where undercrossings currently exist at the following locations: A Street at 1st Street, Railroad Street, Third Street at the railroad right of way. A street crossing treatment may be considered at Pierson Street.

**Santa Rosa Creek Reach 5: Pierson Street to Stony Point Road**

Maps: Santa Rosa Creek Map 3
Type: Modified-Natural Creek
Length: 5,966 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** This reach of Santa Rosa Creek is modified-natural. Due to fish-friendly stream maintenance practices, trees are maturing alongside and within the channel, providing canopy cover. Species include Oregon ash, walnut, willow, valley oak, live oak, alder, bay, and box elder. Instream plants include rushes and sedges, nut sedge, willows, cottonwood, and cattail. Invasives include eucalyptus, ivy, tamarisk, Himalayan blackberry, and silk tree. There is a heavy infestation of tree of heaven as well, just downstream of Pierson Street.

Pools and riffles are present, with some shading from maturing trees as mentioned above. Old riprap, tree roots, and some bank areas provide some shelter for fish. Steelhead trout use this corridor for migration to and from spawning areas upstream.

Riparian enhancement is recommended along this reach, including removal of invasive species and replanting with natives.
Recreation, Access, and Transportation. There is an existing Class 1 paved access road/trail along the north/right bank and an unpaved access road/trail along the south/left bank of the creek for the entire distance of this reach. Both trails cross under Dutton Avenue. An entry point to the north side trail is located on the east side of Dutton Avenue, adjacent to a lot owned by the Sonoma County Water Agency. There is potential for a future public plaza and gathering place at this location (#7). Two additional entry points are proposed on the north bank at the west of Dutton Avenue and at the terminus of West 6th Street. New entries on the south bank are proposed for the downstream side of Dutton Avenue and at Heather Drive. Also proposed is an on-street connection from the proposed Heather Drive entry point south to Third Street. There is a Neighborhood Park planned in the vicinity of the Imwalle property between West Third Street and Santa Rosa Creek. A trail bridge (#15) crossing Santa Rosa Creek is proposed near the Heather Drive entry point. A trail undercrossing exists at Stony Point Road on the north bank.

Santa Rosa Creek Reach 6: Stony Point Road to Confluence with Piner Creek
Maps: Santa Rosa Creek Map 3
Type: Modified-Natural Creek
Length: 11,087 linear feet

Existing Conditions and Recommendations:

Natural Resources. This reach of Santa Rosa Creek is modified-natural. Due to fish-friendly stream maintenance practices, trees are maturing alongside and within the channel, providing canopy cover. Species include Oregon ash, walnut, willow, valley oak, live oak, alder, bay, and box elder. Instream plants include rushes and sedges, nut sedge, willows, cottonwood, and cattail. Invasives include eucalyptus, Himalayan blackberry, periwinkle, water primrose, and giant reed. Pools and riffles are present, with some shading from maturing trees as mentioned above. Old riprap, tree roots, and some bank areas provide some shelter for fish.

The Santa Rosa Creek Greenway Project, including paving and construction of several bridge crossings, was constructed along the right/north bank access road. Due to environmental constraints, riparian enhancement is recommended along this reach, including removal of invasive species and replanting with natives.

Recreation, Access, and Transportation. There is an existing paved Class 1 trail on the north/right bank for the entire reach with an undercrossing at Fulton Road. An unpaved access road/trail exists the entire distance on the south/left bank. Existing mid-block entry points on Malibu Circle on the south bank and at the intersections of the College Creek and Piner Creek Trails on the north bank. A trail bridge (#16) is proposed across Santa Rosa Creek near the confluence with College Creek to connect with Place to Play Park on the south bank. The access road/trail on the south side of the creek is proposed to be paved to provide a connection between the new bridge, Place to Play, and Fulton Road.

Two hundred yards east of the confluence with Piner Creek an unpaved access road (currently closed to the public) enters from the south that connects to a proposed trailhead with equestrian facilities on Hall Road, and eventually, to the Joe Rodota Trail via the proposed Santa Rosa Creek/West County Trail Connector. An existing trail bridge (#50) continues the north bank trail downstream of Piner Creek.
Chapter 4. Watershed-Specific Recommendations

Santa Rosa Creek Reach 7: Piner Creek to Willowside Road
Maps: Santa Rosa Creek Map 4
Type: Modified-Natural Creek
Length: 8,731 linear feet

Existing Conditions and Recommendations:

Natural Resources. This reach is more rural, extending from Piner Creek west to Willowside Road outside of the Urban Growth Boundary. The channel is wider and shallower, with more sediment bars and some riprap. Levees are present, and agricultural land use and a floodplain are adjacent to the creek. Native vegetation within this reach includes willow, valley oak, Oregon ash, and walnut. Invasive species observed include Himalayan blackberry and English ivy.

The Santa Rosa Creek Greenway Project, including paving and construction of several bridge crossings, was constructed along the right bank access road along the entire reach. Due to environmental constraints, riparian enhancement is recommended including removal of invasive species and replanting with natives.

Recreation, Access, and Transportation. There is a paved Class 1 pathway/access road on the north bank and an unpaved access road/trail on the south bank of this reach. Existing trail bridges cross Piner Creek (#50), Peterson Creek (#51), and Wendell Creek (#19) as they enter from the north. The Peterson Creek trail from Guerneville Road creates a mid-point access. The south bank is not proposed for paving.

There is potential need for a street crossing treatment at Willowside Road (#50) to connect the trail segments. This street crossing is not in the City's jurisdiction and the design of the future crossing is to be determined.

Santa Rosa Creek Reach 8: Willowside Road to Confluence with Laguna de Santa Rosa
Maps: Santa Rosa Creek Map 4
Type: Modified-Natural Creek
Length: 8,476 linear feet

Existing Conditions and Recommendations:

Natural Resources. This reach is more rural, extending from Willowside Road west to the Laguna de Santa Rosa. The channel is wider, with accumulated sediment and less riprap. Agricultural land use and a floodplain are adjacent to the creek. Delta Pond, a recycled water storage pond operated by the City of Santa Rosa, lies to the south of the creek. Native vegetation within this reach includes willow, valley oak, Oregon ash, creeping wild rye, and walnut. Invasive species observed include Himalayan blackberry and pepperweed. Many bird species are found within this reach (Appendix D). Turtles and even a mountain lion have been observed. A concrete low flow crossing is present within the reach, and may present a barrier to fish migrating during low water conditions.

This reach is recommended for enhancement rather than restoration of this reach, including removal of invasive species and replanting with natives, due to environmental constraints (underground utilities) and the need to use the maintenance access road along the left bank for access to Delta Pond, a major water storage facility.
Recreation, Access, and Transportation. Unpaved access road/trails extend along both the north and south banks through this reach, but the trail on the north bank is currently overgrown. A proposed paved trail would follow the north bank of the creek from Willowside to Guerneville Road. The unpaved trail along the south bank will remain unpaved and open to the public. The access road around the perimeter of Delta pond will remain closed to protect sensitive wildlife and habitat.

College Creek. College Creek is a tributary of Santa Rosa Creek.

College Creek Reach 1: Ridley Avenue to Confluence with Santa Rosa Creek
Map: Santa Rosa Creek Map 3
Type: Modified-Natural Creek
Length: 5,735 linear feet

Existing Conditions and Recommendations:

Natural Resources. The College Creek drainage begins near Santa Rosa Junior College in a storm drain that outfalls downstream of Ridley Avenue. College Creek is a channelized stream, with some sections routed through underground culverts (pipe). Pools are present, with some riffles. Overhanging vegetation provides some cover for fish. There is an 8-10 foot drop over grouted riprap at the confluence with Santa Rosa Creek, serving as a barrier to fish passage. Trees include redwood, live oak, valley oak, willow, Oregon ash, walnut, and Monterey pine. Invasives include eucalyptus, Himalayan blackberry, and acacia.

Finley Creek originates from a storm drain pipe that drains Finley Park and the creek daylights west of Stony Point Road as a modified channel. Finley Creek is a tributary of College Creek and joins College Creek downstream of West College Avenue.

Habitat enhancement is recommended for this reach, including removal of invasive species and replanting with native vegetation. Additional trees should be planted at the top of bank to encourage more canopy cover. The fish passage barrier should be addressed, but at this time is deemed a low priority, since limited upstream habitat exists.

Recreation, Access, and Transportation. College Creek and its tributary Finley Creek are contained within Sonoma County Water Agency and City of Santa Rosa property. The College Creek trail provides alternate transportation routes to Finley Park. A closed access road that follows the south/left bank from Marlow Road to West College Avenue is proposed to be opened to the public. The access road upstream of Marlow Road will be opened upon obtaining access across private property to Ridley Avenue from the upstream end of the Water Agency owned creek. The section of access road between Marlow Road and West College Avenue could be opened sooner.

On the downstream side of West College Avenue an existing driveway on the east side the Sonoma County Water Agency complex provides a connection to the unpaved access road/trail that follows the north/right bank to the confluence with Santa Rosa Creek. A proposed paved trail alongside the north/right bank extending south from West College Avenue would replace the existing sidewalk and driveway on-street connection. A driveway on the west side of the California Department of Forestry and Fire Protection complex provides a potential connection to the creek trail.
Chapter 4. Watershed-Specific Recommendations

There is a potential need for street crossing treatments at Marlow Road and West College Avenue.

**Skyhawk Creek.** Skyhawk Creek is a tributary of Santa Rosa Creek.

**Skyhawk Creek Reach 1: Urban Growth Boundary to Confluence with Santa Rosa Creek**  
Maps: Santa Rosa Creek Map 2  
Type: Natural Creek  
Length: 10,352 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** Skyhawk Creek is for the most part a natural stream, with some sections routed underground downstream of Highway 12 towards the confluence with Santa Rosa Creek. When the Skyhawk subdivision was built, much of the riparian corridor was preserved, with a bypass storm drain pipe installed to carry increased storm water runoff around the reach to prevent a change in the seasonal nature of the vegetation. Plant species within this reach include willow, live oak, redbud, valley oak, big leaf maple, cottonwood, cattail, and grasses. Invasives include Himalayan blackberry.

This reach is recommended for preservation, due to the habitat value for fish and wildlife, especially upstream of Highway 12. Habitat enhancement is also recommended, including removal of invasive species and replanting with native vegetation.

**Recreation, Access, and Transportation.** Extending upstream from Highway 12, the Class 1 paved Skyhawk Creek Trail follows the creek through Skyhawk Park, a linear greenway. A trail bridge (#3) crosses to the north/right bank 200 feet upstream from Highway 12. The trail crosses Mountain Hawk (#20), Great Heron Drive (#19), and continues 1,300 feet after again crossing Mountain Hawk (#18) before ending at the current extent of houses. Near Austin Creek Elementary School a trail bridge (#10) crosses to the existing soft trails on the south/left bank of the creek.

The Skyhawk Creek Trail is proposed to continue upstream to the Urban Growth Boundary as development occurs. Public access from future development would be provided at planned entry points and connecting trails from each newly developed cul de sac on the right/north side of the creek. A planned trail bridge (#9) would connect the Skyhawk Creek Trail to two existing dirt/soft trails on the south bank that switchback up the hillsides to connect to City streets.

South of Highway 12 Skyhawk Creek passes through several private parcels to City parcels on Diane Way where an unpaved access road/trail follows the left/south bank of the creek to Melita Road where the creek enters a storm drain.

**4.2.2 Oakmont Creek Watershed**

**Watershed Setting.** Oakmont Creek and twelve mostly seasonal creeks drain the hillslopes adjacent to Oakmont. The divide between the Sonoma Creek Watershed which flows to the San Pablo Bay and the Santa Rosa Creek Watershed which flows into the Russian River splits Oakmont into two separate watershed basins. Three of the Oakmont Creeks make their way to the valley floor and retire east towards Sonoma Creek while the other seven connect with Oakmont Creek and wend their way to Santa Rosa Creek near the northeast boundary of
Spring Lake. The headwaters of these creeks are mostly in Annadel State Park and Hood Mountain Regional Park.

**Oakmont Creek.** Oakmont Creek is a tributary of Santa Rosa Creek.

**Oakmont Creek Reach 1: Urban Growth Boundary to confluence Santa Rosa Creek**
Maps: Oakmont 1 & 2
Type: Natural Creek and Modified Natural
Length: 18,290 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** Oakmont Creek flows through the Oakmont Golf Course and neighborhood, then alongside Channel Drive and Annadel State Park until it enters Santa Rosa Creek near Melita Road. Prior to meeting Santa Rosa Creek, Oakmont Creek collects water from seven other creeks: Wild Oak, Quarries and Annadel Creeks from the south and Laurel, Badger, Charlotte and Melita Creeks on the north. The tributaries to Oakmont Creek originate in the surrounding mountains and are seasonal creeks. In the more natural sections of Oakmont Creek downstream of White Oak Drive, pools and riffles form aquatic habitat with roots, boulders and undercut banks providing shelter. There are steelhead trout throughout the reach. The plant community consists of California bay, willow, redwood, coast live oak, big leaf maple and valley oak. Tree of heaven, Himalayan blackberry and periwinkle are common invasive plants throughout.

**Recreation, Access and Transportation.** The creek flows through a mix of public and private property. An existing Class 1 paved trail extends on the south/left bank from White Oak Drive to Timber Springs Road. A proposed on-street connection along Timber Springs Road would connect to an existing unpaved road/trail in Annadel State Park. This trail is proposed to be paved. At Channel Drive a proposed on-street connection would continue to Spring Lake Park and along Montgomery Drive. A parallel on-street connection on the north bank would follow Oakmont Drive and Stone Bridge Road, passing along the driveway to the City’s Oakmont Treatment Plant to cross an existing trail bridge (#1) to Channel Drive.

**Laurel Creek.** Laurel Creek is a tributary to Oakmont Creek.

**Laurel Creek Reach 1: Urban Growth Boundary to confluence Oakmont Creek**
Maps: Oakmont 1
Type: Natural Creek and Modified Creek
Length: 1,829 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** The headwaters of Laurel Creek are located in the foothills of Hood Mountain and enter the City’s Urban Growth Boundary through a culvert under Highway 12. The creek travels approximately 330 feet through an undeveloped field. This reach has a natural bottom with a canopy cover of willows and elderberry. After this natural stretch the creek enters a culvert where it travels over 800 feet. The pipe outfalls into a concrete lined channel downstream of Oakmont Drive before entering Oakmont Creek. This channel is filled with Himalayan blackberry, cattail and an occasional coastal live oak tree on the top of bank.
**Recreation, Access and Transportation.** Public access areas/trails could be incorporated with the development of the surrounding area.

**Badger Creek (also known as Meadow Creek).** Badger Creek is a tributary to Oakmont Creek.

**Badger Creek Reach 1: Urban Growth Boundary to confluence Oakmont Creek**
Maps: Oakmont 1
Type: Natural Creek and Modified Natural
Length: 3,458 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** Badger Creek is a natural channel that enters the City of Santa Rosa underneath Highway 12 just west of Oakmont Drive. The creek meanders through several Oakmont neighborhoods eventually emptying into Oakmont Creek downstream of Stone Bridge Road. The creek has many deep pools formed by boulders and instream large woody debris. These pools are connected by riffle complexes. Throughout most of the reach there is a healthy riparian habitat consisting of large mature California bay trees and coast live oak with a diverse understory of saplings and shrubs like red willow, Oregon ash, spicebush, coyote bush and coffee berry. In areas that lack canopy cover there are infestations of Himalayan blackberry Harding grass and annual grasses like hedgehog dogtail and rat tail fescue.

The steep banks of this creek are held together with a network of roots from mature trees, but may be subject to failure through scouring and deepening of the channel. It is recommended to preserve and enhance the native habitat and if possible reduce peak flows from the storm drain system to limit scouring along the banks. Grade control structures can also be considered to arrest the downcutting.

**Recreation, Access and Transportation.** This creek reach is entirely on private property. There is a privately maintained path along the north/right side of the creek from Meadowridge Drive to the community center. There are no plans to open this trail to the general public.

**Melita Creek.** Melita Creek is a tributary to Oakmont Creek.

**Melita Creek Reach 1: Urban Growth Boundary to confluence Oakmont Creek**
Maps: Oakmont 2
Type: Natural Creek and Modified Natural
Length: 3,839 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** There are two forks of Melita Creek, the main channel and a southern fork. The headwaters of both forks originate north of the City and snake through the valley floor and under Highway 12, eventually meeting just below Susan Drive. The south fork has more natural riparian vegetation than the main fork, but both forks have been confined with various amounts of channelization, riprapped banks and reduced riparian corridor width. The main fork has most of the understory cleared, but some mature valley oaks remain and serve as reminders of what the riparian zone is capable of supporting.
Neither creek is publicly owned and maintenance is conducted by local landowners. Where possible, the riparian zone should be revegetated with native trees.

**Recreation, Access and Transportation.** Public areas could be incorporated with the development of the surrounding area.

**Hood Mountain Creek.** Hood Mountain Creek and two feeder creeks (Coney and Anella Creeks) are tributaries to Sonoma Creek which eventually drains to the San Pablo Bay.

**Hood Mountain Creek Reach 1: Urban Growth Boundary to Urban Growth Boundary**
Maps: Oakmont 1
Type: Natural Creek and Modified Natural
Length: 9,638 linear feet

**Existing Conditions and Recommendations:** Hood Mountain Creek originates in Hood Mountain Regional Park and enters the City north of Highway 12 along Pythian Road. The creek crosses under Highway 12 and passes through a small section of the Oakmont neighborhood. Upstream of Eliza Way the creek is a mix of riffles and pools meandering through a confined channel within a natural canyon. An abandoned pipe crosses the creek in two locations and could lead to destabilized banks. There are many native trees like big leaf maples, California bay trees, interior live oak, hazelnut trees, red willow and buckeyes that provide a deep shade for the moss-covered rocks and fallen trees that are spread throughout the creek channel. There are also pockets of invasive plants like tree of heaven, Himalayan blackberries and French broom.

The two smaller creeks, Coney Creek and Anella Creek, originate in the steep slopes of Annadel State Park. These two creeks have complete canopy cover in the upper reaches with big leaf maples, coast live oak, California bay tree, and madrone and Douglas fir trees in the upper canyons.

Anella Creek begins in the steep canyons of Annadel State Park and heads eastward to pass under Oakmont Drive and join with Hood Mountain Creek just outside the City’s eastern boundary. Anella Creek has a high-flow diversion structure that was designed to hold storm water in two separate detention basins that eventually release storm water back to the creek. The steep banks of Anella Creek are undercut and at risk of failure which is contributing sediment to the creek.

Coney Creek, a tributary of Anella Creek, enters Oakmont into a small detention pond that spills into a storm drain pipe. The creek is daylighted near the entrance to the East Recreation Center and then re-enters the storm drain system at Oakmont Drive and outfalls into Anella Creek in the Oakmont Golf Course.

Preservation and enhancement is recommended for Hood Mountain Creek and it is recommended to have the abandoned pipe cut, where exposed, and removed from the creek channel.

Preservation and enhancement is recommended for Coney Creek.

Enhancement is recommended for Anella Creek, in particular the banks require stabilization measures to be installed like an establishment of woody vegetation as it passes through the
Oakmont neighborhoods. The high-flow retention basins can be re-engineered to accept more of the peak storm water to decrease the velocity and scour.

**Recreation, Access and Transportation.** The sections of the Hood Mountain Creek that are in the Urban Growth Boundary are mostly located within land owned by the County of Sonoma. There is access from Pythian Road to Hood Mountain Regional Park’s Lower Johnson Ridge Trail that follows the east/left bank of the creek starting at Eliza Road and connects into the larger hiking path network in the park. On the west/left bank of Coney Creek there is a private paved walking path that begins at the East Recreation Center and follows the creek to Annadel State Park. There is a private paved pedestrian path along the west/left bank of Anella Creek that travels through private property owned by the Oakmont Golf Course.

### 4.2.3 Brush Creek Watershed

**Watershed Setting.** Brush Creek and its tributaries begin in the unincorporated hillsides surrounding Rincon Valley in northeast Santa Rosa. A little over half of the watershed lies within the Urban Growth Boundary. About two-thirds of the land use within the Urban Growth Boundary is residential and commercial properties while the remaining third consists of open land.

The Brush Creek Watershed includes thirteen creek reaches. The major tributaries are Rincon, Ducker, and Austin Creeks. Although many parts of Brush Creek have been modified over time, it is still home to migrating steelhead trout, the western pond turtle, sprawling oak trees, and many other riparian plants and animals. Popular public trails follow both banks of the creek from its confluence with Santa Rosa Creek at Flat Rock upstream to Montecito Boulevard.

**Brush Creek.** For the purposes of the Master Plan, Brush Creek is organized into three reaches.

**Brush Creek Reach 1: Urban Growth Boundary to Montecito Boulevard**
- **Maps:** Brush Creek Map 1
- **Type:** Natural Creek
- **Length:** 9,168 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** The headwaters of Brush Creek include two branches that join at the Brush Creek Reservoir which is owned by the Sonoma County Water Agency. From this confluence the creek flows through private parcels before entering Sonoma County Water Agency property that starts half a mile above the confluence with Rincon Creek. There are many mature trees, forming a mostly healthy canopy. Plant species include valley oak, live oak, Oregon ash, and many understory invasives, including ivy and Himalayan blackberry. These invasives appear to be preventing regeneration of natives. Pools and riffles are present, with boulders and roots to provide shelter for fish. A channel scour just downstream of the bridge at Badger Road presents a barrier to migration upstream, due to a lack of water depth and excessive jump height.

The scour at Badger Road should be addressed to ensure adequate fish passage to the uppermost portion of this reach. Additional pools could be created if instream structures such as boulders or large woody debris were placed within the channel. Habitat enhancement involving
removal of invasive species and replanting with native vegetation is recommended throughout the reach.

Recreation, Access, and Transportation. The Brush Creek Reservoir is normally dry and provides open space for ball fields. Only high flood flows are diverted off stream and into the reservoir. No creekside trails exist or are proposed. The southern portion of the reach is paralleled to the east by Class 2 bicycle lanes on Middle Rincon Road and to the west by existing sidewalks along Bridgewood Drive.

Brush Creek Reach 2: Montecito Boulevard to Highway 12
Maps: Brush Creek Map 2
Type: Modified-Natural Creek
Length: 7,062 linear feet

Existing Conditions and Recommendations:

Natural Resources. Brush Creek is channelized throughout this reach, but trees along the banks provide some shade to the channel. Plant species include valley oak, live oak, madrone, willow, cattail, and buckeye. Invasive species include Himalayan blackberry, ivy, and Scotch broom. Aquatic pools are long, and there are limited riffles. Larger pieces of riprap and some overhanging vegetation provide shelter. Grouted riprap at the confluence of Brush and Austin Creeks may present a grade change and thus a barrier to migrating fish. The culvert at Montecito Boulevard may present a migration barrier to some life stages of steelhead.

Habitat restoration is recommended for this reach. However, the presence of a trunk sewer line underneath the left bank access road between Austin Creek and Highway 12 prevents the restoration of this portion of the reach. With improved detention in the upper watershed, it may be possible to restore this reach within the current channel cross-section. Without such a change in reach hydrology, restoration is recommended only between Montecito Boulevard and Austin Creek. Restoration would include the removal of grouted riprap and concrete. The access road along the left bank could be relocated to enlarge the creek channel area, creating room for a meandering low-flow channel, instream habitat structures such as boulders and rootwads to encourage pool formation, and planting of native vegetation.

Recreation, Access, and Transportation. For the entire reach an existing paved Class 1 bike path follows the west/right bank and an unpaved access road/trail runs along the east/left bank. The unpaved access road/trail would potentially be relocated to provide space for creek restoration north of Austin Creek.

There is a trail bridge (#23) 600 yards downstream from Montecito Boulevard with midblock access points from Shadyoak Place (#60) and Mission Boulevard (#61). Existing midblock entry points also exist on the west/right bank from Adobe Court (#76), Jenifer Court (#77), Sherbrook Drive (#64), and upstream of the Highway 12 crossing (#78). An entry point (#65) is possible from the development that borders the creek on the left bank about 1,000 feet downstream from the confluence with Austin Creek.

In order to cross Austin Creek, the east/left bank trail is routed to the sidewalk on Mission Boulevard. A trail bridge (#24) is proposed downstream of the Austin Creek confluence near the midblock entry point at Sherbrook Drive (#64). An existing underpass on the west/right side of the creek provides a way for pedestrians and cyclists to cross under Highway 12. A sidewalk on
the north side of the Highway 12 bridge provides access from the east/left bank to the undercrossing.

**Brush Creek Reach 3: Highway 12 to Santa Rosa Creek**

Map: Brush Creek Map 2  
Type: Restored Creek, Modified Natural Creek  
Length: 1,278 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** This reach of Brush Creek includes the Flat Rock open space area and approximately 1,000 feet of restored stream channel. Much of the tree canopy is intact along the right bank, while revegetation plantings along the left bank are progressing and eventually will provide more shade to the channel. Several species have come into the project area naturally with the high winter flows. Dominant plant species include willow, alder, cattail, valley oak, and live oak. Invasive species include eucalyptus, Himalayan blackberry, vinca, and Scotch broom.

Aquatic habitat includes several long pools with some riffles. Rootwads, boulders, and overhanging bank provide shelter for fish. Western pond turtles sun themselves on boulders, and water birds frequent the riffles. Bird species observed during a July 2005 morning survey include mourning dove, Anna's hummingbird, acorn woodpecker, Nuttall's woodpecker, black phoebe, oak titmouse, western scrub jay, American crow, house finch, western tanager, and California towhee.

Habitat enhancement involving removal of invasive species and replanting with native vegetation is recommended throughout the reach. The restoration project area monitoring should continue, and adaptive management actions taken if the vegetation or other aspects of the project are not performing as intended.

**Recreation, Access, and Transportation.** Within this reach there is a paved Class 1 access road/trail on the west/right bank and a soft path and unpaved access road/trail on the east/left bank. A trail bridge exists near Flat Rock Circle (#29).

**Rincon Creek.** Rincon Creek is a tributary to Brush Creek.

**Rincon Creek Reach 1: Urban Growth Boundary to Brush Creek**

Maps: Brush Creek Map 1  
Type: Natural Creek  
Length: 9,226 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** This reach is relatively natural, characterized by healthy canopy and isolated pools, with boulders and roots providing shelter for fish. Dominant tree species include bay, Oregon ash, live oak, valley oak, big leaf maple, willow. Also present are eucalyptus, Scotch broom, periwinkle, and Himalayan blackberry. The bridge at Brush Creek Road was determined to be a potential barrier to fish migration, due to lack of depth and excessive jump height. Culverts at Deer Trail Road, Amber Lane, and Riebli Road were also determined to be potential barriers due to lack of depth; these locations are located outside of the City’s Urban Growth Boundary.
This reach is recommended for preservation, due to the habitat value for fish and wildlife. Habitat enhancement is also recommended, including removal of invasive species and replanting with native vegetation.

**Recreation, Access, and Transportation.** A Class 3 signed bike route along Wallace Road, proposed in the Sonoma County Outdoor Recreation Plan, would parallel Rincon Creek.

A City-owned parcel on the west/right bank south of Wild Lilac Lane is designated as a future Neighborhood Park. A paved path parallels the creek on the east side of Brush Creek Road between Wild Lilac Lane and Creek Meadow Drive. Sidewalks along Fistor Drive, Cox Drive, Greenmeadow Drive, and Bridgewood Drive provide a pedestrian connection south to Montecito Boulevard and the Brush Creek Trail. A proposed paved trail from Fistor Drive to Cox Court would provide a more direct route. There is potential for a public plaza and gathering place at Greenbriar Way.

Street crossing treatments may be needed in the vicinity of Fistor Drive and Brush Creek Road to provide pedestrian access to the future Neighborhood Park.

**Austin Creek.** For the purposes of the Master Plan, Austin Creek is organized into three reaches.

**Austin Creek Reach 1: Urban Growth Boundary to St. Francis Road**
Maps: Brush Creek Map 2  
Type: Natural Creek  
Length: 7,161 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** Austin Creek is fairly natural within this reach, with three separate tributaries draining the steep hillside and a mature canopy throughout. Plant species include willow, valley oak, alder, and live oak; the upper reaches also have coastal redwoods, madrone, and Douglas fir trees. Some invasives are present, including ivy and Himalayan blackberry. Aquatic habitat includes shallow pools and riffles. Roots, woody debris, and boulders provide shelter for aquatic species. Culverts at St. Francis Road and San Ramon Way were determined to be potential barriers to fish migration, due to lack of depth.

This reach is recommended for preservation, due to the habitat value for fish and wildlife. Habitat enhancement is also recommended, including removal of invasive species and replanting with native vegetation. Fish passage barriers at St. Francis Road and San Ramon Way should be addressed.

**Recreation, Access, and Transportation.** This reach passes through both public and private parcels. Between San Ramon Drive and St. Francis Road, an existing soft path follows the south/left bank across City property while sidewalks along Owls Nest Drive and Desoto Drive provide on-street connections.

**Austin Creek Reach 2: St. Francis Road to Brush Creek**
Maps: Brush Creek Map 2  
Type: Natural Creek, Modified-Natural Creek  
Length: 10,261 linear feet
Existing Conditions and Recommendations:

**Natural Resources.** This reach of Austin Creek is channelized from Boas Drive to Brush Creek, but does include some mature trees that provide shade to the channel. The main plant species include valley oak, live oak, Oregon ash, and redwood. Also present are invasives such as ivy, eucalyptus, Himalayan blackberry, periwinkle, and pampas grass. Regeneration of native plant species here, however, is high. Aquatic habitat within this reach includes long pools with some boulders providing shelter. The culverts at Acacia Lane, Jack London Drive, and Boas Drive, and the bridge at Mission Boulevard may present barriers for migrating fish, due to lack of depth.

The portion of this reach downstream of Middle Rincon Road is recommended for restoration. There are two channels at this location, the natural channel (now abandoned) and a modified channel that carries the waters of Austin Creek. Uniting the channels would enlarge the cross-sectional area and allow for the introduction of a meandering low-flow channel, along with instream habitat structures like rootwads and boulders to create pools, and plantings of native trees and shrubs. Fish passage barriers should be addressed at the road crossings mentioned above. Habitat enhancement is recommended throughout the reach, including removal of invasive species and replanting with native vegetation.

**Recreation, Access, and Transportation.** The creek is contained largely within public parcels with two short stretches of private parcels upstream of Calistoga Road and downstream of Boas Drive. A proposed on-street connection from St Francis Road follows El Encanto Drive to an existing trail bridge (#31) that crosses to the north bank of the creek, and continues on Marit Drive to Calistoga Road. A potential paved trail could be developed on private property along the south/left bank of the creek between El Encanto Drive and Calistoga Road. West of Calistoga Road on the north/right bank, a short length of existing paved path could be connected by a proposed paved trail to an existing short stretch of unpaved trail that leads to Boas Drive.

Downstream of Boas Drive, access would be required across 100 yards of private property in order to access Water Agency parcels with unpaved access roads that encompass the rest of the reach. A paved trail is proposed for either bank of the creek in order to eliminate this gap. A trail bridge (#32) would be necessary if access were to be developed on the south bank of the creek. An additional trail bridge at the east end of Roma Street would be helpful to connect the future paved trail across the creek to the neighborhood surrounding Douglas Whited Elementary School.

The unpaved access road that begins downstream of Boas Drive follows the north/right bank to Middle Rincon Road. This access road is closed to the public until there is public access from Boas Drive to Middle Rincon Road. Sidewalks along Boas Drive south, Highway 12 west, and Middle Rincon Road north provide an on-street connection.

Downstream of Middle Rincon Road 70 feet of soft path located on the south/left bank connects to an unpaved access road/trail Middle Rincon Road provides an on-street connection to Benicia Drive. The creek flows in twin channels between Middle Rincon Road at Acacia Lane. Two existing trail bridges (#27 & #28) are required to cross the creek between Benicia Drive and Prospect Avenue.

The unpaved access road/trail extends to Acacia Lane. From here, Acacia Lane is a private road for approximately 650 feet southward until it becomes a public street. As properties on
Acacia Lane continue to be subdivided and redeveloped with new housing, additional public right-of-way will be acquired and in the future, Acacia Lane may provide a public on-street connection south to Highway 12 and the Santa Rosa Creek Trail.

A proposed trail bridge over Ducker Creek (#26), listed under Reach 2 for that creek, would allow access from Acacia Lane to the unpaved trail on the north/right bank of Austin Creek that extends to Mission Boulevard.

Street crossing treatments are potentially needed at Calistoga Road, Jack London Drive, Middle Rincon Road and on the south side of the creek at Mission Boulevard.

**Austin Creek (North Fork) Reach 1: Garfield Park Avenue to Middle Rincon Road**
Maps: Brush Creek Map 2
Type: Modified-Natural Creek, Culvert
Length: 4,193 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** The creek has a Modified-Natural type channel through Oaklake Green and Tanglewood Parks. From Jack London Drive the creek flows through a culvert under private parcels to Middle Rincon Road and then through 100 yards of Modified-Natural channel to the end of the reach.

Oaklake Green and Tanglewood Parks includes turf and paved pathways. Habitat value is low, though there are some large trees. Low water crossings within Tanglewood Park and the culvert at Middle Rincon Road may pose barriers to fish migration, due to lack of depth. Plant species include valley oak, willow, sycamore, nut sedge, and privet. There is some Himalayan blackberry but the primary invasive species is turf grass.

Restoration is recommended in Oaklake Green and Tanglewood Parks to address habitat improvement and potential fish barriers and to solve drainage issues from courts located on the north/right bank. Habitat enhancement is recommended throughout this reach. Additional trees should be planted to shade the channel, and invasive species removed and replaced with native understory vegetation.

**Recreation, Access, and Transportation.** The creek is accessed by a network of existing paved paths through both Oaklake Green and Tanglewood Parks. The sidewalk along Benicia Drive provides access to the “Twin” trail bridges (#27 and #28) in Reach 2. The low water crossings in Tanglewood Park could be replaced with trail bridges (#85 and #34).

**Progress Creek.** Progress Creek has two recognized forks that drain the forested hillside into the City of Santa Rosa’s storm drain system and eventually into Reach 1 of Austin Creek.

**Progress Creek (East Fork) Reach 1: Urban Growth Boundary to Confluence with Progress Creek**
Maps: Brush Creek Map 1
Type: Natural Creek
Length: 3,335 linear feet
Existing Conditions and Recommendations:

Natural Resources. The upper segment of the east fork of Progress Creek is fairly natural within this reach, with a mature canopy of coast live oak, valley oak and blue oaks dotting the upper areas. Non-native annual grasses make up the spaces between tree canopies. This creek most likely does not support fish because it is an ephemeral creek that enters the City of Santa Rosa’s storm drain system at La Cuesta Drive. Aquatic habitat includes shallow pools and riffles. Roots, woody debris, and boulders provide shelter for aquatic species.

This reach is recommended for preservation, due to the habitat value for wildlife. Habitat enhancement including bank stability is recommended along the stretch of creek that is parallel to Casita Vista Place.

Recreation, Access, and Transportation. This reach is entirely on private property and there are no trails planned.

Progress Creek Reach 1: Urban Growth Boundary to Austin Creek
Maps: Brush Creek Map 1
Type: Natural Creek
Length: 7,562 linear feet

Existing Conditions and Recommendations:

Natural Resources. The west fork of Progress Creek is fairly natural, with a mature canopy of Coast live oak, valley oak, California bay and coastal redwood trees in the wetter areas. Non-native annual grasses make up the spaces between tree canopies. This creek most likely does not support fish because it is an ephemeral creek that enters the City of Santa Rosa’s storm drain system just above Yerba Buena Road Aquatic habitat includes shallow pools and riffles. Roots, woody debris, and many large boulders provide shelter for aquatic species.

This reach is recommended for preservation, due to the habitat value for wildlife.

Recreation, Access, and Transportation. This reach is mostly on private property, but the City of Santa Rosa owns a small section of the creek just upstream of La Cuesta Drive.

Promissory Creek. Promissory Creek drains the forested hillside into the City of Santa Rosa’s storm drain system and eventually into Austin Creek.

Promissory Creek Reach 1: East Fork, Urban Growth Boundary to Yerba Buena Drive
Maps: Brush Creek Map 1
Type: Natural – Modified Natural Creek
Length: 3,708 linear feet

Existing Conditions and Recommendations:

Natural Resources. The upper portions of Promissory Creek are natural within a contiguous forested canopy of coast live oak, coastal redwoods and California bay. The creek enters the suburban neighborhood and flows through private property as part of landscaped areas of backyards. This creek most likely does not support fish because it is an ephemeral creek that enters the City of Santa Rosa’s storm drain system just upstream of Yerba Buena Drive.
This reach is recommended for preservation, due to the habitat value for wildlife.

**Recreation, Access, and Transportation.** This reach is entirely on private property and there are no trails planned.

**Ducker Creek.** For the purposes of the Master Plan, Ducker Creek is organized into two reaches.

**Ducker Creek (South Fork) Reach 1: Urban Growth Boundary to Middle Rincon Road**
Maps: Brush Creek Map 1
Type: Modified-Natural Creek, Natural Creek, Culvert
Length: 9,738 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** This reach is mostly channelized, characterized by variable tree canopy. The creek has a natural channel down to Calistoga Road at which point it becomes a modified natural channel before entering a culvert at St. Mary Drive that extends to the end of the reach. Plant species include willow, valley oak, and live oak. The main invasive species is Himalayan blackberry. There are pools and riffles, with some boulders providing shelter for aquatic species. The majority of the above-ground portions are on private property, including a mobile home park.

Habitat enhancement is recommended throughout this reach, including invasive species removal and replacement with native vegetation.

**Recreation, Access, and Transportation.** The creek passes through both public and private parcels. No public trails are existing or proposed.

**Ducker Creek (North Fork) Reach 1: Calistoga Road to Austin Creek**
Maps: Brush Creek Map 2
Type: Natural Creek, Modified-Natural Creek, Culvert
Length: 8,894 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** This reach begins near Maria Carrillo High School property as a culvert outfall into a drainage swale. In Rincon Valley Community Park the creek continues as a Modified channel to the crossing of Montecito Boulevard, which it then continues to parallel in a culvert. The creek surfaces again as a Modified-Natural channel at Benjamins Road.

Steelhead trout were found within Rincon Valley Community Park during a 2005 survey of Ducker Creek. Tree canopy is minimal through this area, with cattail common. Aquatic habitat consists of a storm drain overflow channel, three ponds, and a channelized creek, which then flows through a storm drain pipe and daylights at Benjamins Road. West of Middle Rincon Road, a mature tree canopy thoroughly shades the creek channel. Common plant species within the reach include valley oak and willow. Invasives include Himalayan blackberry, pampas grass, privet, and cotoneaster. The culverts at Rinconada Drive and Middle Rincon Road may present barriers to migrating fish, due to lack of depth.
Chapter 4. Watershed-Specific Recommendations

Habitat restoration is recommended through Rincon Valley Park. The concrete basins and channel bottom could be removed and replaced with a meandering creek, incorporating a low flow channel and boulders for aquatic habitat, and native vegetation to filter runoff from turf areas. Additional trees could be planted to increase shading of the channel. In addition, habitat enhancement is recommended throughout this reach, including invasive species removal and replacement with native vegetation.

Recreation, Access, and Transportation. The creek flows from Rincon Valley Community Park through private property to Middle Rincon Road. The creek parallels an existing Class II bikeway along Montecito Boulevard to Benjamins Road. Downstream of Middle Rincon Road, an unpaved access road/trail follows the creek on its east/left bank to its juncture with the Ducker Creek Reach 1. One hundred yards upstream of this point an existing trail bridge crosses the creek to an unpaved access road that continues on to Benicia Drive. Downstream of Benicia Drive the unpaved access road/trail switches to the south/left bank to Culebra Avenue where another trail bridge crosses to Rinconada Park (#25). An existing paved trail extends through the park. From the park an unpaved access road/trail follows the west/right bank to the confluence with Austin Creek and the end of the reach. A trail bridge (#26) is proposed above the confluence with Austin Creek to connect east to Acacia Lane.

Potential street crossing treatments should be evaluated at Benicia Drive and Rinconada Drive.

4.2.4 Matanzas Creek Watershed

Watershed Setting. Matanzas Creek flows from the northern slopes of Sonoma Mountain and across the agricultural and rural residential land of Bennett Valley before entering the City near Galvin Community Park. Within the City, Matanzas Creek and its tributaries flow mainly through private property. Downstream of South E Street, Matanzas Creek is routed underground to its confluence with Santa Rosa Creek at Santa Rosa Avenue near City Hall. The Matanzas Creek Watershed is comprised of ten creek reaches.

The largest tributary to Matanzas Creek is Spring Creek, which begins in Annadel State Park near Lake Ilsanjo. Matanzas Reservoir and the Spring Creek Dam and Diversion to Spring Lake are major flood control structures. Spring Creek joins Matanzas Creek at the western tip of Doyle Park. Lornadell Creek begins near Galvin Community Park and flows through a flood control channel for most of its length, before joining Matanzas Creek downstream of Tachevah Drive. Sierra Park Creek begins at Summerfield Road as a modified natural stream but later flows through channelized sections until it meets Spring Creek downstream of Mayette Avenue. Cooper Creek joins Matanzas Creek in Doyle Park.

Downcutting of the streambed and the subsequent erosion is a concern of many landowners along Matanzas Creek. Slope instability along the creek banks impacts private and public property along Matanzas Creek from Bennett Valley Golf Course to South E Street. A study of the creek’s hydrology and sediment transport could identify structural modifications and management practices to address these issues.

Matanzas Creek. Matanzas Creek is organized into four reaches.

Matanzas Creek Reach 1: Urban Growth Boundary through Bennett Valley Golf Course
Maps: Matanzas Creek
Type: Natural Creek
Length: 5,137 linear feet
Chapter 4. Watershed-Specific Recommendations

Existing Conditions and Recommendations:

Natural Resources. This reach includes Galvin Community Park and the Bennett Valley Golf Course, two City-owned facilities. The creek is fairly natural except for three barriers to fish passage, including a crossing with riprap and concrete and two culverts. Aquatic habitat within this reach is otherwise intact, and includes pools, riffles, and a floodplain along the lower end of the golf course. Boulders, roots, and vegetation are present to provide shelter. Plant species include bay, Oregon ash, live oak, willow, alder, and buckeye. Himalayan blackberry, eucalyptus, and periwinkle are among the invasive species present.

This reach is recommended for restoration due to habitat value for fish and wildlife. Habitat restoration recommended for this reach is focused on providing migratory fish passage upstream. Existing culverted crossings should be replaced with span bridges. In addition, habitat enhancement involving invasive species removal and replacement with native vegetation is recommended.

Recreation, Access, and Transportation. The parcels through which the creek passes are public. However, due to conflicts with golf course use, additional public use is not proposed on the existing paved and unpaved pathways within and adjacent to the Bennett Valley Golf Course.

Matanzas Creek Reach 2: Bennett Valley Golf Course to Hoen Frontage Road
Maps: Matanzas Creek
Type: Natural Creek
Length: 8,385 linear feet

Existing Conditions and Recommendations:

Natural Resources. This reach is relatively natural, with good canopy cover. Pools and riffles are present, with boulders, large woody debris, roots, and overhanging banks for shelter. Plant species include bay, big leaf maple, live oak, valley oak, Oregon ash, willow, alder, and sedges. Invasives include privet, ivy, periwinkle, eucalyptus, and Himalayan blackberry. Erosion has been observed within this reach of the creek. The arched culvert at Bethards Drive is backwatered at low flows, which may allow for passage of juvenile fish. A concrete grade control structure at the Yulupa Avenue bridge is a potential fish barrier.

This reach is recommended for preservation, due to habitat value for fish and wildlife. Habitat enhancement involving invasive species removal and replacement with native vegetation is also recommended.

Recreation, Access, and Transportation. The parcels through which the creek passes are private, except for a City-owned parcel along Creekside Road. There is no creek trail from Bennett Valley Golf Course to Bethards Drive. From Bethards Drive, sidewalks provide a pedestrian connection along Creekside Road and Cypress Way that parallels the north/right bank of the creek to Hoen Avenue.

Matanzas Creek Reach 3: Hoen Frontage Road to Confluence with Spring Creek
Maps: Matanzas Creek
Type: Natural Creek
Length: 6,111 linear feet
Existing Conditions and Recommendations:

Natural Conditions. This reach of Matanzas Creek is relatively natural, with good stream canopy and varied aquatic habitat. Pools and riffles are present, and boulders, vegetation, and undercut banks provide shelter. Steelhead/rainbow trout have been observed within this reach. They could be resident fish (rainbow trout) or potentially Steelhead (anadromous) who have migrated through the culvert above the confluence of Santa Rosa and Matanzas Creeks. A bridge apron/concrete slab at Monterey Court may serve as a barrier to fish passage. Some bank erosion and incision was noted during field surveys. Plant species include bay, alder, elderberry, maple, buckeye, live oak, and Oregon ash. Invasive species include ivy, periwinkle, and Himalayan blackberry. Giant reed was noted at the intersection of Hoen Avenue and Hoen Court.

This reach is recommended for preservation, due to habitat value for fish and wildlife. Due to existing conditions involving downcutting of the streambed and related erosion, there are areas of the creek where public and private property is affected. Structural modifications in certain areas of this reach may be necessary. Habitat enhancement involving invasive species removal and replacement with native vegetation is also recommended.

Recreation, Access, and Transportation. The parcels through which the creek passes are largely private until Doyle Park, except for the Caltrans Highway 12 right-of-way and small City and school district owned parcels along Hoen Avenue. An existing Class 3 bike route (with a short section of Class 2) on Hoen Avenue parallels the north/right bank of the creek from the beginning of the reach to the Doyle Park entrance and connects to the network of paved paths in Doyle Park. The Bicycle and Pedestrian Master Plan identifies installation of sidewalks along Hoen Avenue between Brookside Drive and Hahman Avenue as a high priority pedestrian project. A proposed paved path would follow the Caltrans Highway 12 right-of-way east along the Spring Creek Bypass storm drain conduit.

Farmers Lane connects Matanzas Creek with Spring Creek. Doyle Park has an existing trail bridge (#43) Doyle Park Drive provides a connection from Doyle Park to Santa Rosa Creek.

Matanzas Creek Reach 4: Confluence with Spring Creek to Confluence with Santa Rosa Creek
Map: Matanzas Creek
Type: Natural Creek, Modified Creek, Culvert
Length: 3,361 linear feet

Existing Conditions and Recommendations:

Natural Resources. This reach is fairly natural except for a channelized section downstream of South E Street and the approximately 1500 foot culvert underneath Sonoma Avenue. This culvert presents a significant fish barrier, as there is no fish ladder present. Aquatic habitat includes pools and riffles, with boulders, roots, and undercut banks for shelter. Dominant plant species include bay, redwood, box elder, live oak, big leaf maple, alder, Oregon ash, and buckeye. Invasive species include ivy, tree of heaven, periwinkle, and Himalayan blackberry.

The majority of this reach is recommended for preservation, due to habitat value for fish and wildlife. Habitat enhancement involving invasive species removal and replacement with native vegetation is also recommended. Consideration should be given to the daylighting and restoration of Matanzas Creek near the confluence of Santa Rosa Creek. If daylighting is not
feasible, a fish ladder could be constructed to open up access to several miles of healthy habitat upstream for migrating steelhead trout.

**Recreation, Access, and Transportation.** The parcels through which the creek passes are mostly private with no existing creek trails. The sidewalk on South E Street parallels the modified creek section upstream of where the creek enters a culvert. There is potential for a public plaza and gathering place on Sonoma County Water Agency property at the northwest corner of South E Street and the creek.

**Spring Creek.** Spring Creek is organized into three reaches.

**Spring Creek Reach 1:** Spring Creek from Annadel State Park to Summerfield Road
Maps: Matanzas Creek
Type: Natural Creek
Length: 6,573 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** This reach of Spring Creek is fed from Annadel State Park, and flows along Park Trail Drive. Flow is seasonal, but there are maturing trees providing canopy cover, including live oak, bay, buckeye, valley oak, Oregon ash, and black walnut. The invasive Himalayan blackberry is abundant downstream and along Summerfield Road. At the upstream end of the reach the Spring Creek Dam and Diversion divert flood flows into Spring Lake. The culverts at Stonehedge and Summerfield Road are severely undersized, and may present barriers to fish migration.

This reach is recommended for preservation, due to habitat value for fish and wildlife. Habitat enhancement involving invasive species removal and replacement with native vegetation is also recommended.

**Recreation, Access, and Transportation.** From the Spring Creek diversion structure, an existing dirt/soft path on City property follows the south/left bank of the creek along Park Trail Drive to the street’s intersection with Summerfield Road. This trail provides connections to the City’s Vietnam Veterans’ Trail, an unpaved soft trail. 250 feet east of Summerfield the creek turns north and travels parallel to Summerfield Road mostly through private parcels before crossing Summerfield Road north of Hoen Avenue.

**Spring Creek Reach 2:** Spring Creek from Summerfield Road to Franquette Avenue
Maps: Matanzas Creek
Type: Natural Creek, Modified-Natural Creek
Length: 5,681 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** Storm flows are diverted from Spring Creek at Summerfield Road into the Spring Creek Bypass, a Sonoma County Water Agency conduit. The Spring Creek bypass re-enters Spring Creek downstream of Farmers Lane. The historic Spring Creek channel has good canopy cover where trees have been allowed to mature. Pools are present, and overhanging vegetation provides some cover. Trees include alder, willow, Oregon ash, black walnut, big leaf maple, bay, and buckeye. Cattail and coyote bush are also present. Invasive species include Himalayan blackberry, fennel, and silk tree.
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This reach is recommended for preservation, due to habitat value for fish and wildlife. Habitat enhancement involving invasive species removal and replacement with native vegetation is also recommended. Restoration of natural stream meanders and native vegetation may be possible through the Caltrans right of way between Hoen Avenue and Mayette Avenue. Sediment deposits in the Caltrans right of way prevent low flow water from flowing down the creek and instead directs it into the bypass conduit. Sediment removal should be considered within the right of way to address this condition. Restoration is also recommended from Summerfield Road along the boundary of Spring Creek Elementary School.

Recreation, Access, and Transportation. The parcels through which the creek passes are public and private. At Summerfield Road, the creek crosses the Caltrans Highway 12 right of way where a paved trail is proposed to follow the right of way westward across Sierra Park Creek and on to Hoen Avenue near Montgomery High School. The creek borders Spring Creek Elementary school; a trail bridge is proposed at the northwest corner (#46). The sidewalks along Summerfield Road, Wyoming Drive, and Spring Creek Drive provide pedestrian connections that generally parallel the creek and connect to the unpaved access road/trail at Village Elementary School. This unpaved access road/trail is proposed to be paved to Yulupa Avenue. From Yulupa Avenue until the end of the reach at Franquette Avenue, there is no public creek access. Existing sidewalks on Spring Creek and Princeton Drives parallel to Spring Creek provide a pedestrian connection between Yulupa and Franquette Avenues.

Street crossing treatments should be considered on Hoen Avenue at Summerfield Road.

Spring Creek Reach 3: Franquette Avenue to Confluence with Matanzas Creek
Maps: Matanzas Creek
Type: Modified-Natural Creek
Length: 6,398 linear feet

Existing Conditions and Recommendations:

Natural Resources. This reach is channelized near Farmers Lane and more natural downstream to Doyle Park. Pools and riffles are present, with good canopy in the downstream portion. Roots, undercut banks, and boulders provide cover. Plant species include bay, buckeye, willow, live oak, black walnut, big leaf maple, Oregon ash, and valley oak. Invasive species include Himalayan blackberry, ivy, periwinkle, and eucalyptus. Culverts at Hahman Drive and Farmers Lane may present barriers to fish migration, due to lack of depth. Steelhead have been observed between Farmers Lane and Doyle Park.

This reach is recommended for preservation, due to habitat value for fish and wildlife. Habitat enhancement involving invasive species removal and replacement with native vegetation is also recommended. Restoration of natural stream meanders and native vegetation may be possible along the frontage with Montgomery High School, between Franquette Avenue and Hahman Drive.

Recreation, Access, and Transportation. The parcels through which the creek passes are public and private. Existing sidewalks along Spring Creek Drive parallel the creek and connect to the creek at Franquette Avenue and Hahman Drive. A trail bridge (#41) exists at Franquette Avenue; this bridge may need replacement. A proposed paved trail would follow along the creek’s south/left bank between Franquette Avenue and Hahman Drive, through Montgomery
High School. Rock Creek Drive provides a pedestrian connection from Hahman Avenue to Farmers Lane.

West of Farmers Lane pedestrians and bicyclists can travel along Hoen Avenue, where a Class 3 bike route with a section of Class 2 bike lanes parallels Matanzas Creek. The bike route connects with a network of existing paved paths in Doyle Park. These paths serve as creek access for the remainder of Spring Creek.

**Lornadell Creek.** Lornadell Creek is a tributary of Matanzas Creek.

**Lornadell Creek Reach 1: Galvin Community Park to Confluence with Matanzas Creek**
Maps: Matanzas Creek  
Type: Natural Creek, Modified Creek  
Length: 8,435 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** Lornadell Creek is channelized and minimally vegetated, with more vegetation and canopy cover downstream of Tachevah Drive, towards the confluence with Matanzas Creek. Portions of this creek have concrete banks and a concrete channel bottom. As such, canopy cover is very low, and habitat value for aquatic life is minimal. Valley oak, cottonwood, willow, and alder occur in some places. Invasives include ivy, privet, eucalyptus, and Himalayan blackberry. Cattails are common. Culverts at Tachevah Drive and Bethards Drive may present a barrier to fish migration due to lack of depth.

Some stream meanders and native vegetation could be restored to Lornadell Creek along the frontage with Yulupa School and Mesquite Park. Restoration of this area is recommended; a detailed hydrology analysis of this creek will be necessary before development of a habitat restoration plan. Habitat enhancement involving invasive species removal and replacement with native vegetation is also recommended throughout the reach.

**Recreation, Access, and Transportation.** The parcels through which the creek passes are public and private. Mesquite Park and Yulupa Elementary School on the south/left bank provide an existing trail connection between Cactus Avenue and Tachevah Drive. Two existing trail bridges connect Cactus Avenue to the Bennett Valley Shopping Center (#38) and Yulupa School (#39) to Tamarisk Drive.

**Sierra Park Creek.** Sierra Park Creek is a tributary of Matanzas Creek. Prior to 2010 the creek was referred to as Arroyo Sierra Creek.

**Sierra Park Creek Reach 1: Summerfield Road to Confluence with Spring Creek**
Maps: Matanzas Creek  
Type: Natural Creek, Modified-Natural Creek  
Length: 6,300 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** Sierra Park Creek is fairly natural, with very good canopy cover as well as pools and riffles, between Summerfield Road and Horseshoe Drive, but then is channelized down to the confluence with Spring Creek. Sierra Park Creek flows through the Caltrans right of way between Hoen Avenue and Mayette Avenue. Culverts at Mayette Avenue, Hoen Avenue,
and Siskiyou Avenue may be barriers to migrating fish due to lack of depth. Just downstream of Hoen Avenue, a large concrete structure diverts all but the highest flows from Arroyo Sierra Creek into the Spring Creek Bypass. This structure is definitely a barrier to fish migration. Valley oak, walnut, cottonwood, live oak, bay, and willow are common. Invasives include Himalayan blackberry, privet, and ivy.

Birds noted during a field survey included American crow, mourning dove, Steller's jay, mockingbird, black phoebe, red-shouldered hawk, and California towhee. Since the creek flows through riparian forest and open grassland habitats, the area would be expected to support a diverse mix of bird species.

Preservation of Sierra Park Creek upstream of Hoen Avenue is recommended due to habitat value for wildlife. Habitat enhancement involving invasive species removal and replacement with native vegetation is recommended throughout the reach. Fish passage barriers should be addressed, but only after passage is secured through the concrete diversion structure of the Spring Creek bypass conduit downstream of Hoen Avenue.

Recreation, Access, and Transportation. Except for one private parcel the creek passes through public parcels. An existing paved trail runs along the north/right bank of the creek from Summerfield Road past Strawberry Park, to Horseshoe Drive. A trail bridge (#44) is proposed to connect with Alejandro Drive. An existing unpaved access road/trail begins at Siskiyou Avenue and continues to Hoen Avenue, with a proposed entry point and trail bridge (#47) at Sacramento Avenue near Calaveras Drive. Unpaved access roads between Hoen Avenue and Mayette Avenue are proposed to be opened and paved to allow connection to the proposed paved trail in the Caltrans right-of-way.

Cooper Creek. Cooper Creek is a tributary of Matanzas Creek.

Cooper Creek Reach 1: Urban Growth Boundary south of Cooper Drive to Confluence with Matanzas Creek
Map: Matanzas Creek
Type: Natural Creek, Culvert
Length: 6,942 linear feet

Existing Conditions and Recommendations:

Natural Resources. Cooper Creek begins on Taylor Mountain and travels through a steep canyon that is created by the Rodgers Creek Fault. This creek is one of the few creeks in Santa Rosa that travels due north. The upper reaches of Cooper Creek are natural and defined by steep canyon walls vegetated with Coast live oak, Oregon white oak, California bay laurel, and California Buckeye. Cobble, gravel, and clay form the stream substrate, and pools and riffles are present. Shelter for aquatic life consists mainly of overhanging bank. The creek enters the City’s storm drain system near Cooper Drive, eventually draining into Matanzas Creek near Doyle Community Park.

Preservation of the remnant portion of Cooper Creek upstream of Cooper Drive is recommended, due to habitat value for wildlife. Habitat enhancement involving invasive species removal and replacement with native vegetation is also recommended.

Recreation, Access, and Transportation. The parcels through which the creek passes are public and private. There is no existing or proposed creek trail access for Cooper Creek.
4.2.5 Piner Creek Watershed

Watershed Setting. Piner Creek (along with tributaries Nagasawa, Russell, Indian, Coffey, Paulin, and Steele) along with Peterson Creek and its tributary Forestview Creek drain the northwest portion of Santa Rosa. For the purposes of the Citywide Creek Master Plan, Paulin Creek (a tributary of Piner Creek) and its tributaries Poppy and Pomo Creeks are treated as a separate watershed area. Peterson Creek flows directly to Santa Rosa Creek, but was included in the Piner watershed because of its proximity to Piner Creek. In all, there are ten creek reaches within the Piner Creek Watershed.

Piner and Russell Creeks start east of Highway 101, in the Fountaingrove neighborhood. Piner Creek flows into Fountaingrove Lake, travels through the golf course where it crosses Thomas Lake Harris Drive and then continues under Highway 101 into northwest Santa Rosa until joining Santa Rosa Creek west of Fulton Road. Russell Creek is fed by several draws, which meet near Bicentennial Way. From there, Russell Creek flows through a storm drain, daylights west of Mendocino Avenue north of Kaiser Hospital, crosses under Highway 101, and flows west to meet Piner Creek. Coffey Creek and Steele Creek both begin west of Highway 101. Peterson Creek and Forestview Creek start in northwest Santa Rosa and flow southwest towards Santa Rosa Creek.

Most westward reaches of these creeks have been engineered for flood control and are accessible by public trails on Sonoma County Water Agency property. Portions of Piner Creek and Russell Creek are surrounded by predominately residential development, with some commercial property. Mature trees shade much of the main channel, which is home to quail, waterfowl, and steelhead trout.

Piner Creek. For the purposes of the Master Plan, Piner Creek is organized into three reaches, depicted on the Paulin and Piner Creeks Maps.

Piner Creek Reach 1: Headwaters to Highway 101
Maps: Paulin and Piner Creeks Map 1
Type: Natural Creek
Length: 8,712 linear feet

Existing Conditions and Recommendations:

Natural Resources. This reach of Piner Creek is more natural than the reaches west of Highway 101. It starts north of Fountaingrove Lake in the Fountaingrove Golf and Athletic Club golf course and flows into Fountaingrove Lake. The lake has a forested island less than two acres in size that provides habitat for nesting birds and turtles. Below the lake, the multistoried canopy from mature trees and shrubs combined with a wide riparian corridor create additional habitat for wildlife. Dominant plant species include live oak, valley oak, Oregon ash, poison oak, horsetail, and willow. Invasive species present include privet, Himalayan blackberry, Scotch broom, and acacia trees. Aquatic habitat includes pools and riffles, with roots and overhanging banks for cover.

Preservation is recommended for the more natural portions of this reach, upstream of Old Redwood Highway. Habitat enhancement is recommended throughout the reach, involving removal of invasive species and replacement with native vegetation. The lower section of this reach between Old Redwood Highway and the culvert under U.S. Highway 101 has failing banks and needs restoration and bank stabilization.
Recreation, Access, and Transportation. From the parking lot of Nagasawa Community Park, a dirt/soft trail follows the western shore of the lake. An existing Class 1 paved path parallels the creek on the south side of Fountaingrove Parkway and on Round Barn Boulevard.

Piner Creek Reach 2: Highway 101 to Northwestern Pacific Railroad
Maps: Paulin and Piner Creeks Map 1
Type: Modified-Natural Creek, Modified Creek, Culvert
Length: 7,430 linear feet

Existing Conditions and Recommendations:

Natural Resources. The creek is in a culvert from Highway 101 to Airway Drive, where it daylights as a Modified-Natural type channel. Downstream of the confluence with the North Fork of Piner Creek, the creek is owned and maintained for flood control by the Water Agency.

Though lower Piner Creek is channelized, there are many mature trees along the creek, providing shade and cover for fish and wildlife. The most common plant species include live oak, walnut, and willow. Invasive species include fennel, eucalyptus, Himalayan blackberry, pampas grass, and ivy. Aquatic habitat in this reach includes long pools and short riffles, with some overhanging vegetation providing shelter for fish. Riprap is present along some of the bank area. This reach flows through a mix of commercial and residential neighborhoods.

Surveys by the Sonoma County Water Agency found steelhead trout within this reach. The culvert at Hopper Avenue may present a barrier to migrating fish, due to lack of depth. The culvert at Coffey Lane was categorized as a barrier to certain life stages of fish, but Taylor et al. (2003) determined that passage is adequate due to proper sizing and culvert condition. A concrete bottom at the railroad crossing may present a barrier to migrating fish, but has not been classified.

Habitat enhancement is recommended throughout the reach, involving removal of invasive species and replacement with native vegetation.

Recreation, Access, and Transportation. An unpaved access road on the east/left bank north of Hopper Avenue is currently closed to the public. A proposed paved path would connect to Airway Drive, eliminating the dead-end section of the access road, and allowing the trail to be opened. South of Hopper Avenue, an unpaved access road/trail follows the west/right bank to Coffey Lane. On the south side of Piner Road, the trail is joined by the Russell Creek access road/trail. Between Coffey Lane and the railroad tracks, the access road is not open to the public. Sidewalks along Piner Road provide a pedestrian connection from the Piner Creek Trail at Piner Road west to the planned SMART trail.

Street crossing treatments at Hopper Avenue, Piner Road, and Coffey Lane need to be evaluated to facilitate connections between trail segments.

Piner Creek Reach 3: Northwestern Pacific Railroad to Santa Rosa Creek
Maps: Paulin and Piner Creeks Map 3
Type: Modified-Natural Creek
Length: 12,421 linear feet
**Existing Conditions and Recommendations:**

**Natural Resources.** The reach is entirely owned by Sonoma County Water Agency. Though this lowest reach of Piner Creek is channelized, there are many mature trees along the creek, providing shade and cover for fish and wildlife. The most common tree species include live oak, valley oak, walnut, alder, big leaf maple, and willow. Regeneration is high, despite the presence of invasive species that include cattail, fennel, eucalyptus, Himalayan blackberry, and ivy. Aquatic habitat in this reach includes long pools and short riffles, with boulders and vegetation providing shelter for fish. During a September, 2005, survey steelhead trout were found within this reach.

This reach should be restored. The channel could be enlarged to make room for a low-flow channel, instream habitat structures like boulders or rootwads to promote pool formation, and planting of native vegetation. In addition, habitat enhancement involving removal of invasive species and replacement with native vegetation is recommended throughout the reach.

**Recreation, Access, and Transportation.** The west/right bank between the railroad tracks and Marlow Road has an access road, which is currently closed to the public but is proposed to be opened upon completion of the SMART trail. From Marlow Road to the end of the reach at Santa Rosa Creek unpaved access roads/trails exist on both sides of the creek.

Consistent with the Santa Rosa Bicycle and Pedestrian Master Plan, a paved trail is proposed to run the entire length of the reach. Paving would occur only on one side of the creek and the future paved access road/trail would be expected to connect with the Paulin Creek trail, which runs along the northern boundary of James Monroe Elementary School. Three trail bridges are proposed in this reach, including one downstream of the railroad tracks (#88), one downstream of the confluence (#66) with Paulin Creek, and one at the confluence of Steele Creek (#49).

Potential entry points are identified on the east/left bank at Creekfield Drive and Marlow Court. Undercrossings are proposed at Guerneville Road and Fulton Road. Sidewalks and Class 2 bike lanes provide pedestrian and bicycle connections on Marlow Road, Guerneville Road, and Fulton Road.

Street crossing treatments should be evaluated for and undercrossings are proposed at Guerneville Road and Fulton Road.

**Nagasawa Creek.** For the purposes of the Master Plan, Nagasawa Creek is described in one reach.

**Nagasawa Creek Reach 1: Headwaters to Confluence with Piner Creek**
Maps: Paulin and Piner Creeks Map 1
Type: Natural Creek
Length: 4,652 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** Nagasawa Creek is a tributary to Piner Creek and is similar to the upper reach of Piner Creek. This creek starts just west of the entrance of Fountaingrove Lake and follows along Fountaingrove Parkway in a deep canyon, eventually entering the City’s storm drain system just above a parking lot on Unocal Place. The storm drain system bypasses flow from the upper reaches around a remnant channel that is located on the other side of Round
Barn Boulevard. The remnant channel crosses under Round Barn Boulevard where flow from the bypass conduit returns to the stream channel. The creek joins Piner Creek in a densely forested canyon just north of Vineyard Commons. Dominant plant species include live oak, valley oak, buckeye, madrone, and willows. Invasive species present include privet, Himalayan blackberry, Vinca and scotch broom.

Preservation is recommended for the more natural portions of this creek. Habitat enhancement is recommended throughout the reach, including removal of invasive species and replacement with native vegetation. A study to determine the feasibility of reconnecting the upstream segment of this creek with the remnant channel along Round Barn Boulevard is suggested.

**Recreation, Access, and Transportation.** An existing Class 1 paved path exists on the south side of Fountaingrove Parkway. Another Class 1 paved path follows the remnant channel and continues around much of Round Barn Boulevard.

**Russell Creek.** Russell Creek is a tributary to Piner Creek, and is organized into two reaches.

**Russell Creek Reach 1: Russell Creek from headwaters to Highway 101**
*Map: Paulin and Piner Creeks Map 1*
*Type: Natural Creek, Modified-Natural Creek, Culvert*
*Length: 11,663 linear feet*

**Existing Conditions and Recommendations:**

**Natural Resources.** Russell Creek starts from several intermittent tributaries in Fountaingrove. The easternmost tributary flows into Nielsen Lake, and then continues down a steep slope to Bicentennial Way. The other two tributaries combine downstream of Altruria Drive and follow along the east side of Fountaingrove Parkway and Bicentennial Way. Except for the lake, the creek in this area is natural, with mature trees and other natural features providing aquatic habitat including riffles and pools, and shelter for fish. Plant species include live oak, madrone, poison oak, and willow. The main invasive species present is Scotch broom and Himalayan blackberry. Portions of the creek near Bicentennial Way are underground, leading to an aboveground section between Mendocino Avenue and Highway 101. This latter section is channelized, but does include trees and understory plants.

Preservation is recommended for the portions of this reach upstream of Bicentennial Drive. Habitat enhancement involving removal of invasive species and replacement with native vegetation is recommended throughout the reach.

**Recreation, Access, and Transportation.** An existing paved Class 1 trail extends along the creek from Francis Nielsen Ranch Park west to Bicentennial Way where it enters a culvert, after crossing the creek once on a trail bridge (#54). West of Mendocino Avenue, the creek daylights until it enters a culvert again at Highway 101. There is an existing unpaved access road/trail along the north/right bank along this aboveground section.

**Russell Creek Reach 2: Russell Creek from Highway 101 to Piner Creek**
*Maps: Paulin and Piner Creeks Map 1*
*Type: Modified-Natural Creek*
*Length: 4,380 linear feet*
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**Existing Conditions and Recommendations:**

**Natural Resources.** From Highway 101 to Range Avenue, Russell Creek is underground. At Range Avenue, Russell Creek daylights as a channelized waterway and flows through predominately commercial and residential areas. Plant species present include live oak, bay, walnut, cattail, and Monterey pine. Invasive species include eucalyptus, French broom, cotoneaster, privet, pampas grass, and Himalayan blackberry. Aquatic habitat includes long pools with slow moving water and a few riffles. A concrete check dam structure half way between Range Avenue and the confluence with Piner Creek may present a barrier to migrating fish due to excessive jump height. Fish passage through the grouted rip rap at the confluence with Piner Creek is also a concern.

Habitat enhancement involving removal of invasive species and replacement with native vegetation is recommended throughout the reach. The fish passage barrier at the check dam should be addressed.

**Recreation, Access, and Transportation.** An unpaved access road/trail extends west on the north/right bank from Range Avenue to the end of the reach and the Piner Creek Trail. There are existing entry points to the trail from neighboring private properties.

**Indian Creek.** Indian Creek is a small tributary of Russell Creek.

**Indian Creek Reach 1: Highway 101 to Confluence with Russell Creek**

*Map: Paulin and Piner Creeks Map 1*  
*Type: Modified Creek, Culvert*  
*Length: 1,465 linear feet*

**Existing Conditions and Recommendations:**

**Natural Resources.** Indian Creek is channelized, conveying water from near Highway 101 south to Russell Creek. The creek is mostly above ground. Observed plant species include cattail, Himalayan blackberry, with an occasional willow, cottonwood, or walnut. There is very little shade for the channel. Aquatic habitat consists of long pools with some riffles due to the cattails.

Habitat enhancement involving removal of invasive species and replacement with native vegetation is recommended throughout the reach.

**Recreation, Access, and Transportation.** No access is proposed for this reach.

**Coffey Creek.** Coffey Creek is a tributary of Piner Creek.

**Coffey Creek Reach 1: Dennis Lane to Piner Creek**

*Maps: Paulin and Piner Creeks Map 1*  
*Type: Culvert, Modified-Natural Creek*  
*Length: 7,423 linear feet*

**Existing Conditions and Recommendations:**

**Natural Resources.** Coffey Creek flows through a mix of commercial and residential areas southward to where it joins Piner Creek. The creek has been routed underground through most
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of the urban area but several fairly natural areas remain. This reach does support mature vegetation in some areas. Tree cover includes live oak, valley oak, willow, redwood, and some Oregon ash. Invasive species present include Himalayan blackberry, fennel, and tree of heaven. Other portions of this reach have little canopy cover and the dominant plant species are annual grasses. Aquatic habitat includes pools and some riffles, with some roots and overhanging vegetation providing shelter in selected areas.

Habitat enhancement involving removal of invasive species and replacement with native vegetation is recommended throughout the reach.

Recreation, Access, and Transportation. Coffey Park has a system of paved trails. A parallel on-street connection follows Coffey Lane in the form of a Class 2 bike lanes. A paved trail is proposed on the east/left bank from Piner Road south to Piner Creek.

Steele Creek. Steele Creek is a tributary of Piner Creek.

Steele Creek Reach 1: Frances Street to Piner Creek
Maps: Paulin and Piner Creeks Map 3
Type: Modified-Natural Creek
Length: 11,577 linear feet

Existing Conditions and Recommendations:

Natural Resources. Storm water runoff from the area around the Armory on the east side of Highway 101 through storm drain lines under Highway 101, before surfacing as Steele Creek, near Frances Street. From there it flows through a Sonoma County Water Agency engineered channel until it joins Piner Creek. Several stretches include fairly mature riparian vegetation, including willow, cottonwood, valley oak, and live oak. There are also areas with mature eucalyptus trees, and other invasive species such as Himalayan blackberry, privet, and tree of heaven.

Aquatic habitat within this reach consists of long pools with slow-moving water. A Sonoma County Water Agency aqueduct crossing the creek downstream of the railroad tracks presents a barrier to migrating fish. Culverts at Gamay Street, Marlow Road, Ridley Avenue, Lance Drive, and Dutton Avenue are considered barriers due to a lack of depth. The confluence of Steele Creek and Piner Creek consists of a pair of culverts, which are considered barriers due to excessive slope.

The valley oaks along the Northwestern Pacific right of way should be preserved. Habitat enhancement involving removal of invasive species and replacement with native vegetation is recommended throughout the reach. The fish migration barriers should be addressed, most importantly the barrier at the confluence of Steele Creek and Piner Creek.

Recreation, Access, and Transportation. The creek passes through both public and private parcels. At the start of the reach, an on-street connection would lead east to a future pedestrian-bicycle overcrossing of Highway 101 to the Santa Rosa Junior College campus. Westward, a paved pathway is proposed between Frances Street and where the creek daylights near the railroad tracks. From here, an unpaved access road/trail follows the east/right bank to Guerneville Road. An existing culvert at Jennings Avenue serves as a trail bridge (#55) and creates informal access across the railroad tracks. The City of Santa Rosa is considering design alternatives to formalize this link due to significant pedestrian activity generated by residential
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and commercial uses near Coddington Mall, the Santa Rosa Business Park, and Helen Lehman Elementary School. The SMART Trail is proposed along the east/left side of Steele Creek from West College Avenue to Guerneville Road.

A short segment of paved trail exists on the south/left bank between the Northwestern Pacific railroad tracks and North Dutton Avenue. A Class II bike lane parallels the creek on Guerneville Road. A paved trail is proposed along Steele Creek between Ridley Avenue and the railroad to replace the existing Class 2 bike lane. Should right-of-way constraints make this infeasible, the City will consider other options, including location of pedestrian and bicycle facilities on the north side of Guerneville Road.

An unpaved access road/trail exists on the north/right bank between Guerneville Road and Ridley Avenue. This access road/trail will remain closed to the public because sidewalks along Ridley Avenue provide an on-street connection from Guerneville Road to the unpaved access road/trail extending from Ridley Avenue to Marlow Road on the south/left bank of the creek. A parallel east-west on-street connection is proposed on Jennings Avenue.

From Marlow Road a dirt/soft path and then sidewalk along Jennings Avenue follows the creek on the south/left bank to Gamay Street. On the north/right bank, a paved path in the Olive Grove subdivision connects to the sidewalk along Zinfandel Avenue. A proposed trail bridge (#48) would connect across the creek at this point. The sidewalk serves as a creekside path until connecting to an existing dirt/soft path for the final 250 feet above the junction with the Piner Creek Trail. This dirt/soft path is proposed to be paved.

Jennings Avenue is an existing informal pedestrian route across the Northwestern Pacific railroad tracks connecting the neighborhoods west of the tracks with Coddington Mall, a regional mall and transit hub. The Bicycle and Pedestrian Master Plan identifies Jennings Avenue as a future “Bike Boulevard” from near Biella Elementary School to Cleveland Avenue. The North Station Area Plan identifies that there are gaps in the sidewalks along Jennings Avenue west and east of the SMART tracks.

**Peterson Creek.** Peterson Creek is a tributary of Santa Rosa Creek, but has been included in the Piner Watershed due to its proximity.

**Peterson Creek Reach 1: Fulton Road to Santa Rosa Creek**
Maps: Paulin and Piner Creeks Map 3
Type: Natural Creek and Modified-Natural Creek
Length: 8,147 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** Peterson Creek is channelized downstream of Youth Community Park but supports mature vegetation that shades the channel. Adjacent parcels include parkland, rural residential and agricultural land, featuring seasonal wetlands and vernal pools that support various state and federally-protected species. Dominant plant species within the creek corridor include bay, Oregon ash, willow, live oak, valley oak, and buckeye. Many invasive species are present, including purple thistle, French broom, tamarisk, bamboo, acacia, teasel, Himalayan blackberry, pampas grass, silk tree, and giant reed. Aquatic habitat includes some pools and riffles, with some overhanging vegetation and roots in the Youth Park portion that provide shelter for fish. At the confluence with Santa Rosa Creek the grouted riprap bottom and a drop
in elevation presents a barrier to migrating fish. The culvert at Fulton Road may also be a barrier due to lack of depth.

Preservation is recommended for Peterson Creek through Youth Park, due to habitat value for fish and wildlife. Habitat restoration is recommended where possible. The most likely location would be between Guerneville Road and Santa Rosa Creek, with channel enlargement possible through relocation of one of the access roads. Instream habitat structures and native vegetation could be placed in the creek channel. Habitat enhancement involving removal of invasive species and replacement with native vegetation is recommended throughout the reach. Fish passage at the confluence of Peterson Creek and Santa Rosa Creek should be addressed.

**Recreation, Access, and Transportation.** Existing paved trails on the south/left bank of the creek in Youth Community Park are connected to the north/right bank by an existing trail bridge (#52). From the park, an unpaved access road on the northwest/right bank is proposed to be paved to Guerneville Road and opened for public use. Santa Rosa Creek Greenway Trail on the access roads on either side of the creek, consistent with the Sonoma County Bicycle Plan. Guerneville Road provides a connection to the unpaved access road/trail on the southeast/left bank of Forestview Creek and Peterson Creek.

A street crossing treatment to connect the trail segments along Peterson and Forestview Creeks should be evaluated.

**Forestview Creek.** Forestview Creek is a tributary of Peterson Creek.

**Forestview Creek Reach 1: Peterson Lane to Piner Creek**
Maps: Paulin and Piner Creeks Map 3  
Type: Culvert, Modified-Natural Creek  
Length: 6,125 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** Forestview Creek is a channelized waterway leading from east of Fulton Road westward to Peterson Creek. Upstream, a remnant of the original channel flows through Peterson Lane Park and a nearby apartment building complex. West of Fulton Road, the land adjacent to the channel quickly becomes more rural, with several open parcels adjacent to the creek. Tree species such as live oak, walnut, and valley oak provide some canopy cover. Invasive species such as eucalyptus, French broom, oleander, Himalayan blackberry, cotoneaster, periwinkle, and water primrose are also present. Aquatic habitat includes pools, with shelter limited to overhanging blackberry and a few boulders. A possible fish barrier is present at the confluence with Peterson Creek. Culverts at Fulton Road and Country Manor Road are considered fish barriers due to lack of depth.

Habitat enhancement involving removal of invasive species and replacement with native vegetation is recommended throughout the reach.

**Recreation, Access, and Transportation.** Paved pathways and a trail bridge (#53) exist in Peterson Lane Park. An on-street via Yardley Street, Apple Tree Drive, and Fulton Road leads to the open channel of Forestview Creek at Fulton Road, where an unpaved access road/trail extends westward on the north/right bank to Guerneville Road. At Guerneville Road the trail switches to the east/left bank and is proposed to be paved as discussed under Peterson Creek.
The proper street crossing treatment should be evaluated by the City and County for Guerneville Road.

4.2.6 Paulin Creek Watershed

Watershed Setting. Paulin Creek (with its tributaries Poppy and Pomo Creeks) forms the largest tributary to Piner Creek. Starting in the fir covered hillsides above Hidden Valley, the creek drops 680 feet in elevation to Mendocino Avenue in the first half of its journey and, after disappearing under Highway 101, loses only an additional 60 feet in elevation before entering Piner Creek west of Marlow Road. The creek is accessible in many areas by creekside trails and City parks. In 2001, the Sonoma County Agricultural Preservation and Open Space District created a 43 acre open space preserve along Paulin Creek near Chanate Road. The Paulin Creek Watershed is comprised of nine creek reaches.

Poppy Creek begins as an intermittent drainage north of the Proctor Terrace neighborhood and makes its way towards two City-owned ponds located north of the Rural Cemetery on Franklin Avenue. From the ponds the creek flows have been diverted to storm drain pipes that rejoin the Poppy Creek channel at Mendocino Avenue. The historic channel resumes at Wright Street. Winding through the Santa Rosa Junior College neighborhood, the creek disappears underground again at Mendocino Avenue. It resurfaces downstream of Steele Lane, flows through Steele Lane Park, and joins Paulin Creek downstream of Major Drive. Pomo Creek is largely underground but travels a short distance through Northwest Community Park before joining Paulin Creek.

Paulin Creek. For the purposes of the Master Plan, Paulin Creek is organized into six reaches, moving downstream.

Paulin Creek (East Fork) Reach 1: Headwaters to confluence of east and west forks Paulin Creek
Maps: Paulin and Piner Creeks Map 1
Type: Natural Creek, Modified Creek, Modified-Natural Creek
Length: 4,688 linear feet

Existing Conditions and Recommendations:

Natural Resources. This reach is comprised of a privately-owned canyon with seasonal flow, with a steep gradient leading down to the residential neighborhood below. Plant species include bay, valley oak, and live oak, and the most abundant invasive species is Scotch broom.

Preservation is recommended for this reach. Habitat enhancement including invasive species removal and replacement with native vegetation is also recommended.

Recreation, Access, and Transportation. No trails exist or are proposed for the East Fork of Paulin Creek. A proposed on-street connection along Aaron Drive is described in Reach 6.

Paulin Creek Reach 2: Confluence of east and west forks Paulin Creek
Maps: Paulin and Piner Creeks Map 1
Type: Natural Creek
Length: 2,585 linear feet
Existing Conditions and Recommendations:

Natural Resources. The stream corridor is fairly narrow with pools and riffles. Overhanging vegetation and boulders provide shelter for aquatic life. Plant species include valley oak, and willow, with the most abundant invasive species being Himalayan blackberry and privet. Preservation is recommended for this reach. Habitat enhancement including invasive species removal and replacement with native vegetation is also recommended.

Recreation, Access, and Transportation. This reach is partly on private property and partly on public property. Downstream of Sleepy Hollow Road existing dirt/soft trails follow both sides of the creek to Hidden Valley Park. The trail on the west/right bank connects via an existing trail bridge (#60) to the existing paved paths in Hidden Valley Park. The trail on the east/left bank crosses trail bridge (#59) over a small tributary stream before entering the park. An existing trail bridge (#76) at Castle Rock Court provides a pedestrian connection from Parker Hill Road to the park.

Paulin Creek Reach 3: Chanate Road (near Parker Hill Road) to Mendocino Avenue
Map: Paulin and Piner Creeks Map 1
Type: Natural Creek, Modified Creek
Length: 7,036 linear feet

Existing Conditions and Recommendations:

Natural Resources. This reach is more natural (except for a short modified section just downstream of Chanate Road near Parker Hill Road), with a step-pool pattern to the creek channel and a wider, relatively undisturbed riparian corridor. There is abundant canopy cover. Plant species include willow, valley oak, and alder, with a strong presence of the invasive species Himalayan blackberry, privet, and Scotch broom. Aquatic habitat includes pools and riffles, with woody debris, boulders, and overhanging banks for shelter. Potential barriers for fish include culverts at Mendocino Avenue, three crossings of Chanate Road, and Piner Reservoir.

Preservation is recommended for this reach, due to habitat value for wildlife. The barriers to fish migration should be addressed. In particular, passage through the Piner Reservoir would allow access to upstream habitat for steelhead. Habitat enhancement including invasive species removal and replacement with native vegetation is also recommended.

Recreation, Access, and Transportation. A trail bridge (#87) is proposed east of Parker Hill Road to connect the sidewalk along Chanate Road. The Class 2 bike lanes along Chanate Road provide an on-street connection to the Paulin Creek Preserve. Sonoma County Agricultural Preservation and Open Space District is developing a trail and management plan for the County, Water Agency and District properties that encompass the preserve. An existing access road on the north/right bank at the upstream end of the preserve would be opened, connecting from an existing parking area on the south side of Chanate Road to the Piner Reservoir dam. Existing dirt/soft trails and an existing City access road on the south/left bank of the creek could be improved to continue the route downstream to Chanate Road.

Downstream of Paulin Creek Preserve the creek passes almost exclusively through private property. A proposed on-street connection that roughly parallels the creek would follow the existing Class 2 bike lane along Chanate Road to Mendocino Avenue.
Paulin Creek Reach 4: Mendocino Avenue to Highway 101
Map: Paulin and Piner Creeks Map 1
Type: Modified-Natural Creek
Length: 2,365 linear feet

Existing Conditions and Recommendations:

**Natural Resources.** This reach of Paulin Creek flows alongside the County Administration Center. Poppy Creek enters Paulin here. The banks are fairly steep, with a good amount of canopy cover but very little understory species except for invasive species. There is some concrete reinforcement of banks in this reach. Aquatic habitat consists of pools and riffles. Boulders, roots, and undercut banks provide shelter for fish. The culverts underneath Highway 101 and at Mendocino Avenue may present fish barriers. Plant species include redwood, willow, live oak, and bay, with invasive species including Himalayan blackberry and giant reed.

Habitat enhancement including invasive species removal and replacement with native vegetation is recommended. Habitat restoration may be possible with removal of some of the landscaped area. Ground water contamination may be an issue for restoration activities within this reach.

**Recreation, Access, and Transportation.** This reach is a mix of public and private property. An existing paved trail follows the north/right bank between Mendocino Avenue and County Center Drive. Private property borders the opposite bank. A trail bridge (#62) is proposed to connect this trail to the end of Meyers Drive, which would start on-street connections to trails along Poppy Creek in Steele Lane Park. Highway 101 can be crossed by either using the existing Class 3 bike route on County Center Drive and then west on Steele Lane to the Class 2 lane north on Range Avenue, or by traveling on the Class 3 route that follows Ventura Avenue north and Bicentennial Way to the Class 2 bike lanes on Range Avenue.

Paulin Creek Reach 5: Highway 101 to the Confluence with Piner Creek
Maps: Paulin and Piner Creeks Map 3
Type: Modified-Natural Creek
Length: 9,949 linear feet

Existing Conditions and Recommendations:

**Natural Resources.** Aquatic habitat in this reach includes long pools and glides separated by several short riffles, with boulders and vegetation providing shelter for fish. During a September, 2005, survey steelhead trout were found within this reach. The culvert underneath Highway 101 may present a barrier to fish due to its length and lack of adequate resting areas. In addition, the culverts at Cleveland Avenue, Coffey Lane, and West Steele Lane may pose barriers to fish migration. However, Taylor et al. (2003) note that at stream grade at these three locations there would be 100% passage. Tree species include live oak, willow, Oregon ash, walnut, and valley oak. Understory vegetation is dominated by grasses, with few shrubs. Invasive species include English ivy, vinca, Himalayan blackberry, eucalyptus, French broom, and Scotch broom.

During a September 2005 bird survey, several bird species were observed, including: black phoebe, mallard, scrub jay, mourning dove, California towhee, chickadee, black throated warbler, Wilson’s warbler, American crow, white breasted nuthatch, yellow warbler, Canada goose, orange crowned warbler, Hutton’s vireo, spotted towhee, downy woodpecker, barn swallow, Townsend’s warbler, warbling vireo, starling, and Western tanager.
Habitat restoration is recommended between West Steele Lane and Piner Creek. The channel could be enlarged by expanding the riparian zone into Northwest Community Park and reconfiguring the access road on the right bank, allowing for placement of instream habitat structures such as rootwads and boulders to promote pool formation, and revegetation with native plant species. A restoration concept plan is underway for the creek within Northwest Community Park. Crossings may be necessary to accommodate trail users. Habitat enhancement including invasive species removal and replacement with native vegetation is also recommended.

**Recreation, Access, and Transportation.** This creek is mostly within Sonoma County Water Agency property. An unpaved access road/trail exists on the north bank from McBride Lane to Hardies Lane, where it switches to the south bank. A paved trail is proposed to replace the existing unpaved access road/trail between McBride Lane and Coffey Lane. It is recommended that the paved trail (Class 1 bikeway) be extended between McBride Lane and Cleveland Avenue on either the north or the south side of Paulin Creek, where it can be accommodated. The bikeway would be continued to Cleveland Avenue as redevelopment occurs in the area; a bikeway is also proposed from the Northwest Pacific Railroad to Cleveland Avenue. Two entry points (#144 & #145) are proposed on the south bank between Hardies Lane and Coffey Lane. A potential public plaza and gathering place (#20) is identified near Hardies Lane.

From the end of the creek trail at Coffey Lane, Class 2 bike lanes connect to the future SMART trail at West Steele Lane. The SMART trail can be followed north and rejoins the creek trail on the west side of the tracks.

West of the tracks, an unpaved access road/trail extends on the right/north bank to West Steele Lane, crossing Apache Street. The trail is open to the public downstream of Apache Street. The closed access road upstream of Apache Street would be opened upon completion of the SMART trail. A proposed entry point is located at the east end of Mohawk Street (#148).

South of West Steele Lane the route switches to an unpaved access road/trail on the south/left bank. The access road on the north/right bank will remain closed and may be reconfigured in the future as part of creek restoration efforts. An existing paved trail system parallels the creek trail through Northwest Community Park between West Steele Lane and Marlow Road. Removal of the existing fencing between the park and the creek trail would provide connections between these two features. An existing large culvert carries Pomo Creek under the park trail and access road/trail.

Downstream of Marlow Road, unpaved access road/trails follow both banks of the creek to the confluence with Piner Creek. Either of these access road/trails could be paved to provide a route to the proposed paved trail on Piner Creek. The access road/trail on the opposite bank could be reconfigured to augment creek restoration efforts. A new trail bridge is proposed upstream of the confluence of Paulin and Piner Creeks.

There is potential need for street crossing treatments at Range Avenue, Hardies Lane, Coffey Lane, Apache Street, and at West Steele Lane. Pedestrians can use the existing pedestrian signal at Marlow Road near Monroe School.

**Paulin Creek Reach 6: Headwaters to confluence of east and west forks of Paulin Creek**
Maps: Paulin and Piner Creeks Map 1
Type: Natural Creek, Modified-Natural Creek, Culvert
Length: 5,887 linear feet
Existing Conditions and Recommendations:

Natural Resources. This reach is the west fork, starting near a water tank off Blue Sage Court. It is a Natural type channel crossing private property south to Parker Hill Road, where it enters a culvert in the street right-of-way before emerging at Stagecoach Road. From there, the creek flows in a Modified-Natural type channel south to near Leete Avenue, where it again enters a culvert until its confluence with the east fork.

Parts of this reach may have been relocated when an adjacent hillside housing development was built. There are riffles and small pools present. Some boulders are present. Culverts and the underground portion along Aaron Drive present a migration barrier for fish. Plant species include cattail, willow, and valley oak. Himalayan blackberry, acacia, and scotch broom are abundant.

Habitat enhancement including invasive species removal and replacement with native vegetation is recommended.

Recreation, Access, and Transportation. An existing Class 1 paved path with two existing trail bridges, (#57 and #58) follows Stagecoach Road and Parker Hill Road to Leete Avenue. An existing paved trail is located on the east/left bank parallel to Bent Tree Place. A proposed trail bridge (#56) would connect this trail to the existing Class 1 path parallel to Parker Hill Road. Existing sidewalks along Leete Avenue, Aaron Drive, and Sleepy Hollow Drive provide a pedestrian connection to Paulin Reach 2.

Poppy Creek. Poppy Creek is a tributary of Paulin Creek and is organized into two reaches.

Poppy Creek Reach 1: Norte Way to Wright Street
Map: Paulin and Piner Creeks Map 2
Type: Modified-Natural Creek, Culvert
Length: 3,752 linear feet

Existing Conditions and Recommendations:

Natural Resources. This reach of Poppy Creek is narrow and runs dry in the summer months. The creek is hydrologically connected to the City of Santa Rosa retention ponds north of the Rural Cemetery, and a portion of the creek is underground. Overflow from the ponds travels in a storm drain bypass culvert under Silva Avenue and Mendocino Avenue where it rejoins the creek channel. Vegetation includes valley oak, live oak, bay, and willow. Invasive species include Himalayan blackberry, ivy, and periwinkle.

Habitat enhancement including invasive species removal and replacement with native vegetation is recommended.

Recreation, Access, and Transportation. The creek is primarily privately owned within this reach. Existing sidewalks north of the Parsons Drive creek crossing would be continued as a paved trail along the east sides of the City’s retention ponds. Existing unpaved paths in the Rural Cemetery could be extended along the south sides of the ponds to intersect the new trail. Existing sidewalks south of the Parsons Drive creek crossing follow Terrace Way and McDonald Avenue to connect with the existing Class 3 bike route on Pacific Avenue. Poppy Drive provides a pedestrian connection between the proposed new paved trail along the east side of the retention ponds to Franklin Avenue.
**Poppy Creek Reach 2: Wright Street to Confluence with Paulin Creek**
Maps: Paulin and Piner Creeks Map 2
Type: Modified-Natural Creek, Culvert
Length: 5,589 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** Poppy Creek is fairly narrow in this reach, flowing between backyards towards its confluence with Paulin Creek. The creek appears to have been channelized, and the banks are reinforced with concrete in some places. The creek is routed underground near the intersection of Mendocino Avenue and Steele Lane. There are some pools and ripples, but at the time of field surveys this reach held little water. Plant species include live oak, valley oak, willow, Oregon ash, bay, and cattail. The main invasive species are Himalayan blackberry, with some giant reed noted at the confluence.

Habitat restoration is recommended at Franklin Park, where there is room to enlarge the channel and reintroduce stream meanders and native vegetation. The creek in Steele Lane Park provides another opportunity for restoration. Native trees should be planted along this portion of the reach. Habitat enhancement including invasive species removal and replacement with native vegetation is also recommended.

**Recreation, Access, and Transportation.** A potential public plaza and gathering place opportunity is located on a City-owned right-of-way at King Street and Carr Avenue where an existing trail bridge (#77) crosses the creek.

An existing paved path follows the right/north bank of the creek in Steele Lane Park to Major Drive, with a trail bridge (#63) crossing the creek. Major and Meyers Drives provide pedestrian connections to the proposed trail bridge (#62) over Paulin Creek and to the Steele Lane Community Center via Steele Lane. From the park, sidewalks along Schurman Drive connect to Mendocino Avenue and then to the Paulin Creek Trail on Mendocino Avenue near the County Center or south on Rowe Drive and west on Steele Lane to the Steele Lane Community Center.

**Pomo Creek.** Pomo Creek is a tributary of Paulin Creek and has one reach.

**Pomo Creek Reach 1: Northwest Community Park to Confluence with Paulin Creek**
Maps: Paulin and Piner Creeks Map 3
Type: Culvert, Natural Creek
Length: 594 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** Pomo Creek originates at the northwest corner of Coddingtontown Mall where there is one short stretch above ground at the corner of Guerneville Road and Range Avenue. From this point, the creek is contained within storm drainpipe until it surfaces in Northwest Community Park, flowing through the park before joining Paulin Creek. Within the park, mature trees line the channel, including valley oak, willow, and alder. Himalayan blackberry, cattail, English ivy, and privet are also present. Aquatic habitat includes pools and ripples, with overhanging bank and roots for shelter.
This creek presents an environmental education opportunity due to its proximity to multiple schools. Habitat enhancement including invasive species removal and replacement with native vegetation is recommended for this reach.

**Recreation, Access, and Transportation.** Paved trails exist in Northwest Community Park, but do not follow Pomo Creek.

### 4.2.7 Southern Santa Rosa Creeks Watershed

**Watershed Setting.** The Southern Santa Rosa Creeks Watershed area includes four creeks, Roseland Creek, Kawana Springs Creek, Colgan Creek, and Old Colgan Creek, that flow to the Laguna de Santa Rosa. These creeks are not generally considered to support steelhead trout, due to warm water temperatures, lack of instream habitat complexity, and limited summertime flows. This watershed is comprised of nine creek reaches.

**Roseland Creek.** Roseland Creek flows more than six miles westward across the Santa Rosa Plain, from its headwaters southwest of the Highway 101 and Highway 12 interchange to its confluence with the Laguna de Santa Rosa southeast of Sebastopol near the Laguna Treatment Plant. The creek runs through predominantly private property to Burbank Avenue. An engineered channel maintained by the Sonoma County Water Agency begins 600 feet downstream of Burbank Avenue and continues to the Urban Growth Boundary.

Roseland Creek is organized into four reaches moving downstream.

**Roseland Creek Reach 1:** Roseland Creek from the Northwestern Pacific Railroad to McMinn Avenue  
*Map: Southern Santa Rosa Map 1*  
*Type: Natural Creek*  
*Length: 3,622 linear feet*

**Existing Conditions and Recommendations:**

**Natural Resources.** This uppermost reach of Roseland Creek surfaces at an outfall west of the Northwestern Pacific Railroad tracks. A few yards downstream, the creek is characterized by a fairly natural, meandering channel, with some large trees shading the water. Small pools and riffles are present, with shelter provided by roots and woody debris. The primary plant species include Oregon ash, live oak, and valley oak. Himalayan blackberry is the dominant invasive species. This reach is predominately privately owned. The culvert at Dutton Avenue may present a barrier to fish movement.

This reach is recommended for preservation. Habitat enhancement including invasive species removal and replacement with native vegetation is also recommended.

**Recreation, Access, and Transportation.** The parcels through which the creek passes are private. There is no creek trail on this reach. There is an existing trail bridge on West Avenue (#67).

Street crossing on McMinn Avenue near Delport Avenue to facilitate pedestrian and bicycle access to the proposed trail along Reach 2 should be evaluated.
Roseland Creek Reach 2: Roseland Creek from McMinn Avenue to Burbank Avenue  
Map: Southern Santa Rosa Map 1  
Type: Natural Creek  
Length: 1,240 linear feet

Existing Conditions and Recommendations:

Natural Resources. This reach of Roseland Creek is characterized by a more natural, meandering channel, with large trees shading the water. Pools and riffles are present, along with large woody debris. The primary plant species include Oregon ash, willow, live oak, and valley oak. Regeneration of native species is high in this area despite an abundance of Himalayan blackberry. Pampas grass is also present. Adjacent parcels include grasslands and oak woodlands used by raptors for foraging, with large trees for nesting. This reach includes the future Roseland Creek Community Park and the entire area may be annexed by the City of Santa Rosa in the future.

This reach is recommended for preservation and is covered as part of the City’s adopted Roseland Creek Restoration Concept Plan (Appendix C) and proposed plans for Roseland Creek Community Park. Compliance with the City’s 50 foot setback requirement is proposed for this reach, due to habitat value for wildlife. Habitat enhancement including invasive species removal and replacement with native vegetation is also recommended.

Recreation, Access, and Transportation. The creek passes through Water Agency and private parcels. A paved trail is proposed to connect McMinn Avenue to Burbank Avenue through the future Roseland Creek Community Park.

Roseland Creek Reach 3: Roseland Creek from Burbank Avenue to Stony Point Road  
Maps: Southern Santa Rosa Map 1  
Type: Modified Creek, Natural Creek  
Length: 4,030 linear feet

Existing Conditions and Recommendations:

Natural Resources. The majority of this reach of Roseland Creek is characterized by a grass-lined flood control channel consisting of long, isolated pools. The upper 600 feet of the creek is fairly natural, with several large Oregon ash trees and Valley oaks. The rest of the reach is Modified Natural channel maintained by the Sonoma County Water Agency. Some trees and shrubs are present within a narrow riparian zone, but they do not yet shade the channel. Dominant plant species include rice cut-grass, cattail, bulrush, Himalayan blackberry, and nutsedge, with some plantings of live oak, Valley oak, bottlebrush, and black oak. A few willow, coyote brush, and cottonwood have come into the reach naturally. Invasive species present include Himalayan blackberry and eucalyptus. Adjacent parcels include grasslands used by raptors for foraging, with large trees for nesting. Bird species observed during a September, 2005 morning survey include rock pigeon, Anna’s hummingbird, willow flycatcher, pacific slope flycatcher, northern mockingbird, oak titmouse, western scrub-jay, American crow, European starling, American goldfinch, yellow warbler, Wilson’s warbler, California towhee, song sparrow, Lincoln’s sparrow, and white-crowned sparrow.

Habitat restoration is recommended for this reach as part of the Roseland Creek Restoration Concept Plan. Widening the channel would allow for construction of a meandering low-flow
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channel, instream habitat structures, and replanting of native vegetation. See Appendix C for a more detailed description of the restoration concept and plan drawings.

**Recreation, Access, and Transportation.** The proposed paved trail in Reach 2 would connect via Burbank Avenue to the existing paved access road/trail on the west side of Burbank Avenue 400 feet south of the creek. An existing trail bridge (#86) crosses Roseland Creek to the Water Agency’s unpaved access road/trail on the north/right bank. The access road/trail on this side of the creek is paved in sections adjacent to development and is proposed to be paved for the entire reach. A trail bridge (#80) is proposed to cross the creek at the east end of Giffen Avenue. An undercrossing (#160) is proposed for the planned extension of Northpoint Parkway. The extension would provide another creek crossing and a connection to Southwest Community Park. The Roseland Creek Restoration Concept Plan includes a potential public plaza and gathering place near the future extension of Trombeta Avenue (#26). More details are available in the Roseland Creek Restoration Concept Plan (Appendix C). There is a Water Agency earthen access road/trail on the east/left bank.

Street crossing treatments are potentially needed at Burbank Avenue (in the unincorporated County) and at Stony Point Road.

**Roseland Creek Reach 4: Roseland Creek from Stony Point Road to Ludwig Avenue**
Maps: Southern Santa Rosa Map 2  
Type: Modified Creek  
Length: 8,433 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** This reach of Roseland Creek is characterized by a grass-lined flood control channel, consisting of long pools and glides, with very few riffles. Some trees and shrubs are present within a narrow riparian zone, but they do not provide shade to the channel. Dominant plant species include cattail, rice cut-grass, Himalayan blackberry, and nutsedge, with some plantings of live oak, valley oak, big leaf maple, and toyon at the top of bank. A few willow and cottonwood have come into the reach naturally. Invasive species present include Himalayan blackberry and pampas grass.

Adjacent parcels include grasslands used by raptors for foraging, with large trees for nesting. This reach is adjacent to several preserves and open space areas. The FEMA preserve, where the protected California Tiger Salamander (CTS) breed in vernal pools, is located on the southeastern bank of the 90 degree bend in this reach of Roseland Creek. These vernal pools also support rare plant species, including Sonoma sunshine (*Blennosperma bakeri*), and Sebastopol meadowfoam (*Limnanthes vinculans*). The Yuba preserve and its CTS breeding pools are located south of Yuba Drive. Both preserves are managed by the California Department of Fish and Wildlife. Across the creek from the FEMA preserve is the City’s Fresno Avenue CTS Corridor Preserve, which was built to support the migration of CTS from the upland areas in the west to the ponds at the FEMA preserve. None of these preserves are open to the public.

Habitat restoration is recommended for this reach to allow for channel enlargement to accommodate a meandering low-flow channel, instream habitat structures, and replanting of native vegetation.
Recreation, Access, and Transportation. The creek passes through public parcels. An existing Class 1 paved trail with multiple access points follows the left/south bank of the creek for 3,000 feet downstream from Stony Point Road to the Fresno Avenue CTS Corridor Preserve. There is a future Neighborhood Park planned in this area.

An unpaved access road/trail continues to the end of the reach. A proposed trail bridge (#68) would cross to the right/west bank where the creek turns 90 degrees to the south around the FEMA Preserve parcel. An existing Class 1 paved trail runs along Fresno Avenue from Northpoint Parkway to south of Yeager Drive. This paved trail is proposed to be extended south to Ludwig Avenue. A second trail bridge (#69) is proposed at Yuba Drive to allow a connection west to the proposed trail. The existing access road on the left/east bank could potentially be relocated as part of creek restoration efforts.

The Sonoma County Bicycle and Pedestrian Master Plan 2010 proposes a Class 1 bike path along the creek from Stony Point Road to Ludwig Ave, which would also continue downstream to Llano Road.

Colgan Creek. Just under half of Colgan Creek’s nearly 5,000 acre drainage area lies within Santa Rosa’s Urban Growth Boundary. The area includes residential neighborhoods, commercial areas, and undeveloped lands. Colgan Creek is mostly channelized within the urban area. Kawana Springs Creek (also known as Upper Colgan Creek) flows westward from its headwaters in the oak woodlands on Taylor Mountain to Colgan Avenue, where it is joined by the Old Colgan Creek storm drain and continues downstream as Colgan Creek. After passing under Highway 101 the creek flows southwest toward the City’s Laguna Treatment Plant before joining with the Laguna de Santa Rosa. In 2002, the City Council adopted the Lower Colgan Creek Restoration Concept Plan (Appendix E) for Reach 3. A second restoration concept plan, covering a portion of Reach 2, was adopted in 2007 for Kawana Springs Creek (Upper Colgan Creek). See Appendix E.

Kawana Springs Creek is organized into two reaches moving downstream.

Reach 1: Kawana Springs Creek: Urban Growth Boundary to Petaluma Hill Road
Map: Southern Santa Rosa Map 3
Type: Natural Creek
Length: 4,375 linear feet

Existing Conditions and Recommendations:

Natural Resources. This reach of Kawana Springs Creek, also known as Upper Colgan Creek, is characterized by a more natural, meandering channel, with large trees shading the water. Pools and riffles are present, along with large woody debris. The primary plant species include valley oak, willow, buckeye, and live oak. Some Himalayan blackberry is present. Adjacent parcels include grasslands used by raptors for foraging, with large trees for nesting.

Preservation is recommended for this reach, due to habitat value for wildlife. Habitat enhancement including invasive species removal and replacement with native vegetation is also recommended. Some bank stabilization may also be needed to prevent excess sediment from entering the stream.

Recreation, Access, and Transportation. The parcels through which the creek passes are both public and private. Taylor Mountain Regional Park is upstream of the reach and beyond the
Urban Growth Boundary. A paved trail, with an undercrossing of the future Farmers Lane extension, is planned through City-owned parcels that encompass a future Community Park on the north/right bank of the creek from the beginning of the reach to near Turquoise Way. From Turquoise Way, sidewalks and existing Class 2 bike lanes provide a connection on Kawana Springs Road and north on Petaluma Hill Road to the beginning of Reach 2.

There is an existing crosswalk at Kawana Springs Road to cross Petaluma Hill Road. Future frontage improvements along undeveloped areas of these roads will provide additional connectivity.

**Kawana Springs Creek, (also known as Upper Colgan Creek) Reach 2: Petaluma Hill Road to confluence with Old Colgan Creek**

Maps: Southern Santa Rosa Map 3  
Type: Modified Creek, Culvert  
Length: 2,924 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** This reach of Kawana Springs Creek (also known as Upper Colgan Creek) consists of a flood control channel, the majority of which is owned by the Sonoma County Water Agency. The channel is grass-lined in some locations, and concrete-lined in others, with some underground sections. Shallow pools dominate the aquatic habitat. Some trees and shrubs are present within a narrow riparian zone, but they do not provide a large amount of canopy cover to shade the channel. Dominant plant species include cattail, Himalayan blackberry, bulrush, and nutsedge, with some plantings of live oak, valley oak, and walnut. A few willow, cottonwood, and Oregon ash have come into the reach naturally. Invasive species present include Himalayan blackberry, pampas grass, and eucalyptus. Adjacent parcels include some grasslands used by raptors for foraging, with large trees for nesting.

Habitat restoration is recommended for this reach. The channel could be recontoured to include a meandering low-flow channel, instream habitat structures, and replanting of native vegetation. See Appendix D for a detailed description of the “Upper Colgan” Restoration Concept Plan and drawings.

**Recreation, Access, and Transportation.** The parcels through which the creek passes are public with a culverted section running under private property at Costco. A Class 1 paved trail follows the creek from Petaluma Hill Road, through Colgan Creek Park, and on to Colgan Avenue. The trail is on the south/left bank until Costco where a series of three existing trail bridges (#70, #71, and #72) cross the creek before Colgan Avenue.

The Upper Colgan Creek Concept Plan proposes additional improvements to the trail system in this reach, including a trail bridge (#79) connecting to a proposed paved trail on the right/north bank. See Appendix D.

Colgan Creek is covered in two reaches.

**Colgan Creek Reach 1: Highway 101 to Victoria Drive**

Map: Southern Santa Rosa Map 3  
Type: Modified Creek  
Length: 5,781 linear feet
Chapter 4. Watershed-Specific Recommendations

Existing Conditions and Recommendations:

Natural Resources. This reach of Colgan Creek consists largely of a Sonoma County Water Agency flood control channel, part of which is under easements to cross private properties. The channel includes grass-lined and concrete sections, and consists of long, isolated pools. Some trees and shrubs are present within a narrow riparian zone, but they do not provide a large amount of canopy cover to shade the channel. Dominant plant species include cattail, Himalayan blackberry, and nutsedge, with some plantings of live oak, valley oak, and walnut. A few willow and cottonwood have come into the reach naturally. Invasive species present include Himalayan blackberry, ivy, bamboo, and eucalyptus. Adjacent parcels include some grasslands used by raptors for foraging, with large trees for nesting. Kingfisher and northern mockingbird were observed within this reach during a June, 2005 daytime survey. Previous fish surveys recorded California roach, green sunfish, and mosquitofish in a pool downstream of Corby Avenue.

Habitat enhancement including invasive species removal and replacement with native vegetation is recommended for this reach.

Recreation, Access, and Transportation. The parcels through which the creek passes are public and private. This reach has no existing public access The SMART trail would follow the creek near Hearn Avenue with a proposed trail bridge upstream of Hearn Avenue. The SCWA access road upstream of Hearn Avenue could be opened to the public if through access becomes available to undeveloped parcels to the north. A proposed on-street connection would run west along Hearn Avenue to a point where a future street or paved trail could provide a connection to the existing unpaved access road/trail on the west/right bank that begins 100 yards downstream of Victoria Drive.

A street crossing treatment should be evaluated at Hearn Avenue.

Colgan Creek Reach 2: Victoria Drive to Bellevue Avenue
Map: Southern Santa Rosa Map 3
Type: Modified Creek
Length: 6,751 linear feet

Existing Conditions and Recommendations:

Natural Resources. This reach of Colgan Creek consists of a flood control channel, the majority of which is owned by the Sonoma County Water Agency. Most of the channel is grass-lined with long pools and glides. Stretches are also concrete-lined and grouted rip-rapped. A concrete grade control structure immediately downstream of Victoria Drive may pose a barrier to migrating fish. Another concrete structure check dam is present just upstream of Bellevue Avenue at Elsie Allen High School. Some trees and shrubs are present within a narrow riparian zone, but they do not yet provide any canopy cover to shade the channel. Dominant plant species include cattail, Himalayan blackberry, and nutsedge, with some plantings of live oak, valley oak, and walnut. A few willow and cottonwood have come into the reach naturally. Invasive species present include Himalayan blackberry and eucalyptus. Bird species observed during a July, 2005 morning survey by Madrone Audubon include great egret, turkey vulture, mourning dove, black phoebe, western kingbird, barn swallow, northern mockingbird, house finch, American goldfinch, song sparrow, red-winged blackbird, Anna’s hummingbird, western scrub-jay, European starling, house sparrow, spotted towhee, California towhee, and brewer’s...
blackbird. Adjacent parcels include some grasslands used by raptors for foraging, with large trees for nesting.

This reach is recommended for restoration, as described in the Lower Colgan Creek Restoration Concept Plan, adopted by City Council in 2002 (see Appendix E). A meandering low-flow channel would be restored to the creek, with instream habitat structures and native revegetation. The existing access road along the east/left bank between Victoria Drive and the 90 degree bend in the creek at Bellevue Avenue would be relocated to allow more room in the channel for improvements. From this point downstream to the Bellevue Avenue crossing, the right bank access road would be relocated to allow for restoration. See Appendix E for a detailed description of the restoration concept and plan drawings.

Recreation, Access, and Transportation. The creek passes through property owned by Sonoma County Water Agency and Santa Rosa High School District. Currently, an unpaved access road/trail exists along the west/right bank from near the top of the reach to Burgess Avenue. The trail then becomes a Class 1 bikeway for the final 250 yards of the reach to the Bellevue Avenue crossing. An unpaved access road that is closed to the public follows the east/left bank from near the top of the reach to Bellevue Avenue where the creek bends 90 degrees to the west. From this point, a proposed Class 1 paved bikeway parallels the south/left bank to the end of the reach.

South of Bellevue Avenue and the Urban Growth Boundary, Sonoma County Regional Parks’ Class 1 paved Colgan Creek Trail follows the left/east bank to Stony Point Road while an unpaved Water Agency access road/trail allows access on the opposite bank of the creek. There is a County plan to extend the Colgan Creek Trail to Walker Road.

Consistent with the Lower Colgan Creek Restoration Concept Plan and resulting design work, a paved Class 1 bikeway would follow the right/west bank from near the top of the reach and cross the creek on a proposed trail bridge (#78) in the planned Neighborhood Park. The Class 1 bikeway would then follow the south/left bank to the end of the reach. Future development should seek opportunities to provide public access points to the bikeway. An unpaved access road/trail would extend from the park to the end of the reach on the north/right bank. The access road on the east/left bank upstream of the proposed park would remain closed.

An informal, dirt/soft trail on the west/right bank that connects Victoria Drive to the planned Class 1 bikeway could be improved for public access. A Neighborhood Park is planned where the Dutton Avenue/Northpoint Parkway Extension would cross Colgan Creek.

Street crossing treatments should be evaluated at Dutton Meadow Burgess Avenue, and Bellevue Avenue.

Old Colgan Creek. Old Colgan Creek consists of two small tributaries that combine with Kawana Springs Creek to form Colgan Creek. These tributaries are modified in culverts or remnants of natural channels. The parcels through which the creek passes are public and private.

Old Colgan Creek Reach 1. East of Brookwood Avenue to Confluence with Kawana Springs Creek (also known as Upper Colgan Creek) at Colgan Avenue
Map: Southern Santa Rosa Map 3
Type: Modified Creek, Culvert, Natural
Length: 10,116 linear feet
Chapter 4. Watershed-Specific Recommendations

Existing Conditions and Recommendations:

Natural Resources. With the development of the Sonoma County Fairgrounds area, much of the northernmost tributary of Old Colgan Creek was rerouted through drainage ditches and storm drain pipe. The southern tributary, which begins in a swale near Taylor Mountain Place and Kawana Springs Road, is mostly a natural channel and makes its way northwest towards Kawana Community Garden, where it enters a storm drain pipe to connect with the northern tributary. Old Colgan Creek joins Kawana Springs Creek in a concrete culvert along Colgan Avenue where it turns into Colgan Creek.

The southern tributary passes through multiple undeveloped parcels along Tokay Street designated by the General Plan for medium density residential uses where housing projects have been approved but are not yet built. The creek would not be preserved as part of the approved projects, and removal of the creek would be mitigated off-site.

Recreation, Access, and Transportation. There is no existing or proposed creek access.

4.2.8 Western Creeks Watersheds

Watershed Setting. Western Creeks are mostly low gradient, seasonal creeks that originate at outfalls of the City’s storm drain system west of Highway 101 and flow to the Laguna de Santa Rosa. There are five creeks in this watershed area: Gravenstein and Naval Creeks, Irwin Creek (also known as Spirit Creek), Riccas Creek and Countryside Creek.

Western Gravenstein and Naval Creeks. Naval and Gravenstein Creeks are tributaries to the Laguna de Santa Rosa. The parcels through which the creeks pass are private.

Gravenstein and Naval Creeks Reach 1: Old Santa Rosa Air Center to Urban Growth Boundary
Map: Southern Santa Rosa Map 2
Type: Modified-Natural Creek
Length: 7,050 linear feet

Existing Conditions and Recommendations:

Natural Resources. Both creeks begin near the old Santa Rosa Air Center site, and flow westward, joining together before Gravenstein Creek continues on toward the Laguna de Santa Rosa. The surrounding landscape features a complex of grasslands, seasonal swales, and vernal pools, supporting federally-protected species including the California tiger salamander and Sebastopol meadowfoam. Common plant species include willow, valley oak, cottonwood, Oregon ash, and walnut. Invasive species include Himalayan blackberry and eucalyptus. During the winter season, adjacent vernal pools and swales fill with rainwater, and water has been observed to flow across the surface of South Wright Road.

Habitat enhancement including invasive species removal and replacement with native vegetation is recommended for this reach.

Recreation, Access, and Transportation. Currently, there is no existing or proposed access along these privately owned creeks within the Urban Growth Boundary. Outside of the Urban Growth Boundary in the unincorporated County, the Laguna de Santa Rosa Trail includes paths
through Brown Farm, located just north of the confluence of Gravenstein Creek and Laguna de Santa Rosa.

**Irwin Creek.** Irwin Creek is a tributary to the Laguna de Santa Rosa. The parcels through which the creek passes are private except for J. X. Wilson Elementary School and Live Oak Park. The creek is Modified-Natural in this reach.

**Irwin Creek Reach 1: Occidental Road to Urban Growth Boundary west of Fulton Road**  
Map: Santa Rosa Creek Map1  
Type: Modified-Natural Creek  
Length: 10,918 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** Irwin Creek is first observed west of Stony Point Road (where it is locally known as “Spirit Creek”) though it may have historically begun near Dutton Avenue. A diversion structure north of Occidental Road routes high flows to Santa Rosa Creek through the storm drain system. The remaining creek flow continues on the surface and enters the storm drain west of J. X. Wilson Elementary School, surfacing at Fulton Road. West of the Urban Growth Boundary, Irwin Creek flows through the California Department of Fish and Wildlife’s Cramer Preserve, and is then joined by Riccas Creek before continuing to the Laguna de Santa Rosa. Vegetation observed within these creeks includes cattail, willow, redwood, and privet.

Habitat enhancement including invasive species removal and replacement with native vegetation is recommended for this reach.

**Recreation, Access, and Transportation.** There is no public creek access except for a short stretch of existing paved path in the shopping center north of Occidental Road. Sonoma County Regional Parks’ proposed Santa Rosa Creek West County Connector would follow the Urban Growth Boundary and cross the creek.

**Riccas Creek.** Riccas Creek is a tributary of Irwin Creek.

**Riccas Creek Reach 1: Fulton Road and Highway 12 to Urban Growth Boundary**  
Map: Santa Rosa Creek Maps 1 and 2  
Type: Modified-Natural Creek  
Length: 2,587 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** Riccas Creek is first observed in the grassy area between Highway 12 and Occidental Road, just west of Fulton Road. The furthest south channel of Riccas Creek originates in the drainage ditches along Sebastopol Road west of South Wright Road. It joins another channel that collects storm water runoff from Highway 12 and Fulton Roads. These two channels combine with other short channels that originate outside of the Urban Growth Boundary to form a wetland mosaic dominated by non-native wetland plants like curly doc and harding grass. There are also large clumps of broad-leaf cattails. Though these two branches of the creek originate in the City of Santa Rosa, most of Riccas Creek is outside of the City’s Urban Growth Boundary and is protected by conservation easements on the Wright Preservation Bank managed by California Department of Fish and Wildlife. The storm drain
outfalls from the City of Santa Rosa deposit lots of trash into these creeks and regular trash cleanup at the outfalls is suggested to keep the protected lands healthy.

**Recreation, Access and Transportation.** Since most of Riccas Creek is protected by conservation easements and it is bordered by Highway 12 there is no plan to create public access to these stretches of creek.

**Countryside Creek.** Countryside Creek is a tributary to Riccas Creek. The parcels through which the creek passes within the Urban Growth Boundary are private.

**Countryside Creek Reach 1: Fulton Road to Urban Growth Boundary**
Map: Santa Rosa Creek Maps 1 and 2  
Type: Modified-Natural Creek  
Length: 1,318 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** Countryside Creek is first observed west of Fulton Road and is fed by an outfall of the City's storm drain system. The creek follows a modified channel through the Countryside Estates development before entering California Department of Fish and Wildlife’s Wright Preservation Bank, a wetland mosaic, where it combines with Riccas Creek. The channel is choked with vegetation including cattails, Himalayan blackberry and willow trees. Flow through the channel is restricted by downstream constraints, including an aggraded stream bed.

Planting trees to shade the channel is suggested to prevent cattail infestations that reduce the flood conveyance.

**Recreation, Access, and Transportation.** Sonoma County Regional Parks’ proposed Santa Rosa Creek West County Connector would follow the Urban Growth Boundary and cross the creek.

4.2.9 **Todd Creek Watershed**
The Todd Creek Watershed is comprised of three creek reaches. Tributaries to Todd Creek that flow through the Citywide Creek Master Plan area include Hunter Creek, Todd Creek, and Moorland Creek.

**Todd Creek.** The Todd Creek Watershed is located in the far southern portion of the Urban Growth Boundary.

**Todd Creek Reach 1: Eastern Urban Growth Boundary to Southern Urban Growth Boundary**
Maps: Todd Creek  
Type: Natural Creek, Modified Creek, Modified-Natural Creek  
Length: 24,025 linear feet

**Existing Conditions and Recommendations:**

**Natural Resources.** Todd Creek begins on the western slope of Taylor Mountain, and flows to the south and west towards the Laguna de Santa Rosa. The main channel of Todd Creek is a
Chapter 4. Watershed-Specific Recommendations

grass-lined, channelized stream. Within the Urban Growth Boundary, Sonoma County Water Agency has planted trees at the water’s edge and along the top of bank to establish canopy.

Besides its tributaries of Hunter and Moorland Creeks, Todd Creek receives drainage from Todd Creek (East Fork), and two unnamed tributaries, The East Fork is the most prominent tributary and joins Todd Creek near East Robles Avenue, south of the unnamed tributaries. The East Fork is a Natural type channel and has a narrow band of remnant riparian vegetation along both banks as it flows through rural private property until becoming a modified channel downstream of Petaluma Hill Road. The creek is outside the Urban Growth Boundary for roughly 500 yards upstream and downstream of its crossing of Petaluma Hill Road.

The northernmost unnamed tributary enters Todd Creek outside of the Urban Growth Boundary and the southern one enters east of El Crystal Drive. West of Petaluma Hill Road, these two tributaries are modified grass-lined channels that lack woody vegetation.

There are no access roads along the Todd Creek tributaries, but on the main channel existing access road/trails on each bank begin just upstream of Delores Lane. Vegetation includes willow, cattail, Himalayan blackberry, harding grass. The East Fork has coast live oaks and valley oaks providing shade in the more natural creek sections.

Channel enlargement to accommodate a low flow meandering channel and revegetation with native species could occur throughout much of Todd Creek by expanding into adjacent undeveloped land, but some reaches may require the relocation of one access road. Crossings may be needed to accommodate trail users should an access road be removed. The confluence of Hunter and Todd Creeks could be expanded and have the grouted rip rap walls and channel bottom removed.

Recreation, Access, and Transportation. A paved trail is proposed on the east/left bank from the point where the proposed Farmers Lane Extension/Bellevue Avenue Connector would cross the creek to the confluence with Hunter Creek. This would include paving the Water Agency access road/trail that is currently open to the public. A proposed trail bridge (#74) would connect to Taylor Mountain Elementary School on the west bank. A proposed trail bridge over Hunter Creek (#75) would connect the trail to Sonoma County Regional Parks’ existing paved Class 1 Hunter Creek Bikeway that follows Hunter and Todd Creeks from Snyder Lane to Santa Rosa Avenue.

The entire unpaved Water Agency access road existing on the west/right bank from downstream of East Robles Avenue to the end of the reach could potentially be relocated to support creek restoration. The access roads between Santa Rosa Avenue and Highway 101 would remain closed because there is no access past the highway. The east/left bank access road would be paved from South Moorland Avenue to the end of the reach at Scenic Avenue. There would be an on street connection north along Santa Rosa Avenue, across Highway 101 at Todd Road, and south along Moorland Avenue.

Hunter Creek. Hunter Creek is a tributary of Todd Creek and begins on the western side of Taylor Mountain.

Hunter Creek Reach 1: Urban Growth Boundary to Confluence with Todd Creek
Map: Todd Creek
Type: Modified Creek
Length: 973 linear feet
Existing Conditions and Recommendations:

Natural Resources. Within the Urban Growth Boundary, Hunter Creek is a Modified channel with grouted riprap along the banks of the confluence with Todd Creek. There are remnants of riparian canopy further upstream that is dominated by coast live oaks and valley oaks at the top of the bank, with Himalayan blackberry, vinca, and non-native grasses throughout the channel.

Relocation of the right bank access road would allow for channel enlargement to accommodate a low flow meandering channel and revegetation with native species.

Recreation, Access, and Transportation. The creek runs through Water Agency property. Sonoma County Regional Parks’ paved Class 1 Hunter Creek Bikeway, with a 4 foot wide soft shoulder, runs along the south/left bank of the creek within the Urban Growth Boundary and continues to Snyder Lane near Petaluma Hill Road. A proposed trail bridge over Hunter Creek (#75) would connect to a trail on the left/east bank of Todd Creek.

Moorland Creek. This creek has a Modified type channel. It passes through rural private land to the east of the Northwest Pacific Railroad corridor.

Moorland Creek Reach 1: Northwest Pacific Railroad to Confluence with Todd Creek
Maps: Todd Creek
Type: Modified Creek
Length: 4,944 linear feet

Existing Conditions and Recommendations:

Natural Resources. Moorland Creek is channelized, originating along the Northwest Pacific Railroad and flowing south to join Todd Creek. There are some concrete sections, specifically under Todd Road and along the railroad. Adjacent land uses include industrial, commercial, and open fields. At Cresco Court the creek is routed into a storm drain pipe which outfalls to Todd Creek. Native vegetation within this reach is confined to willows, with invasive species including Himalayan blackberry, eucalyptus, and annual grasses.

Habitat enhancement including invasive species removal and replacement with native vegetation is recommended for this reach.

Recreation, Access, and Transportation. A short section of proposed paved path would connect Cresco Court to the proposed SMART trail that runs along much of the reach.
4.3 Map Products and Geographical Information System

4.3.1 Map Products

The Citywide Creek Master Plan maps are available on the City’s website. Site visitors can view a map of the Plan area, the boundaries of the specific Watershed Planning Areas, and detailed information about each area by utilizing the interactive GIS system. The Watershed Planning Area maps are also available as Adobe Acrobat pdf files of detailed 24" by 36" maps at 1" = 550’ scale. Each map has a legend of the features displayed.

The Citywide Creek Master Plan maps were created from existing data layers and new tables of data specific to the project. The Master Plan text presents existing conditions, recommendations, and design concepts in a narrative form and is intended to be used as a companion to the maps.

4.3.2 Geographical Information System

A Geographical Information System (GIS) can be extremely helpful in the analysis, planning, design, and presentation of technical information. Using GIS, a dataset can be queried for specific information, with the results displayed in a spatial (map) format. Data are displayed in map layers, and the user can decide which layers to view alone or in combination with other layers. Objects or features within each layer are comprised of a combination of points, lines, and polygons. Surfaces may also be used as a layer, including a raster, or matrix of identically sized square cells. Each cell represents a numeric value of some measurable unit. Each feature is linked to a geographic location, with x and y coordinates. Features are also linked to tables of information, including labels, numeric measures, and other attributes. Photographs and other files can be linked to features to provide the user with additional information.
5. Implementation Strategy

“\textit{The key to the success of a natural waterways program is the continued active support of the citizens of the community and cooperation between all agencies involved in water projects.}”

\textit{- Santa Rosa Natural Waterways Study, 1969}
Chapter 5. Implementation Strategy

The Citywide Creek Master Plan includes many recommended projects within nine different watershed planning areas. Projects are described in the plan text and depicted on the maps: see Appendix F for a comprehensive list of site specific projects. Full implementation of the Plan will not occur within the next year, ten years, or even twenty years. Rather, the Plan provides guidance on where incremental habitat enhancements and trail improvements should occur, ultimately resulting in a comprehensive and integrated network of healthy creeks and improved recreation, access, and transportation opportunities.

5.1 Oversight of Plan Implementation

The Open Space and Conservation Element of Santa Rosa General Plan 2035, adopted by the City Council in 2009, incorporated key policies from the Citywide Creek Master Plan and supports implementation of the plan. There are also numerous policies in the Transportation Element that call for the development of a citywide network of pedestrian sidewalks and pathways, and designated bikeways.

The Waterways Advisory Committee, created in 1993, is an advisory body, making recommendations to decision-making bodies, such as the Design Review Board, the Planning Commission, and the City Council, on projects that may affect local creeks. Implementation of the Citywide Creek Master Plan will occur primarily through the City's Capital Improvement Project Program and as part of private development projects. Approvals of both types of projects will be made by decision-making bodies with guidance and input from the Waterways Advisory Committee.

5.2 Priority Reaches

Some activities in the Citywide Creek Master Plan are part of a citywide “programmatic” approach to improve the quality of creek habitat and recreational value. For example, habitat enhancement including removal of invasive species and replacement with native species would be appropriate citywide. Similarly, replacement of entry gates with bollards at trail entries, and opening of access roads to the public as multiple use trails would also occur across the Master Plan area. Signage for identifying creek crossings, location identification for emergency responders, regulatory signage for public safety personnel, and interpretive signage for education purposes also would apply citywide. These projects can be started immediately and completed over time.

Other projects proposed in this Plan are more site-specific, including habitat restoration, addressing barriers to fish passage, wildlife movement, trail upgrades, development of new trails or trailhead/access points, or construction of new creek crossings. A list of site-specific projects by watershed, and the Citywide Creek Master Plan goals met by each, is listed in Appendix F: List of Site Specific Projects.
Prioritization Criteria – Project Types

All projects described in this document are important contributions to meeting the Master Plan goals. Each listed project represents a step towards creating healthy riparian habitat and a comprehensive creekside trail system. There are five main project types:

- **Creek Habitat Restoration/Enhancement.** The goals of habitat restoration and enhancement are to increase the quality, size or extent of the riparian zone. Enhancement projects can be small scale like planting native trees to shade the creek and provide nesting bird habitat or they may be large scale restoration projects that change the physical features of the channel in some way to return it to a more natural condition. Includes fish passage projects that allow fish to move more freely throughout the creek by removing or modifying manmade barriers. May also address and alleviate risk of hydromodification.

- **Parks and Open Space.** Open space/recreation projects include Community and Neighborhood Parks near creeks designated by the City’s General Plan for public parkland acquisition and development, as well as publicly accessible open spaces near creeks and trailheads that allow the public to access creek trails and provide opportunities for passive recreation.

- **Trails and Connections.** Further development of the City’s creekside trail system. Trail/transportation projects improve the network of paved and unpaved trails along creeks to allow trail users to get around town while enjoying the aesthetic benefits of creeks and associated vegetation. These projects may also include increasing access at trailheads, improving street crossings, and trail enhancing features such as interpretative, location, and way-finding signage.

- **Water Quality.** These projects help to protect water quality within the waterways.

- **Flood Protection.** These projects focus on the capacity of creeks to carry storm water runoff and/or provide surface drainage to reduce flood risk.

Many projects fit into multiple type categories but a primary category is identified for each project. Based on the project prioritization criteria, a Priority List will be developed for each project type. The Priority Lists will be updated on a recurring basis.

Prioritization Criteria – Key Factors

There are several main factors to consider when prioritizing all projects, and within each specific project type there are additional factors. The prioritization criteria are based largely on Citywide Master Plan Goals and Objectives.

Overall

- Does the project have potential to achieve multiple goals and objectives of the CCMP?
- Can the project be accomplished as part of another City project?
- Is there potential for partnerships with other agencies, nonprofit organizations, and community groups?
- Has the project received community support and interest?
- Could the project to be a catalyst for increased public interest in learning about and caring for creeks?
- Do viable grant funding opportunities exist?
Chapter 5. Implementation Strategy

- Is there potential for project to be completed as part of private development?
- Is the project site owned by the City or in the public right-of-way?
- Does the Priority List include a mixture of different scale projects in terms of project duration and costs?
- Does the Priority List provide for a mixture of Citywide Creek Master Plan goals to be met?

Creek Habitat Restoration/Enhancement projects:

- Benefit to special-status fish, wildlife and plant species
- Benefits to water quality
- Location of project relative to other completed restoration projects
- Maintenance access
- Provide connectivity in habitat (e.g. fish passage barrier or grouted concrete channel)
- Potential to provide mitigation credits

Parks and Open Space projects:

- Areas underserved for open space should receive priority
- Can it be developed as part of a private development project (time frame?)
- Does the project require acquisition of land or easements?

 Trails and Connections projects:

- Does the project connect and expand a system of trails and pathways linking neighborhoods with parklands, public facilities, schools, libraries, shopping centers and other community destinations?
- Does the proposed trail project provide a connection between existing trails?
- Would the proposed trail connect to regional (County) trails or key recreation destinations (e.g. Taylor Mountain Regional Park)?
- Is the project a priority of the Bicycle and Pedestrian Master Plan?

Water Quality projects:

- Would the project result in a significant benefit to water quality? (e.g. reduce water temperature, filter pollutants)
- Is there potential for the project to qualify as a storm water offset project or to provide mitigation credits?

Flood Protection projects:

- Projects that address flood conveyance in areas of high flood risk are given preference over flood conveyance projects in areas of lower flood risk.

5.3 Funding Sources

The Citywide Creek Master Plan will be implemented through funding such as grants and special appropriations programs – some requiring a local matching contribution; general funds of the City and County; redevelopment agency funds; bonds and special assessments;
mitigation for off-site projects; land donations and dedications; and construction of some improvements by developers as conditions for approval of their projects. Creek restoration funding allocated through the City storm water enterprise fund has been an excellent source of local matching funds.

Funding and financing sources include grants and technical assistance from federal, state, and local agencies, land transfer and assessments from benefiting property owners, and assistance from non-profit and volunteer entities. Funding for new, private, creek-compatible projects may occur through the normal private development process, guided by appropriate governmental regulations and possible financial contributions by agencies.

5.4 Partners for Plan Implementation

The creation of the Citywide Creek Plan involved many different partners, including citizens, private and public property owners, the business community, non-profit community organizations, the development community, elected officials, and federal, state, and local agencies. The implementation of the Plan will require a similarly cooperative approach.

Each partner involved with the implementation of a particular project can contribute. For example, agencies can work together to secure the appropriate regulatory approvals necessary to carry a project forward. Community organizations can provide information on a particular topic of interest or concern before, during, and after a project. Local businesses can take advantage of creekside locations for compatible uses such as creekside outdoor seating areas, and encourage improvements to the health of the creek by sponsoring creek walks/runs, caring for native plantings near their businesses, and supporting employee involvement in creek clean-up days. Developers can design their projects to accommodate and highlight the creek, creating a more livable and aesthetically pleasing community, contributing to higher property values.

Of special note are the volunteers that are the ‘eyes and ears’ of the creeks: the Creek Stewards. The Creek Stewardship Program was created by the Sonoma County Water Agency and City of Santa Rosa to provide organizational support to citizens who live, travel, and recreate along Santa Rosa’s creeks. The program offers the opportunity for interested members of the community to protect and enhance the creeks they enjoy. An informed, supportive, and proactive community strengthens desirable qualities such as wildlife protection and public safety while reducing problems such as illicit dumping, water pollution, illegal camping, bank erosion and growth of non-native invasive plants. Creek Stewards provide a vital link between the community and the governments and agencies responsible for the protection and care of creeks. Anyone who spends a little time along creeks can volunteer as a Creek Steward.

The Creek Stewardship Program is key to the successful implementation of the Citywide Creek Master Plan, since many of the project recommendations involve tasks that Stewards are already working on. Removal of invasive species and revegetation with native plants is essential to improving habitat for fish and wildlife, and keeping an eye out for new invasions helps to catch them early. Health and safety of trail users is improved by more use of trails by regular, aware, citizens reporting locations of illegal encampments to the Program Coordinator. Monitoring of restoration areas, education events, and light maintenance of trails all contribute towards healthier creeks and an integrated creek trail system.
5.5 Operation and Management of the Creek Trail System

The Creek Trail System is envisioned to be a very low maintenance facility consisting primarily of paved and unpaved trails and natural or naturalized vegetation areas. Potential management, maintenance, and repair tasks are outlined below as a guide for estimating the necessary staff and resources. Potential responsible parties for these tasks, depending on the location and maintenance agreements or arrangements, include:

- City of Santa Rosa Transportation and Public Works Department;
- City of Santa Rosa Recreation and Parks Department;
- City of Santa Rosa Utilities Department;
- Creek Stewardship Program, including coordination of volunteers;
- Sonoma County Water Agency;
- Sonoma County Regional Parks Department;
- Sonoma County Agricultural Preservation and Open Space District;
- Utility companies and others using service roads that are part of the Creek Trail System.

Facility Management. General management activities would include:

- Inspection of conditions and addressing general use issues.
- Coordination with user and interest groups, neighboring property owners’ associations, and individual property owners, residents and citizens.
- Active use management - Volunteer Creek Stewards, and other formal volunteer trail patrol groups, as well as informal groups, could share active management duties, potentially including:
  - Patrol and oversight of trail use; notifying violators about rules, and notifying Police about criminal activity.
  - Observation and reporting of trail conditions and issues.
  - Posting of signs, notices and information about changed conditions, events, etc.
  - General coordination with City staff, Water Agency staff, Regional Parks staff, etc. regarding trail management issues.
  - Emergency contact point for police, fire, etc.
  - Help coordinate volunteer clean-up, trail maintenance, weed management and replanting, environmental education, and special events.
  - Maintain a log of trail maintenance, management and coordination activities.
- Coordination with agencies, organizations, businesses, schools, churches, etc. with adjacent or overlaying property, facilities, or interests in the Creek Trail System.
- Coordination with schools and environmental organizations that may conduct environmental education activities, or low-intensity recreation activities such as nature walks and day camps.
- Law enforcement and fire protection - the City of Santa Rosa Police and Fire Departments or the comparable agencies in the unincorporated area will be directly responsible for addressing crime and fire safety issues.
Chapter 5. Implementation Strategy

**Maintenance.** Basic trail maintenance requirements would include the following tasks:

- Maintenance and minor repair of boundary fences.
- Annual mowing, trimming, and spraying of adjacent vegetated areas to keep the trail clear and manage fuel load for fire protection purposes.
- Conventional landscape maintenance of portions of the trail corridor that have formal landscaping.
- Cleaning of drainage culverts, inlets, and ditches.
- Minor repairs, painting, etc. on signs, benches, kiosks, artwork.
- Graffiti removal.
- Litter pick-up and emptying trash receptacles.
- Periodic sweeping of the paved trails.
- Maintenance and repair of unpaved trails, especially after storms.
- Periodic tree pruning and clean-up of branches and leaf litter.

**Repair and Replacement.** Staff or contractors will eventually be required to undertake the following types of repairs:

- Repair and re-surfacing of the paved trails/service roads (potentially shared with the Water Agency and utilities companies that also may use the trails as roads).
- Repair and re-grading of unpaved and dirt/soft trails.
- Replacement of signage due to age and vandalism.
- Repair and replacement of restroom facilities.
- Repair and replacement of light fixtures.
- Repair and replacement of entry structures, such as bollards.
- Repair and replacement of fencing.
- Repair and replacement of irrigation systems.
- Replanting of formal landscaping.
6. References

“We need to bring open space to the people, instead of expecting them to journey to find it. That’s where greenways are contributing.”

~ Gilbert Grosvenor, Vice Chairman, President’s Commission on Americans Outdoors, 1987
Santa Rosa Citywide Creek Master Plan

References


Caltrans, Highway Design Manual, Chapter 1000.


City of Santa Rosa, County of Sonoma, Sonoma County Water Agency, 1993. Santa Rosa Creek Master Plan. Santa Rosa, CA. September.

Committee for Restoring Santa Rosa Creek. 1990. Creek Dreams Revealed…an idea book. Santa Rosa, CA.


Institute of Transportation Engineers, 2002. *Innovative Bicycle Treatments.*


National Center for Bicycling and Walking (bikewalk.org)

Pedestrian and Bicycle Information Center (bicyclinginfo.org)


7. Appendices

“The rivers are our brothers. They quench our thirst. The rivers carry our canoes, and feed our children. If we sell you our land, you must remember, and teach your children, that the rivers are our brothers and yours, and you must henceforth give the rivers the kindness you would give any brother.”

~ Suquamish Chief Sealth, 1854
CITY OF SANTA ROSA

SANTA ROSA CREEK DESIGN GUIDELINES

OCTOBER 1997
SANTA ROSA CREEK DESIGN MANUAL

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Adopted by City Council - Resolution Number
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Chapter I

Santa Rosa Creek Design Guidelines Overview
I. SANTA ROSA CREEK DESIGN GUIDELINES OVERVIEW

A. INTRODUCTION
Santa Rosa Creek is the major waterway of the City of Santa Rosa. Early in the City’s history, the creek provided food and shelter for an abundance of wildlife and at the same time provided settlers with a good source of food and water. The creek also contributed to the City’s considerable natural beauty.

Over time, this natural beauty was increasingly threatened by development as urbanization pushed closer to the creek banks. By the early 1950’s Santa Rosa had grown to a point where the creek’s 56,000 acre natural drainage basin had been highly altered. These changes increased runoff and flooding became a concern to residents and business owners alike.

By the mid-1960’s, Santa Rosa Creek had been reconfigured through most of the urban core. About this same time many Santa Rosans were becoming aware that a major amenity was being lost. In 1988, planning for restoration of the creek took a major step forward when the Citizens for Santa Rosa Creek Committee was formed. The goal of the group was to plan total restoration of the altered portions of the creek and to protect the unaltered portions from further degradation. The results of the Committees’ work along with the city and county staff was the Santa Rosa Creek Master Plan.

The next step in restoring the creek was to secure funding sources. The Santa Rosa Creek Master Plan estimated that $55.5 million was required for restoration of the entire creek. The Santa Rosa City Council has authorized $5.6 million in the City’s 1995-1996 Capitol Improvement Program for the Phase I restoration project. Council further designated $3.5 million from the Prince family bequest to the City towards Phase I construction.

B. REGIONAL MAP

Photo 1
Construction of a concrete box culvert in Santa Rosa Creek for future City Hall site.
D. PLANNING AND ZONING

Design Objectives:
To promote & maintain diverse types of compatible land uses along the Creek Corridor that preserve & enhance the creeks natural environment while promoting public use for people of all abilities.

Refer to the City of Santa Rosa's General Plan, July 23, 1996, and the Zoning Ordinance, Revised July 1, 1995.
Chapter II

Design Guidelines
II DESIGN GUIDELINES

A. Design Guidelines Approach

The approach used in developing the Design Guidelines has been to emphasize the creek’s natural attributes while providing amenities necessary to make the creek accessible and inviting. A primary goal in this process is to create a healthy environment for native vegetation and wildlife. Along with restoration of the creek itself, the creek banks will be developed with multi-purpose paths for various recreational uses, a natural backdrop for adjacent residential and commercial uses, and educational opportunities for the community.

In order to create a consistent natural identity for the creek from its rural headwaters through the downtown corridor and out into the agricultural reaches in the Laguna de Santa Rosa, a palette of materials has been selected for incorporation into the design elements. Materials were chosen for their natural character, adaptability to various applications, aesthetics, and economic considerations.

Inherent in these Design Guidelines is a recognition that the creek traverses several distinctly different settings, from rural wooded reaches, through residential, urban, historic, suburban and agricultural zones. Therefore, a design theme has been established for consistency throughout the length of the creek while permitting adaptability to the unique characteristics of each location. Design considerations include the ability of selected materials to adapt to various conditions, the reinforcement of different site characteristics through unique styles of architectural detailing and the ability to withstand the effects of hand use and/or vandalism.

Stone masonry, “weathered” wood, and black powder-coated steel were selected for theme elements along the entire length of the creek. The Design Standards included in these Design Guidelines incorporate one or more of these materials into each element.

Some sections of the creek to undergo restoration will be funded, designed and constructed by the City. Other portions will be funded and built by developers, contractors, homeowners, and other private parties. Some improvements will be completed as part of major public works projects, others by adjacent land owners and still others by City maintenance workers over long periods of time. The essential component to the overall success of the creek restoration process will be to follow the standards, maintaining consistency of design, intent and quality throughout the entire creek corridor.

If development occurs as envisioned in these Design Guidelines, the result will be a pleasant, sustainable, environmentally sound, pedestrian-scaled creek corridor that stimulates a renewed interest in protecting the creek for the benefit and enjoyment of all future generations.

This design manual is composed of special design criteria and guidelines for development and restoration along the Santa Rosa Creek Riparian Corridor. These guidelines should be used as a supplement to the City’s General Plan, Zoning ordinance, Design Guideline Standards, Santa Rosa Waterways Plan and the Santa Rosa Creek Master Plan.

B. HOW TO USE THIS MANUAL

This manual breaks down various reaches of the creek, as described in the Santa Rosa Creek Master Plan, into three categories that reflect the predominate character and adjacent land uses found along the creek corridor:

Urban Reaches
Rural Reaches
Natural Reaches

(See figure 3, Reach Index Map, pages 9 & 10)
In all three categories, the intent of this manual is the following:

- To develop basic standards and guidelines that promote the input and creativity of different consultants (Landscape architects, designers, architects, planners, artist and engineers), businesses, community groups and residents to develop a cohesive final end product and community treasure.

- Improve the aesthetic value of existing and adjacent land uses.

- Guide new development to restore the natural creek environment and incorporate the creek into the project site as an amenity.

- Provide a common goal for development, so that as construction occurs in phases it will serve to unify and give identity to the creek environment. The result will be development that is a cohesive asset to the community.

- Promote the unique character and 'sense of place' of various reaches of the creek and their historical significance, while maintaining continuity of design.

- Maintain continuity and simplicity with construction materials, forms and site furnishings and encourage creative design solutions for development along the creek.

Urban Reaches
This designation refers to areas along the creek corridor (Reaches C, D and E) that are adjacent to the downtown area, or in areas where future commercial development offers the opportunity to integrate commercial uses with creek restoration. One example is the Grace Brothers Site at Third Street and Wilson, the future Hotel/Conference Center location.

Rural Reaches
This designation refers to areas along the creek corridor that are adjacent to rural and agricultural land uses: Reaches F and G. These reaches and areas extending to the Laguna De Santa Rosa, offer the opportunity to restore and enhance previously engineered waterways into self-sustaining natural environments.

Typical uses in this area would be multi-purpose trailheads, recreational and wildlife facilities, and wetland restoration and enhancement. Visitors could access various points for viewing wetland wildlife, bird watching at the delta pond (which stores recycled water for irrigation) and exploring wetlands.

These types of concentrated development facilities would enhance the educational aspects of the creek and be compatible with adjacent farming and agricultural land uses.

Natural Reaches
This designation refers to preservation reaches of the creek: Reaches A-East, A-West, and Reach B. Development in these areas would be primarily limited to ecological enhancements of the natural creek environment. Enhancements would include removal of introduced landscape plants (Ivy, Himalaya Berry) and replacement with native species, pool restoration (cold water fisheries) and ecologically sensitive erosion control (wattling).
Reach Index Map

(Source: Santa Rosa Creek Master Plan)
There are two trailside parks that are planned for Reach A-West: Mission 2000, east of Mission Blvd., and Flat Rock Park at the confluence of Santa Rosa Creek and Brush Creek. Flat Rock Park is the location where it has been suggested that, Rosa, a Native American girl, was baptized, thus our City name Santa Rosa.

1. SITE PLANNING

Design Objective: To encourage creek compatible development and rehabilitation of existing land uses along the street and the adjacent creek corridor, promoting public use of the creek and preserving and/or enhancing the natural creek environment.

Creek Interface

1. Development of plans along the creek corridor shall be designed to preserve and incorporate the creek as an asset into the development.

Commercial Site Layout and Setbacks

(See Figure 4 & 5, pages 12 & 13 )

1. Commercial development must utilize a site plan that orients development, views and outdoor spaces to the creek corridor.

2. Buildings shall be laid out to maintain and promote views to the creek from adjacent properties.

3. Outdoor spaces shall be designed with landscaped pedestrian links and bike paths to creek trails.

4. Provide site furnishings such as bike racks, signage, benches, public art, and lighting to accentuate the trail, the business and public access.

5. Consolidate trash, recyclables, utility and loading areas on the site and incorporate into architecture. Avoid visibility from the creek of such accessory structures.

6. Provide a buffer and screen between conflicting adjacent land uses, using architectural elements or landscape materials.

Commercial Parking and Vehicular Circulation

1. With the predominate views being the street frontage and views from the creek corridor, parking should be consolidated to the sides of the parcel and screened from off-site views.

Photo 4
A commemorative landmark to the Native American Indians located at the intersection of Brush Creek & Santa Rosa Creek.

The creek also passes the Carrillo Adobe and Native American site. This is an historically significant site with great archeological and cultural value. It is recommended that this area be provided with park-type amenities (benches, signs, trails, etc.) that preserve and enhance the historical and archeological character of the site.

Photo 5
Carrillo Adobe now housed by a structure to protect the deteriorating clay brick from the weather.
Small Lot Commercial Planning

Figure 4

Screen service areas from views from the creek and the street. Incorporate into the architecture.

Coordinate tree and landscape placement with existing landscape.

Use grade changes and plant materials to screen views from the creek pathway.

Creek setback

ACCESS NODE:
- Increased width of pathway for safe circulation.
- Change in paving material to define space.
- Introduce site furnishings (Benches, Bike racks, and Signage).

Create interior & exterior pedestrian links to the creek.

Adjust building layout to preserve existing trees and landmarks.

Use grade changes and plant materials to screen views from the creek.

Notch building to maintain views from existing uses.

Trellis Structure: To accentuate the building entry and to provide protection from the weather.

Outdoor Seating / Plaza oriented towards creek.

Hard surface multi-use pathway.

Soft surfaced pathway.

Sculpture or interpretive sign.

Low water crossing

ACCESS NODE:
Large Lot Commercial Site Planning

Figure 5

- Terraced or hanging gardens with interactive water features to drown out the road noise.
- Low water crossing
- Santa Rosa Creek
- Multi-use path
- Creekside vendors and open air plaza
- Accentuate guest entry with architecture and strong pedestrian links.

Outdoor cafe and fountain and mobile vendors (such as florist, snacks, and toys)

Water features, art, and plaza that link pedestrian access from street, through project, to the creek.

Meandering sidewalk with maximum landscape buffer from roadway.

Architectural landmarks visible from Hywy 101 and surrounding area.

Plant materials that reflect the "sense of place" and the architectural style.

Linear creek connector with water features, plaza, and pedestrian access.

Project signage incorporated into the corner entry feature.

Public transit stop

Outdoor cafe and fountain and mobile vendors (such as florist, snacks, and toys)
2. Promote the opportunity to consolidate side parking areas between multiple parcels through the use of easements. This would free up more area for parking, landscaping, and outdoor spaces. Common entry drives for this type of parking would also limit the amount of driveway ingress and egress.

3. Avoid parking conflicts by providing designated employee parking areas.

Commercial Pedestrian Circulation
1. Develop strong pedestrian links to commercial entrances from parking areas and creek trails for people of all abilities. Weatherproof awnings and canopies are encouraged for these links.

2. Use architectural features, plantings, and special paving materials to aid in defining entrances.

3. Enhance pedestrian activity along the creek and at business entry points by widening trail width and providing additional site furnishings or extension of building architecture (trellis, waterproof awnings, etc.).

4. Use canopy trees to shade outdoor spaces and paths of travel. In hardscaped areas use 4' square minimum tree wells with grates or granite square cobbles with root aeration tubes and irrigation systems to promote healthy growth and longevity.

Residential Site Layout and Setbacks
1. Refer to Chapter 20-05, Article 3.1 of the zoning code for creekside setback requirements.

2. The layout of the streets must be oriented to the creek (examples shown in figures 6, 7, 8, & 9).

3. Site and street design shall orient buildings toward the creek or toward paths, entrances, or open spaces that lead to the creek.

4. Integrate natural site amenities such as trees, rock outcroppings, and unique views into the site design.

5. Limit grading adjacent to the creek corridor to minimize loss of riparian habitat or vegetation and soil erosion.

6. Encourage natural surveillance and security by providing visibility from buildings to problem areas along the creek. Locate common areas along the waterway where they can be viewed by residents.

7. Promote rear yard open wire fencing with landscaping to maintain desired views to creek. Screen undesirable views with solid fencing and landscaping.

Residential Parking and Vehicular Circulation
1. Orient streets to preserve creek views and create access to waterway for as many residents as possible.

2. Use streets as a buffer between private property and public access. Encourage off-street parking in these areas. Where on-street parking is necessary, consolidate parking to areas that are not visible from the creek.
3. Other examples of street layout patterns that can achieve this objective are from the City of Santa Rosa Waterways Plan, as follows:

**Parallel or Waterway-Frontage Street**

The waterway or parallel-frontage street is the preferred approach for placing streets along waterways. The placement of the street and the orientation of the buildings protect privacy by providing clear transitions between public and private space and offer a high degree of surveillance. A hard curb prevents vehicle encroachment and tailgate dumping. (See Photo 7, below and Fig. 6 page 16)

**Radial Design:**

Coordinated with parks and other common space, this approach promotes views of specific neighborhood entrances to the waterway area. This design concentrates access in areas of high surveillance, and identifies the neighborhood with key natural features visible from neighborhood avenues. (see Figure 7, page 16)

**Alternating Loop:**

This design minimizes exposure of backyards to public spaces along the waterway. Access is available along street frontage, with good surveillance of sections of the waterway. Pedestrian corridors between residences and the waterway can be established in neighborhood linear parks, providing view corridors. (see Figure 8, page 17)

**Extended Cul-de-sacs:** This approach uses common space as a buffer to side and back yards, and provides clear surveillance of the point of entry. Cul-de-sacs may be desirable when natural features or channel characteristics prevent the construction of a street parallel to the waterway. They provide linkage and access to creek pathways. (see Figure 9, page 17)

**Residential Pedestrian Circulation**

1. Orient development to provide primary all weather access points/paths to the creek that preserve and emphasize the natural site amenities, while creating passive recreational areas.

2. Provide secondary access points that work with the development of circulation patterns and decrease distances required to walk to access creek corridor and improve neighborhood surveillance.

3. Provide pedestrian amenities, such as shade structures, benches, drinking fountains, trash receptacles and landscaping that accentuate entry points.

Promote road widths that are proportional to the traffic volumes. Create a stronger visual connection to the creek with appropriate site furnishings.
Parallel or Waterway Frontage Street

Figure 6 Locate access points at preserved natural features or landmarks (Rock outcrops or native trees).

Orient houses toward open space and creek for natural surveillance.

(E) Native trees

Pedestrian access combined with utility easements allow for pathway, fencing and landscaping to maintain home owner privacy.

Public street.

Multi-use pathway.

Trellis covered patio with site furnishings for creek users and local residents.

Common open space for residents and creek users.

Radial Street Design

Figure 7 A pocket park, designed to preserve natural site amenities (trees, rock outcroppings, or areas of historical significance). These parks can also identify the neighborhood and promote a sense of pride.

Fences

Tot lot

Heritage tree

Pedestrian linkage between two neighborhoods.

Surveillance is accomplished by road location, adjacent houses oriented toward creek and as a corner lot with only two sides fenced.
Alternate Loop Design

Figure 8

- Private rear yards
- Storm-water energy dissipaters with water falls, pools, & boulders.
- Trail/pathways
- Low-water crossing.

Planning & Development shall preserve and enhance Unique Site Features:
- Rock outcropping.
- Heritage Trees.
- Man-made elements.
- Sculpture/Art.

Building layout creates a view corridor to the Creek.

- Layout minimizes exposure of backyards to the Creek.
- Preserve existing trees.
- Building orientation & access along street frontage provides good surveillance of waterway.
- Develop linear parks between buildings to buffer views & create view corridors to the Creek.

Extended Cul-de-Sac Street Design

Figure 9

- Multi-use path.
- Pedestrian and bike path.

Use common space to provide access to creek and buffer between pathway and side yards.

Locate roads and lots to preserve unique natural site features.

Create open views to creek.

Trellis and site amenities.

SANTA ROSA CREEK DESIGN MANUAL
2. GRADING

Design Objective:
In accordance with Section 2 of the Santa Rosa Waterways Plan, provide minimal grading as required in creek channel, on banks, and top of slopes, while protecting and restoring the native riparian environment and natural site conditions.

General Recommendations

1. To the greatest extent possible grade to restore natural stream processes.
2. Increase hydraulic capacity of creek where necessary.
3. Prepare re-vegetation and erosion control plans for all graded and disturbed areas to prevent sedimentation of low flow channel.
4. Grading operations and construction in all creek reaches shall be phased to avoid construction during the wet weather season.
5. Protect and preserve all healthy native trees as per tree ordinance. When grading for hydraulic capacity requires removal, mitigate all tree removals with replacement of appropriate native species. Refer to City tree ordinance. (Chapter 17-24)
6. Create a vegetation and tree protection plan to preserve the greatest amounts of native vegetation while meeting Creek Channel Design criteria.

Natural Reaches

1. Mechanical grading in these reaches shall be limited to areas outside the required creek setback, with construction implemented so as to protect and preserve the natural site conditions.
2. Minimal grading will be permitted to construct multiple use paths and crossings and low water crossings in reach 'A' west. Mechanical grading should be limited to the smallest piece of equipment reasonable to reduce potential impacts (erosion, sedimentation, soil compaction and loss of vegetation).

Rural Reaches

1. Creek restoration and grading in this reach could include increasing channel width by up to 100' and relocating one or both levees away from the creek to create a naturalized meandering creek pattern.
2. Mechanical grading in these areas shall focus on limiting the areas of environmental impact and providing appropriate mitigation measures to restore the natural creek environment.
3. Where one multi-use soft surface and one multi-use hard surface path are required on one side of the creek, grading should provide a vertical grade separation between paths. Locate the soft surface path closer to the creek.
4. Limit slope of channel banks so as not to exceed 3:1 slope. Slopes flatter than 3:1 are preferred. In areas where the creek channel width does not allow for this degree of slope, engineered terraced walls and vegetative wall systems shall be incorporated into the design to maintain desired hydraulic capacity.
5. Grading operations shall be confined to smallest work area possible for construction of multiple use and low water crossings.

Urban Reaches

1. Provide grading operations as needed to increase channel hydraulic capacity. Restore the creek's native riparian flora and fauna and provide public access for persons of all abilities.
2. Creek restoration in these areas involves increasing channel hydraulic capacity, removing existing rip-rap, laying back or constructing planted crib wall on the south bank, and stepping back the north bank with a series of terraced retaining walls for multi-use, pedestrian and maintenance paths.
3. The greatest amounts of earth retaining will be required in these urban reaches to obtain the desired creek cross section.

4. A low flow channel shall be re-routed and directed through a culvert of appropriate size during grading and construction operations. This will allow fish to migrate up or down stream and reduce sedimentation down stream. A culvert shall extend past the limit of work zone to allow equipment and workers to cross the creek without disturbing water quality.

3. CREEK CROSSINGS

Design Objective:
To identify and enhance the significance of the creek greenway, its native vegetation and unique characteristics. To make the creek more identifiable and accessible from streets.

Vehicular Bridge Crossings
1. Emphasize the creek greenway as it crosses existing vehicular bridges.
2. Use creek logo and signage, pilasters and railings, lighting, natural vegetation patterns and unique characteristics of each particular creek reach to identify creek crossings.

3. Replace existing asphalt on bridges with special paving to reflect the creek’s water direction and serve as a visual reminder of this amenity.
4. Provide elements under bridges or on walls that create a human scale. Incorporate murals or etchings onto plain walls to reduce graffiti and provide a sense of community involvement and pride.

Photo 9
Create a user friendly entrance and identify the creek crossing through the use of logo & signage, lighting, seating & landscaping.
Multi-use Path & Bridge Crossing

Figure 11

- Textured paving
- Provide crosswalk where under-crossings are not feasible.
- Creek entry sign
- Bench
- Stone walls function to provide pedestrian oriented disabled access and improve aesthetics of entry points.
- Open metal railings for visual access.
- Creek overlook.
- Selectively cleared existing vegetation to increase visual access to creek.
- Creek entry point.
- Vehicle access gate with accent paving.
- Stone or concrete pilaster with postmounted street light fixture.
- Stone pilaster with pole mounted light fixture.
- Creek entry sign.
- Creek overlook with interpretive sign.
- Disposed and bicycle access.

Multi-use and Bridge Crossing Section A

Figure 12

- Textured concrete paving to accentuate creek amenity.
- Fencing that matches "bridge railing details.
- Informational & directional sign.
- Creek filling.
- Median plantings.
- Creek overlook with interpretive sign.
- Creek entry sign.
- Planted and irrigated containers.
5. Create pedestrian overlooks or view platforms on bridges that promote views into creek zone.

6. Break formal street tree plantings into more informal natural vegetation patterns using riparian plant species at road crossings to draw attention to the creek greenway.

Multiple-use Path Crossings

1. Multiple-use crossing shall provide safe high water crossings and year round barrier free access at selected locations along the entire continuous length of the creek.

2. Crossings shall be located to provide a safe visual sight distance for bicyclists, pedestrians, equestrian, and vehicular traffic. Locate multiple-use crossings in areas where a node in the pathway system can be accommodated to allow for benches, drinking fountains, lighting, trash receptacles, and stacking of users to maintain a safe passing condition for other trail users.

3. Crossings should be a minimum of 8’ wide and handle the loads of pedestrians, bicyclists, and small emergency and maintenance vehicles.

4. Provide long spans between supports to minimize the obstruction of flood waters.

Materials

1. Bridges for multiple-use crossings shall be constructed of materials that are compatible for that specific reach of the creek.

2. Wood, metal, masonry and concrete (or a combination of these materials) are appropriate materials for bridge construction in the rural and urban reaches. Continuity of design is important.

Bridge Under-crossing

1. Bridge under-crossings are the preferred method of crossing roadways.

Photos:

Photo 10
Pedestrian overlook platform on bridge.

Photo 11
Locate multiple use pathway crossings in areas with sufficient space to allow for a safe vision triangle, appropriate site furnishings, landscaping and stacking of users.

Photo 12
Existing pedestrian overpass on Hwy 101.
2. Under-crossings reduce potential conflicts between trail users and vehicles at points where creek pathways cross existing roadways.

3. Multi-use paths shall dip down from top of bank into creek channel and join the pedestrian path to safely pass under vehicular bridges.

4. During storms with high water levels path users would be directed by signs to the nearest location of a safe street crossing.

5. In areas where site conditions prohibit under-crossings, disabled access users must be able to cross at street level as directed by signage.

6. Provide under-crossing railing in areas where required by the ADA or Uniform Building Code.

---

**Low Water Crossings**

1. Low water crossings shall be provided for safe, pedestrian-only trail links during low water periods.

2. Locate crossings in response to circulation patterns, based on land uses or unique creek features where people gather and crossings are desirable.

3. Crossings shall be designed to allow low water flows and sediment/bedloads to pass and be secure enough to withstand the velocity of high water flows. Set top of pavers at least 4" above low water flow elevation.

4. Provide site furnishings around these areas to promote gathering points in close proximity to the creek. Furnishings could include; seatwalls, shade structures, benches, steps and signage.
Materials

1. In rural and natural reaches low water crossings shall be constructed of wood, stone or other natural materials and securely anchored to channel bed.

2. Examples:
Stone columns (18" diameter X 6' long) set vertical into channel bed. Brooks quarry, Windsor, CA.
Crossings may be natural or concrete or square granite blocks (approximately 2'X2'X2') and securely anchored to channel bed.

If a concrete crossing is preferred, add tan or black coloring additives, and press large native riparian tree leaves or ferns into the top finished surface of stepping stones, to leave an impression and provide a textured safe walking surface.

ARCHITECTURE

Design Objective:
To create standards for building development adjacent to the creek resulting in architecture that is complementary to the natural environment of the creek.

Commercial Buildings

1. Buildings shall be oriented toward the creek with pedestrian connections provided from creekside paths to individual buildings located along the creek.

2. Buildings shall be sited and designed to take advantage of creek views. Views from adjacent properties toward the creek must be maintained through the use of notched corners or building setbacks.

3. Multi-story buildings must be stepped back from the creek. Single stories only are permitted directly adjacent to the creek. Buildings over three stories must have a minimum of three "steps" rising from a single story at the creek edge.

4. Permanent screening integrated into

Photo 15
Multi-story buildings shall step back from the creek.

Photo 14
Natural impressions in concrete.

5. Building architecture should enhance the pedestrian use of the creek with pedestrian-scaled architectural elements on the side facing the creek. These elements could include recessed entries, arbors, display windows, awnings and signage as appropriate to the use of the building. Large areas of blank exterior walls are undesirable.

6. Outdoor spaces between the creek and buildings facing the creek are required. Outdoor space must be equivalent to a minimum of 5% of the building’s street level square footage. Outdoor space may be in the form of a terrace, patio, yard, balcony or other usable space. Views to the creek must be provided from the outdoor space.
7. Use of landscaping between buildings and the creek should complement plant materials used in the creek greenway. Use of native riparian species is recommended. Trellises, arbors, hanging gardens, rooftop gardens and other landscape elements are encouraged.

8. Architectural colors and materials must complement the creek environment. Strong or dark colors are prohibited, as well as reflective finishes. The use of subdued, natural materials and colors is encouraged.

5. SITE FURNISHINGS
Design Objective: To provide attractive, durable site furnishings which promote the use of the creek without detracting from the natural appearance of the creek and surrounding area.

Residential Buildings
1. Residential buildings must be sited and designed to provide views and access to the creek.
2. Multi-story buildings must be stepped back from the creek. Single level stories only are permitted directly adjacent to the creek.
3. Balconies, terraces, rooftop gardens, arbors, yards and patios with views to the creek are encouraged.
4. Landscaping materials must be complementary to the creek environment. Use of native species is recommended.
5. Trash and storage areas must be completely screened from views from the creek corridor.

Benches
1. Benches are to be placed in all reaches: urban, rural and natural.
2. Benches shall reinforce the character of each section of the creek, see City Standard 113. Locate benches strategically to reduce obstacles in circulation patterns.
3. Locate multiple benches in areas where people gather and single benches in places of solitude or special interest.

4. Benches can be the tops of low retaining or seatwalls 14"-18" tall, can aid in defining a space, or can be large boulders strategically placed.

Trash Receptacles

- Incorporate trash receptacles and recycling containers into architectural elements (walls, fences, arbors) to simplify the number of site furnishings and reduce the visual impact.
- Locate receptacles at appropriate areas where people gather, in proximity to vendors/restaurants and at strategic points along the creek.
- In areas where receptacles must stand alone. (See city standard 117).

Bicycle Racks

1. Bike racks are to be placed in all reaches: urban, rural and natural, see City Standard 115.
2. Bike racks shall be located at major points of entry, major creek crossings, major points of interest, trail heads and trailside parks.
3. Locate in visible areas for security and out of the main flow of traffic.

4. Bike storage lockers are not recommended along the creek, but may be utilized at trailheads and trailside parks with proper screening and plantings.

6. CONSTRUCTION MATERIALS

Design Objective:
To select complementary materials that maintain a natural, rural, or urban character based on unique site characteristics and geographic location along the creek.

Design Criteria

1. Material colors shall be compatible with all reaches of the creek and shall be greens, black and earth tones.
2. Selection of materials shall address maintenance costs or repairs and resistance to vandalism.
3. Furnishings shall be selected to be compatible with each reach of the creek, whether natural, rural or urban.
4. Finishes shall be resistant to vandalism, easy to maintain or repair and durable to withstand the elements (sun, rain and time).
5. Furnishings shall be located at points of entries or along the creek corridor to help define nodes, points of interest and crossings.
6. Furnishings such as telephones and trash enclosures/receptacles shall have a subdued appearance and be incorporated into architectural elements (trellis, fences or walls) to reduce their visual impact. (see figure 17)

7. Metal may be used if the finish color is complementary to the site character. In most situations this would be dark greens, or black finish colors. Galvanized finishes are not appropriate.

8. Use of reflective materials (mirrored glass or glossy finishes) is not permitted.

Natural Reaches
1. These sections of the creek greenway are considered preservation reaches with some ecological enhancement.

2. Materials in these sections of the creek shall reflect the natural and native creek environment.

3. Man-made elements (walls, benches, paths, railings, etc.) shall be constructed of wood, stone, earth or other natural and native site materials.

Rural Reaches
1. Restoration in these sections includes removal of existing rip-rap and revegetating with native riparian species.

2. Materials in these sections of the creek shall reflect the rural creek environment and adjacent agricultural land uses. Materials must complement those used in other reaches of the creek.

3. Materials must be easy to maintain, long-lasting, and reinforce a rural site character.

4. Man-made elements (walls, trash receptacles, fencing, and benches, etc.) shall be constructed of metal, wood, stone, or concrete. Masonry block and brick are not appropriate for this reach.

Urban Reaches
1. These sections of the creek are located in and around the commercial core of the City, (downtown and Railroad Square). Restoration in these reaches include removing existing grouted rip-rap, replacing southern bank with engineered vegetative crib wall system, and stepping north bank with retaining walls allowing for various pathway systems.

2. Selected materials must integrate commercial uses with restored creek environment.

3. All materials and finishes shall reinforce the unique local, cultural, environmental and/or historic site characteristics.

Historic Railroad Square:
1. Material selections and design of commercial development west of Highway 101 should emphasize the historic character of old Railroad Square.

2. Materials and forms characteristic of this area include antique style light posts, quarried and cut stone blocks or pavers, grid-scored concrete, ornamental wood or metal railings, fences and late 19th century and early 20th century architectural detailing.
City Commercial Core:

1. Construction materials shall be selected to be compatible with the commercial district as well as to integrate with materials from other reaches of the creek.

2. Construction materials shall be metal, wood, stone, brick, concrete or other appropriate materials found in the commercial core.

3. Materials shall reinforce the urban character of the commercial core and emphasize the natural creek character. For example, a commercial use with a creekside plaza along the greenway could have retaining walls that combine urban and natural materials. It could be a combination retaining wall/seatwall for a patio/plaza constructed with native stone veneered stem wall and a concrete pre-cast seat cap. In this case, the natural stone-veneer is compatible with the creek while a concrete seatwall cap could be complementary to the architecture or patio finish.

7. PATHWAYS

Design Objective:
To develop a trail system that provides access to all reaches of the creek and is a link between other local and regional trial systems. Trails shall be constructed to standards appropriate for use, site conditions and safety, and shall be environmentally and aesthetically sensitive.
Pathway Sections

Figure 18

General Recommendations

1. Paths within the low flow channel shall not be surfaced due to exposure to annual flooding and washout.
2. Paths must comply with Title 24 Standards and the American Disabilities Act for Barrier Free Access.
3. Select materials that reduce maintenance costs. Locate paths at various elevations to reduce potential for washout.
4. Layout paths to preserve safe sight distances to meet requirements of intended user groups and to be environmentally and aesthetically sensitive to topography.

Multiple-use Soft Paths
(8' width minimum)

1. Provide paths to serve pedestrians, equestrians, and bicycles.
2. Accommodate E.V.A. and maintenance vehicles in reaches D-G.
3. Locate in creek channel above 2-year storm water level to reduce potential for washout or locate on top of bank.
4. Provide accent paving at entry points, such as where pathway intersects public roadways or another pathway.

Acceptable Materials:
Decomposed granite, crushed and compacted rock, wood chips, and earth.

Multiple-use Hard Paths
(8' width minimum, with 2' shoulders)

1. Provide barrier-free access for people of all abilities.
2. All-weather surfaces shall be constructed of smooth, hard, all-weather material.
3. Provide pull-outs or nodes for seating and gathering at special points of interest and where site conditions favor this use.
4. Locate path outside the riparian zone to minimize impact on fish, wildlife and vegetation, except at bridge under-crossings.
5. Provide a 14' minimum height clearance from finish grade.
6. Where existing or natural structures prevent the multiple use path from being located outside the riparian zone, it may be located on the channel bank for a short period (providing there are no environmental impacts or they are fully mitigated).


Natural Soft Path
(4' width minimum)
1. Locate near creek above 2-year flood level wherever possible to reduce washout repairs and maintenance costs.
2. Provide at least 8' minimum height clearance from finish grade.
3. Create areas along path for pedestrian amenities (tables, benches, drinking fountains) and creek access based on site conditions, points of interest and low water crossings.

4. Steps, where required, shall be constructed of stone, wood or other natural material that is appropriate to the particular reach of creek.

5. Acceptable Materials: Stone, earth, wood chips or other appropriate, natural materials

On-Street Connectors
1. These connectors consist of class 1, 2, and 3 bicycle routes as designated by the General Plan or by a Bicycle Masterplan.
   • Class 1: Separate, off-street paths or trails.
   • Class 2: On-street, but separated from motor vehicles by lane marking.
   • Class 3: On street and only designated by signs.
2. Provide creek signs and logo where connections intersect greenway.
Cantilevered Boardwalk Path (4' width minimum)

1. Locate at all points along the creek where conditions make it undesirable to have a path on bank (such as steep banks) provided there are no environmental impacts or they are properly mitigated.

2. Wood or metal cantilevered boardwalks or pier-supported decking and railings should be designed to minimize hydraulic impacts and maintenance. These types of paths would most likely occur in reaches A, B and C.

2. The logo appears on entry point signs, directional signs and informational signs. Additionally, the logo will appear on pamphlets, stationary, and other appropriate uses. See City Standards 118.

8. LOGO

Design Objective:
To create a graphic image of the Santa Rosa Creek for use on signage, pamphlets, stationary, etc.

Description
1. The logo is an abstracted symbol of a linear waterway.
9. **CREEK SIGNAGE**

**Design Objectives:** Entry point signs will create a strong visual marker for major access points to the creek and road crossings. Informational and directional signs will convey the required information while blending into the natural environment. Signage will be consolidated and minimized to the greatest extent possible. (See Figure 20, page 30)

**Entry Point Identity Signs**

1. The entry point sign was designed as a vertical element located at the curb in order to maximize its visibility, minimize obstruction of views from the road to the creek, and to fit within the limited spaced available at entry nodes. The design allows the sign to be viewed above automobiles parked at the curb and to fit in with other vertical streetscape elements (street lights, street signs, telephone poles, etc.).

2. The entry point sign is a hollow bronze column on a concrete base.

   The base incorporates a pathway light on two sides. The logo is cut out of the column and lined on the inside with white plexiglass. Internal illumination, will radiate the logo during the night. On the two sides of the column perpendicular to the street the creek logo is displayed. "Santa Rosa Creek" appears on the side of the column directly facing the street, and the street crossing name appears on the opposite side facing the trail. See City Standard 110.

**Informational Signs**

1. Informational signs include signs on educational, historical or environmental topics and on user regulations. Sign information shall be condensed as much as possible. A minimal number of signs will be erected. Signs will be located near entry points and in areas not blocking views or circulation paths to the creek.
Directional Signs

1. Directional signs include traffic signs and signs denoting pathway uses. The location of the signs is dictated by their use. These will be stamped 4"x4" square aluminum signs, blue images on a black background, attached to 6" X 6" wood posts. See City Standard 111B.

2. Images for these signs shall be universally recognized symbols which communicate graphically, quickly, and distinctly, the information needed by people in the creek corridor. Use symbols developed by the U.S. Department of Transportation or the A.D.A.

10. TRAILHEADS AND TRAILSIDE PARKS

Design Objective:
To develop trailheads and trailside parks that act as a public access or gathering point to enhance the recreational aspect of the creek greenway.

Trailheads

1. Trailheads shall be designed to enhance the image of the creek greenway and provide public access.

2. Trailheads must blend in with surrounding community character, maintain privacy of adjacent land uses, and be clearly identifiable from the road.

3. Trailheads may contain all or some of the following features:
   - Parking (25 vehicles and horse trailers maximum)
   - Creek logo and signage
   - Interpretive displays
   - Restrooms/Water
   - Picnic facilities
   - Trash receptacle
   - Earth berms
   - Irrigation and landscaping

4. Screen views of vehicles and horse trailers from road and conflicting land uses with earthen berms and low maintenance landscaping.

5. Plant trees to shade parking lot, cars, and people spaces/picnic areas.

6. Provide all-weather surface for parking areas, lanes of travel, and disabled parking.

Trailside Parks

1. Trailside parks shall be located and designed to enhance the image of the creek corridor and provide public access.

2. Depending on the location along the creek, the trailside parks should emphasize a 'sense of place'. These improvements shall reflect significant historical, archeological and cultural aspects of the site, (for example, Native American Indians, early settlers, Carrillo Adobe, and agrarian ancestries).

3. Trailside parks may contain some or all of the following site furnishings:
   - Trellis
   - Benches
   - Tables
   - Trash receptacles
   - Historical/interpretive displays
   - Drinking fountains
   - Disabled access
   - Parking

4. Provide architectural or vegetation buffers between parks and adjacent non-compatible land uses.
Hall Road Trail Head

Figure 24

- To Creek Corridor.
- Preserve healthy existing native trees.
- Open split rail fencing and gate to control access.
- Provide a separation between horse & pedestrian traffic.
- Interpretive display.
- Restrooms with visibility from the road.
- EQUESTRIAN LANDING. Separate horse & trailer parking from pedestrian/vehicular parking.
- Maintenance access/parking.
- Berms and evergreen trees to screen conflicting land use.
- Hall Road
- Gravel Drive
- Picnic and lawn areas.
- Public transportation shelter.
- Creek logo and signage.
- Hall Road Trail Head
- Asphalt Drive
- Two vehicle access points.
- Two vehicle access points.
5. Use appropriate low maintenance native and ornamental plantings. See Section 12 and figure 26 for a list of recommended plant materials.

6. Plants that reinforce specific cultural and historical characteristics may be used in areas deemed appropriate by the City.

7. Provide park identification signs that are visible from trails along the creek or the nearest road access point.

8. Vehicle access shall be provided for maintenance and patrol personnel.

11. LIGHTING

Design Objective:
To provide adequate pathway illumination for safety and evening use of designated sections of the creek. All light sources must include the following:

- Light sources shall be shielded, louvered or cut-off, to prevent direct glare from affecting pedestrians or vehicular traffic.
- Light sources shall not be visible from adjacent land uses.
- Illumination should focus on architectural elements or highlighting trees and vegetation rather than the pathway.

Rural and Natural Reaches

1. Lighting in these areas shall be avoided. Any lighting shall be limited to trailheads and trailside parks, points of access, or areas with security concerns.

Urban Reaches

1. Lighting in these areas shall be subtle in nature while providing adequate illumination for safety and security.

2. Existing cobra head street light on bridges and roadways that have a direct relationship with the creek corridor shall be relocated or replaced with a pole-mounted light fixture or Santa Rosa Creek entry sign to maintain continuity of the creek corridor.

3. In areas where people gather or at access points, lighting shall be sufficiently located to safely illuminate these areas with fixtures that are scaled for pedestrians. These areas shall be illuminated along the walkway. Use traditional wall mount, or single or twin-mounted lights on post.

4. Light fixtures with banners can be included for a festive or seasonal atmosphere. See City Standard 112A.

5. Pathway lighting shall be such that it illuminates a safe lane of travel for pedestrians with the minimal number of fixtures. Locate these lights uniformly along paths, at steps, grade changes, intersections and elsewhere as needed to provide a safe pathway. See City Standards 112B.

6. In areas with walls or architectural elements that require lighting use a wall niche light to replace the bollard type pathway light. See City Standards 112C. This will reduce the amount of clutter and simplify the number of amenities along the trails.
12. LANDSCAPING AND PLANT MATERIALS

Design Objective:
To restore and create a creek corridor that reflects the native character of the creek, complements adjacent land uses and enhances environmental conditions in and along the creek for wildlife and the community.

Planting Zones

1. Riparian creek area - use native plant revegetation schemes.
2. Road/bridge crossings - emphasize the significance of the creek at street level, with informal planting concepts in masses.
3. Major arterial and City gateway entry points - emphasize the significance of the creek and gateway to Santa Rosa with formal planting concepts.
4. Creek-oriented commercial areas - combine compatible native and ornamental plantings to provide a transition zone.
5. Pathway nodes or intersections - combine natural and informal planting concepts to reinforce a 'sense of place' unique to that section of the creek.

Recommendations

1. Ecological planting zones: plants must be horticulturally compatible with proposed location. Select native plants that will be designed and installed into zones which match their tolerance of the different moisture levels.

(See Figure 26, 27 on page 37 & 38)
2. Respect hydrological zones: these zones are where planting schemes must comply with the hydrological capacity of the channel and long term maintenance needs for maintaining a low flood hazard potential (see Figure 26 & 27, Hydrological Zone B-1, B-2).

3. Create a 'sense of place' at entry and access points.

4. Control bank erosion and reduce sedimentation of creek channel.

5. Remove introduced plants (ivy, locust, etc.) and replace with native species.

6. Provide shade canopy from tree plantings along creek, especially on the south side of the creek.

7. Use native plants that restore riparian woodland and wildlife habitat.

8. Locate and select plants based on their ability to survive when planted in appropriate hydrologic planting zones.

9. Plants must have low maintenance, disease and pest resistance, and drought tolerant characteristics.

10. Maintain safe sight distances for vehicles, bikes, pedestrian and equestrian traffic.

11. Locate informal massings of plant materials along riparian corridor that undulate up or down slope and relate to topography.

12. Leave fallen trees where appropriate to provide animal habitat and improve soil fertility.

13. Provide selective pruning and tree removal to create views into the creek from roadways/bridges and overlooks.

14. Provide seasonal interest and contrast in leaf color and texture.

15. Develop planting schemes at points of entry that reflect the character of that section of the creek:
   - **Old Railroad Square Area** - historical plant materials.
   - **Urban Areas** - trees planted in rows or on a grid representing the agricultural heritage of the community.
   - **Road Crossings of the Creek** - plant materials and informal massings should enhance the riparian corridor.

16. Lawn areas should not exceed 30% of the landscaped areas unless necessary for the function of the outdoor space.

17. Lawn may be used in appropriate areas such as public gathering places and trailside parks. Do not place lawn on slopes greater than 5:1 slope. Use drought tolerant and disease resistant Dwarf Fescues in sunny locations.

13. **FENCING**

   **Design Objective:** To maintain a visual connection to the creek from adjacent land uses while providing necessary security, privacy and screening of undesirable views or uses.

   **Recommendations**

   1. An open transparent type of vinyl coated wire fencing is preferred along the creek with plant materials providing the necessary visual barrier.

   2. Depress the grade of pathways adjacent to residential properties to reduce height of fence and preserve privacy.

   3. All fencing shall be softened by the addition of suitable plant materials on the creek side of the fence.

   4. Four foot tall fences are preferred with 6' being the maximum height allowed above finished grade, (where deemed appropriate by the City).

   5. Use stone masonry columns along entire length of fence to accent points of entry to the creek. Columns should be an extension of an architectural building material and may support approved signage and lighting.
Typical Revegetation Scheme for Urban Reaches “C”, “D”, and “E”

Figure 26

<table>
<thead>
<tr>
<th>PLANTING ZONES</th>
<th>MOISTURE REGIME</th>
<th>PRINCIPAL PLANT SPECIES</th>
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<tbody>
<tr>
<td>A Top of Bank</td>
<td>Xeric (dry)</td>
<td>Live Oak, Valley Oak, Madrone, Bay, Manzanita, Ceanothus, Native Bunch Grasses and Wildflowers</td>
</tr>
<tr>
<td>B Mid-Bank</td>
<td>Mesic (intermediate)</td>
<td>Valley Oak, Black Oak, Suckeye, Maple, Elderberry, California Rose, California Blackberry, California Grape, Snowberry, Native Grasses and Wildflowers</td>
</tr>
<tr>
<td>C Lower-Bank</td>
<td>Hydric (seasonally wet)</td>
<td>Alder, Cottonwood, Willow, Ash, Boxelder, Elderberry, Maple, Snowberry, California Rose, California Blackberry, California Grape, Native Herbs</td>
</tr>
<tr>
<td>D Channel Bottom</td>
<td>Hydric (perennially wet)</td>
<td>Elderberry, California Blackberry, California Grape, California Rose, Snowberry, Sapping Willows, Native Wetland Grasses, Sagges, Tules, Rushes, Cattails, and Bur reed</td>
</tr>
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HYDRAULIC PLANTING ZONES

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<tbody>
<tr>
<td>1 Above 2 yr. Floodplain</td>
<td>Elderberry, California Blackberry, California Grape, California Rose, Snowberry</td>
</tr>
<tr>
<td>2 Below 2 yr. Floodplain</td>
<td>Grasses, Tules, Cattails, Snowberry, California Rose, California Blackberry, and Fishery Enhancement</td>
</tr>
</tbody>
</table>

(Source: Santa Rosa Creek Master Plan)
Typical Revegetation Scheme for Rural Reaches “F”, and “G”

Figure 27

<table>
<thead>
<tr>
<th>PLANTING ZONES</th>
<th>MOISTURE REGIME</th>
<th>PRINCIPAL PLANT SPECIES</th>
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<tbody>
<tr>
<td>A Top of Bank</td>
<td>Xeric (dry)</td>
<td>Live Oak, Valley Oak, Bay, Black Oak, Madrone, Manzanita, Ceanothus, Bunch Grasses, Native Wildflowers</td>
</tr>
<tr>
<td>B Mid-Bank</td>
<td>Mesic (intermediate)</td>
<td>Valley Oak, Black Oak, Buckeye, Maple, Elderberry, California Rose, California Blackberry, California Grape, Snowberry, Native Grasses and Wildflowers</td>
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<tr>
<td>C Lower-Bank</td>
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<td>Alder, Cottonwood, Willow, Ash, Boxelder, Elderberry, Maple, California Blackberry, California Grape, California Rose, Snowberry, Native Herbs</td>
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<tr>
<td>D Channel Bottom</td>
<td>Hydric (perennially wet)</td>
<td>Alder, Cottonwood, Willow, Ash, Boxelder, California Blackberry, California Rose, Snowberry, Elderberry, California Grape, Sappling Willows, Native Wetland Grasses, Tules, Sedges, Rushes, Catails, Bur reed</td>
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</table>

HYDROLOGIC PLANTING ZONES

1 Above 2 yr. Floodplain

2 Below 2 yr. Floodplain

<table>
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<tbody>
<tr>
<td>Alder, Cottonwood, Willow, Ash, Boxelder, California Blackberry, California Rose, California Grape, Snowberry</td>
</tr>
</tbody>
</table>

Alder, Cottonwood, Willow, Ash, Boxelder, California Blackberry, California Rose, Snowberry, Elderberry, California Grape, Grasses, Tules, Cattails, Bur reed and Fishery Enhancement
6. Provide lockable access gates in fences to areas where privacy or security is required.

Solid Fencing
(Limited to urban and rural reaches)
1. Use to screen existing conflicting land uses. These are uses that do not enhance the creek setting.
2. Use to screen trash and service areas from creek or street views.

3. Avoid locating solid fences in areas where adjacent property owner views of creek are restricted.

Open Wood Framed and Wire Fencing
1. Use where security is required and visual access to the creek is desired.
2. Use for access roads and cul-de-sacs (where fencing is required) to maintain a view corridor to the creek.
   (See Figure 28, above)

Materials
1. Fences shall be constructed using materials that are indigenous to the creek environment:
   • Wood: Rough-sawn or milled redwood, cedar, or pressure treated wood. Stain pressure treated wood to mask any green coloration.
   • Metal: Paint or powder-coat with black or dark green finish
   • Wire fencing: Black vinyl coated, non-climbable style fencing.
   • Stone: Indigenous material to this geographic area.
14. IRRIGATION

Design Objective:
To provide the necessary moisture requirements to establish and maintain new and existing plant materials in a healthy growing condition.

Irrigation Zones
1. **Natural creek reaches** - irrigate to establish plantings (3-5 years minimum). Provide permanent or temporary means of watering.
2. **Rural creek reaches** - provide permanent and/or temporary irrigation systems.
3. **Urban creek reaches** - provide permanent irrigation systems.

Recommendations
1. Provide automatically controlled drip or spray irrigation systems for all new urban and rural plantings that meet City of Santa Rosa Recreation and Parks Standards.
2. Provide temporary drip or spray irrigation systems to establish plantings in natural creek reaches.
3. Use reclaimed water where available.
4. Minimize water usage to meet the City’s Water Efficient Landscape Ordinance. Accomplish this through the use of low flow irrigation systems and native or drought tolerant plants.
5. Install in-line check or swing valves to reduce low head drainage or control erosion from breaks in irrigation pipes.
6. Use irrigation control systems with flow sensors that detect breaks in irrigation systems to reduce potential erosion and washout.
7. Use bubblers or drip irrigation systems in natural and rural areas of the creek to establish new trees and shrubs planting on a temporary basis, until plants can survive on natural precipitation.
8. Avoid summer irrigation of existing native trees found in a preservation area that is not tolerant to this condition.
9. Use low flow spray heads so that the precipitation rate will not exceed the absorption rate of the soil and cause runoff and erosion problems.
10. Adjust spray heads to avoid overspray onto buildings or pathways.
Chapter III

Santa Rosa Creek
City Standards
CITY OF SANTA ROSA
Santa Rosa Creek Standards
Entry Signs

Adopted ___, 1997
by City Council Res. #____

12" SQ. BRONZE COLUMN
SOLID CAP

SANTA ROSA CREEK TEXT
- 8" TALL RIBBON TYPE STYLE, 3/8" DEPTH
BLACK ANODIZED ALUMINUM LETTERS
FACING PARALLEL TO ROAD (BOTH SIDES)

ENTRY POINT OR CROSS STREET TEXT
- 8" TALL RIBBON TYPE STYLE, 3/8" DEPTH
BLACK ANODIZED ALUMINUM LETTERS
FACING AWAY FROM ROAD

S. R. CREEK LOGO
- CUT OUT SHAPE INTO BRONZE COLUMN
- SECURE WHITE PLEXIGLASS TO INSIDE OF COLUMN AND INTERNALLY ILLUMINATE

PATHWAY LIGHT FIXTURE WITH BLACK METAL FRAME

CONCRETE CURB AND GUTTER

CONCRETE COLUMN BASE
ETCHED ALUMINUM SIGN
COVERED W/ 1/4" THICK PLEXIGLASS
1/4" X 1" STANDARD FRAMES
(BOLT TOGETHER WITH SIGN IN MIDDLE)

6X6 REDWOOD POST

SIDE VIEW

1" SQ. STL TUBE FRAME
W/ BLACK FINISH

6X6 REDWOOD POST

INCORPORATE DIRECTIONAL
SIGNS WHERE APPROPRIATE

FRONT ELEVATION

PATHWAY

CITY OF SANTA ROSA
Santa Rosa Creek Standards
Informational Signs

Adopted __, 1997
by City Council Res. #____

DWN APPROVED FILE NO.
CHK

STD.111A
6X6 REDWOOD POST

4" SQUARE STAMPED ALUMINUM SIGNS

• BLUE IMAGES ON BLACK BACKGROUND

• ROUTE WOOD TO ACCOMMODATE SIGN TO FIT FLUSH TO FACE OF POST

FRONT ELEVATION

COMBINE DIRECTIONAL SIGNS W/ 1" SQ. STL TUBE FRAME W/ BLACK FINISH USE WHEN 5 OR MORE SIGNS ARE NECESSARY

FRONT ELEVATION

CITY OF SANTA ROSA
Santa Rosa Creek Standards
Directional Signs

Adopted ____ , 1997
by City Council Res. # _____

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<tr>
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<td>STD.111B</td>
</tr>
</tbody>
</table>
3EGA 9756S OR 9772S (DOUBLE) HPS
WITH PHOTO CELL AND BANNER BRACKET
HEIGHT VARIES ON LOCATION, USE 12' OR 15'
STEEL POLES-BLACK

VARIES 12' & 15'

SANTA ROSA CREEK LOGO
BANNERS

5' MINIMUM
CURB AND GUTTER

MOUNT ON SIDEWALK OR
TOP OF STONE COLUMNS

CITY OF SANTA ROISA
Santa Rosa Creek Standards
Street & Multi-use Pathway Light

Adopted ___, 1997
by City Council Res. # ___
BEGA
BOLLARD LUMINAIRE
MODEL NO. 8516 S BLACK,
30" HIGH

CITY OF SANTA ROSA
Santa Rosa Creek Standards
Walkway Light

Adopted __, 1997
by City Council Res. #________
MDL SERIES
MDL SERIES RECESSED WALL OR NICHE LIGHT
MODEL NO. MDL-2, 3, OR 4-04-19-TPH-TCP

CITY OF SANTA ROSA
Santa Rosa Creek Standards
Recessed Wall Light

Adopted______, 1997
by City Council Res. #______
Square wall or ceiling mounted luminaires with die cast aluminum cross guard. Injection molded polycarbonate plastic with internal optical structure. Captive socket head stainless steel screws. Color: Black

<table>
<thead>
<tr>
<th>Polycarbonate</th>
<th>Lamp</th>
<th>Lumen A</th>
<th>B</th>
<th>C</th>
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<tr>
<td>2754P</td>
<td>13W PLC</td>
<td>860</td>
<td>8½</td>
<td>8½</td>
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<tr>
<td>2756P</td>
<td>26W PLC</td>
<td>1800</td>
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CITY OF SANTA ROSA
Santa Rosa Creek Standards
Wall Light

Adopted _____, 1997
by City Council Res. # _____
PERMANENT SURFACE MOUNTING

COLUMBIA CASCADE TIMBER FORM - RESTORATION #2118
COLOR: BLACK
USE IN URBAN OR HISTORICALLY SIGNIFICANT AREAS

PROVIDE STL. POST MOUNT OR MASONRY STONE BASE

COLUMBIA CASCADE TIMBER FORM - GREENWAY #2140
USE IN RURAL AND NATURAL REACHES

Adopted __ , 1997 by City Council Res. # ___

CITY OF SANTA ROSA
Santa Rosa Creek Standards
Benches

Scale: DWN APPROVED FILE NO.
Date: CHK STD.113
METAL TREE GRATE

IRONSMITH - ADA TREE GRATE
#M6058

#M6060 W/ LIGHT WELL
AND POLYCARBONATE COVER
• SQUARE TREE GRATE FRAME #M6000-F

CONCRETE CURB/SIDEWALK

TIE INTO STORM
DRAINAGE SYSTEM

PLAN

SECTION

GRANITE COBBLED TREE WELLS

CITY OF SANTA ROSA
Santa Rosa Creek Standards
Tree Grates

Adopted ____, 1997
by City Council Res. #______
TIMBER FORM SUPER CYCLOOPS #2170 (LENGTH VARIES)

- PERMANENT EMBEDMENT OR SURFACE MOUNT
  ON EXISTING HARDSCAPE
  DARK GREEN OR BLACK

COLUMBIA CASCADE
TIMBERFORM BOLLARD CYCLOOPS #2173
- DARK GREEN OR BLACK

CITY OF SANTA ROSA
Santa Rosa Creek Standards
Bike Racks

<table>
<thead>
<tr>
<th>Adopted</th>
<th>Date</th>
<th>File No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
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<td>STD.115</td>
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</table>
Haws Ornamental Stone

Model FMS76

Barrier Free Steel Pedestal Drinking Fountain

COLOR: BLACK WITH STAINLESS STEEL, BOWL AND SAND TRAP

CITY OF SANTA ROSA

Santa Rosa Creek Standards

Drinking Fountains

Adopted __, 1997 by City Council Res. #____

Scale: Date:

DWN APPROVED FILE NO.

CHK STD.116
COLUMBIA CASCADE

FEATURES

- PERMANENT MOUNT
- 36 GALLON STEEL LINER
- SIDE OPENING DOOR
- BLACK COLOR COATED STEEL FINISH

PERMANENT SURFACE

TIMBERFORM 'RESTORATION'
#2126-HT (MARINE TEAK)
FOR RURAL REACHES

COLUMBIA CASCADE

FEATURES

- PERMANENT MOUNT
- 36 GALLON STEEL LINER
- SIDE OPENING DOOR
- BLACK COLOR COATED STEEL FINISH

FOR URBAN REACHES

CITY OF SANTA ROSA
Santa Rosa Creek Standards
Trash Receptacle

Adopted __, 1997
by City Council Res. # ___
Approves Design Concept Plan for the Pierson Reach of Santa Rosa Creek and the placement of the bike pathway

September 12, 2000

RESOLUTION NO. 24555

RESOLUTION OF THE COUNCIL OF THE CITY OF SANTA ROSA APPROVING THE DESIGN CONCEPT FOR THE PIERSON REACH CREEK RESTORATION AND BIKE PATHWAY ALONG SANTA ROSA CREEK FROM RAILROAD STREET TO PIERSON STREET

WHEREAS, the City of Santa Rosa desires to construct a bikeway from Railroad Street to Pierson Street, which will connect the Prince Memorial Greenway with the existing pathway at Pierson Street; and

WHEREAS, the City has applied for and been awarded federal and state funds for the design and construction of this bikeway; and

WHEREAS, the City entered into a contract with RRM Design Group for the concept design of the bike pathway; and

WHEREAS, the concept design of the bike pathway has been completed and has been reviewed and recommended by the City’s Waterways Advisory Committee, the Railroad Square Property Owners, the Westside Neighborhood, and other interested parties.

NOW, THEREFORE, BE IT RESOLVED that the Council of the City of Santa Rosa approves the Design Concept for the Pierson Reach Creek restoration plan and bike pathway to be constructed from Railroad Street to Pierson Street.

IN COUNCIL DULY PASSED this 12th day of September, 2000.
Roseland Creek Restoration Plan

Introduction

The City of Santa Rosa developed a conceptual habitat enhancement plan for the 1-mile reach of Roseland Creek from McMinn Avenue downstream to Stony Point Road. The project is characterized by a preservation reach extending from McMinn Avenue downstream to approximately 400 feet west of Burbank Avenue and a restoration reach extending downstream from the preservation reach to Stony Point Road. The project has the following goals:

- Enhance and preserve aquatic and riparian habitat for wildlife.
- Provide appropriate creek setbacks to enhance the riparian corridor and improve water quality.
- Construct a self-maintaining channel with adequate bank-full dimensions to transport sediment, contain healthy riparian vegetation and convey the 100-year flood.
- Provide open space areas and recreational opportunities with links to regional trail networks.
- Promote educational opportunities and construct informative signage.

Project Need

The degraded condition of Roseland Creek and the undeveloped nature of adjacent lands provide an exceptional opportunity to enhance the creek area as a resource for wildlife and to improve the quality of life for the citizens of Santa Rosa. Roseland Creek was channelized in 1980 from the area near Burbank Avenue downstream to Llano Road. During construction of the channel, riparian vegetation was completely removed, the channel was straightened and routed in a different location from the historic channel, and the creek banks were reshaped to increase flow capacity. Upstream of the channelized reach, the creek flows through a dense riparian forest whose preservation will protect the habitat and water quality.

Changes in the channel dimensions, location, and the removal of vegetation drastically altered Roseland Creek. Historically, the stream flowed in a southwesterly direction through the project area. The channel was moved during construction to flow in a more southerly direction upstream of Stony Point Road. The construction lengthened the channel and thus reduced the overall channel slope between Burbank Avenue and Stony Point Road. Construction of the channel also created a wide, open channel lacking trees to shade the channel. The loss of riparian vegetation reduced habitat for wildlife and likely increased stream temperatures.

The project area is adjacent to existing housing developments and an east-west pedestrian and bike trail would provide an alternative transportation route. Other properties in the area will also likely develop in the foreseeable future adding to the need for a trail along Roseland Creek. As development occurs along the creek, adequate area can also be set aside for wildlife, recreation, flood capacity, and educational opportunities.
Biological Setting

The project area is located within the County of Sonoma and partially within the City of Santa Rosa (Latitude N 38°24’54” Longitude W 122°44’18”). Roseland Creek, an ephemeral stream, drains an area of 4.59 mi² and begins near the railroad tracks south of Sebastopol Road. The creek flows southwesterly crossing under Dutton Avenue, West Avenue, McMinn Avenue, Burbank Avenue, Stony Point Road, Ludwig Avenue, and Llano Roads before joining the Laguna de Santa Rosa. The creek flows through private property until it reaches property owned by the Sonoma County Water Agency (SCWA), approximately 400 feet downstream of Burbank Avenue downstream to Llano Road. Through the SCWA property, the creek consists of a constructed earthen channel with access roads and lacks a natural riparian canopy.

Within the project reach, Roseland Creek flows through a privately owned section from McMinn Avenue downstream to the SCWA property, where is it channelized to the downstream end of the project reach. The majority of the privately owned reach has a well-developed riparian canopy of valley oak (Quercus lobata) and Oregon ash (Fraxinus latifolia) trees, lining steep banks in a narrow channel of fine silt and sand. Areas outside of the channel banks have been impacted by agricultural practices and are dominated by non-native annual grasslands.

The channelized reach, extending downstream of the privately owned reach to Stony Point Road, has little to no tree cover near the channel and vegetation is composed primarily of non-native grasses. The channel was constructed with shallow (6:1) slopes and the streambed is dominated by fine silt and sand. Along the top of the banks, access roads exist although they don’t appear to be well traveled. Beyond the access roads, ditches are present to route runoff under the roads and into storm drains. A formal wetland delineation will be conducted for all potential wetlands prior to construction and permits will be obtained from appropriate agencies.

A list of all the plant species observed on the site is attached in Appendix A.

Soil types within the project area include Wright loam, wet, 0 to 2% slopes and Yolo clay loam, 0 to 2% slopes (Soil Survey, Sonoma County, USDA SCS 1972). Wright loam is not a hydric soil, however hydric inclusions can be present in floodplains (Hydric Soils List for Sonoma County, USDA NRCS 1992). Yolo clay loam is not a hydric soil. The elevation of the project site is approximately 37 m (120 feet) above sea level and the topography is flat within the project area.

Land use immediately surrounding the project site is dominated by residential uses. Residential uses include urban and rural single-family housing. In the vicinity of the project, other uses include small industrial, interim open space, commercial, and park parcels.

Public Input

To gather public comments a public meeting was held on January 29, 2004 and staff presented the project to the Roseland Joint Subcommittee on March 24, 2004 to solicit public ideas and concerns for the concept plan reach. Over 100 comments were received and most were supportive of the concept. Input received included the following general comments:
- Plant more native trees along the creek to create a canopy to shade the creek and provide habitat for wildlife.
- Create a park near the top of the restoration reach or near McMinn Avenue.
- Increase setbacks or provide larger buffers for the creek.
- Enhance or restore habitat within or adjacent to the creek for fish and wildlife.
- Create a trail along one side of the creek.
- Establish sanctuary areas for wildlife.
- Encourage educational opportunities for the public.
- Reduce pollution and trash from getting into the creek by educating the public and having clean up days.
- Construct informational signage.
- Maintain or improve flood capacity of the creek.
- Many species of animals and plants currently exist along the creek.
- Develop a crosswalk across Stony Point Road.
- Protect public safety along any future trails.
- Preserve cultural and historic resources.
- Construct an attractive bridge over the creek at Stony Point Road.
- Protect and encourage groundwater recharge areas.
- Limit human amenities along the creek.
- Remove invasive species.

Existing Channel Geometry

The preservation reach, extending from McMinn Avenue to approximately 400 feet downstream of Burbank Avenue, drains an area of 0.60 mi² and has a sinuosity of 1.09. The sinuosity of a meandering stream is the ratio of the channel length to the straight-line length. The lack of sinuosity or curviness of the channel is likely the result of the location of the reach within the watershed or the unnatural alteration of the stream as agriculture and urban development occurred adjacent to the stream over time. The average channel slope of this reach is 0.0048 ft/ft.

The restoration reach drains an area of 1.07 mi² and currently has a sinuosity of 1.43. The channel historically flowed southwest from Burbank Avenue before channelization lengthened the channel. The channel now flows south and then turns sharply west before crossing Stony Point Road. The high sinuosity for this reach is due to the approximately 1,300 feet of length added during the channelization. The average channel slope of this reach is 0.0026 ft/ft.

Geomorphic Calculations

Channel characteristics for the concept reach were developed from field measurements of Roseland Creek, comparison with regional averages, and aerial photo analysis of Roseland and Colgan Creeks from 1956 to 2003. The bankfull discharge is significant because it occurs frequently and with enough velocity to form and maintain major features of the channel. In a constructed channel the term “bankfull discharge” does not mean that the flow is up to the top of bank. Bankfull discharges typically occur on the average every 1.5 years. Bankfull width measurements were taken along the reach and compared with regional averages for the San Francisco Bay area (Leopold 1994). Regional curves were also consulted to establish mean bankfull widths and cross-
sectional areas for the concept reach. To further assess the regional averages, Manning’s Equation was used to determine the bankfull discharge based on the field measurements of cross-sectional area and wetted perimeter. A bankfull discharge was calculated to be 46.8 cubic feet per second (cfs) and a similar result was identified based on regional averages (52 cfs). A Manning’s roughness of 0.032 was used for the channel since it has grasses and some gravel. Field measurements were consistent with regional curves as found by other researchers in nearby watersheds (PCI 2002).

Bankfull width (BFW) of the channel was used to calculate ranges for meander lengths, beltwidth, amplitude, radius of curvature using the following formulas:

\[
L = 10.9 \times BFW^{1.01} \quad \text{(range 10-14 x BFW)} \quad \text{(Leopold et al. 1964)}
\]

\[
A = 2.7 \times BFW^{1.1} \quad \text{(range 4 –20 beltwidths - BFW)} \quad \text{(Leopold et al. 1960 and Rosgen 1996)}
\]

\[
R_c = 2.3 \times BFW \quad \text{(range 1.5 to 4.5 x BFW)} \quad \text{(Riley 2003)}
\]

Channel characteristics calculated for Roseland Creek are depicted in Appendix B.

**Concept Plan Features**

The concept plan would enhance the creek and adjacent areas by preserving existing riparian vegetation, realigning the channel, enhancing habitat conditions, promoting alternative transportation, and providing an urban open space for area residents (see attached plan sheets). Returning the creek to its historic alignment is not possible due to development after the creek was relocated and channelized. The planned channel alignment would reduce the overall channel length and create a cross sectional area capable of moving sediment downstream. The project would also increase flood capacity of the existing channel to prevent flooding and protect public safety. Consistent with the City’s Zoning Code 20-30.040, the creek setback shall be 50 feet from the top of the proposed top of bank on both sides of the channel. Exceptions to the creek setback are the same as those outlined in the City’s Zoning Code.

Habitat enhancements include adding meanders, creating pools, and planting native vegetation. The project would create a variety of aquatic habitat types (pools, riffles, etc.) within the channel and a more natural riparian forest. New tree plantings would be spaced with openings every 100 feet to facilitate hydraulic maintenance of the channel. The project would attract numerous species of wildlife. It includes a pathway on only one side of the creek to minimize wildlife disturbance. A wildlife area is also proposed to provide additional habitat along the southern portion of the project.

The project would also enhance the area for people, providing a natural place within the urban area for recreation, transportation, and leisure activities. Enhancements include picnic areas, a playground, a Class 1 pedestrian and bicycle pathway, and interpretive signage.
The preservation reach depicts the approximate minimum creek setback as required by the City’s zoning code of 50 feet from the top of bank of a waterway with a defined bank. The required minimum setback may also be greater if the banks are steeper than 2.5:1, which might be the case along the preservation reach. The minimum setback would then be measured by projections of a slope 2.5:1 from the toe of the streambank to ground level, plus 50 feet. The Santa Rosa Design Guidelines also state where riparian growth extends outside of the creek setback, preserve and protect this important part of the creek corridor.

**Hydrology and Hydraulics**

City engineering staff supplied input to the habitat enhancement plan for the restoration reach of Roseland Creek in terms of project hydrology (flow rate) and hydraulics (flow stage and velocity). Flow rates upstream of Stony Point Road were based on a 1995 hydrologic analysis conducted by the SCWA that used the Rational method. Flow rates downstream of Stony Point Road were based on those used in the 1970’s by the SCWA for design of the Roseland Creek flood control channel (Table 1). Per SCWA Flood Control Design Criteria, these flow rates were based on a developed watershed and represent runoff rates that would be expected to occur in the future.

A hydraulic model of proposed channel conditions was developed in HEC-RAS, a software model developed by the US Army Corps of Engineers for the purpose of analyzing open channel hydraulics. Downstream flow depth was based on the predicted 100-year water surface elevation for the Laguna de Santa Rosa. Existing conditions cross sections were taken from the SCWA Roseland Creek Flood Control Channel plans. Cross sections and alignment for proposed conditions were based on the conceptual design. Existing bridges and culverts were included in the proposed conditions model except at Stony Point Road, where the culvert needs to be enlarged from the existing 10 feet by 6 feet box to a proposed 20 feet by 6 feet box. Hydraulic roughness values of 0.064 on the banks and 0.040 in the bed were used to model the conceptual design, which is higher than the roughness value of 0.035 used in the design of the existing channel. The proposed channel geometry and planting plan is consistent with the modeled roughness value. The roughness value is also consistent with SCWA guidance of values appropriate for “constructed natural waterways”.

The proposed conceptual plan for Roseland Creek improves flood carrying capacity of Roseland Creek by enlarging the flow area so that the 100-year flow would be contained within the creek banks with adequate freeboard. This conceptual plan is also consistent with the hydrologic and hydraulic design requirements of the Sonoma County Water Agency.

**Maintenance**

Maintenance of Roseland Creek through the project reach is the responsibility of private landowners and the SCWA. From McMinn Avenue downstream to the SCWA right-of-way the channel is privately owned and maintained. The SCWA owns the channel through the lower reach of the project area and performs maintenance on a routine basis to maintain the hydraulic capacity of the channel. Once the project is constructed, periodic maintenance would likely be needed to maintain constructed slopes, replant riparian plantings, remove exotic species, and remove vegetation that may reduce the hydraulic capacity.
As the creek adapts to its new channel minor work may be needed as the creek reaches equilibrium. Minor bank areas could need maintenance to alleviate any erosion. Riparian plantings may also need maintenance to reduce competition and promote their growth. Volunteer vegetation could also need maintenance as cattails and willows develop in the newly constructed channel. Plantings will likely not be large enough to shade out these species and removal or trimming could be needed for up to 3 years after construction.

**Cost Estimate**

A preliminary cost estimate was developed based on recent estimates and restoration projects for the Brush Creek Restoration Project ($800 per linear foot), Lower Colgan Creek Restoration Project ($1,000 per linear foot), and the Pierson Reach of the Prince Memorial Greenway ($2,000 per linear foot). $1,500 per linear foot was used for restoration work along Roseland Creek. Recreation, access, and transportation amenity costs were generalized and based on the quantities of individual items. Estimated costs include the following:

- Recreation, Access, & Transportation $556,922.30
- Restoration $7,500,000.00
- Construction Overhead (21%) $1,691,953.68
- Planning, Design, & Management (35%*) $194,922.81
- Total $9,943,799.79

* Applies to Recreation, Access, & Transportation project costs only.
Roseland Creek Restoration Plan

References


TABLE 1
Roseland Creek 100-year Peak Flow Rates

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<th>Location</th>
<th>Station</th>
<th>Flow Rate (cfs)</th>
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<tbody>
<tr>
<td>Upstream of Burbank Avenue</td>
<td>275+35-274+70</td>
<td>420</td>
</tr>
<tr>
<td>Burbank Avenue to Giffin Avenue</td>
<td>274+50-258+00</td>
<td>517</td>
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<tr>
<td>Giffin Avenue to Future Northpoint Parkway</td>
<td>257+00-245+21</td>
<td>620</td>
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<tr>
<td>Future Northpoint Parkway to Stony Point Rd.</td>
<td>243+00-234+87</td>
<td>704</td>
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# Appendix A. Roseland Creek Plant List, Spring 2004.

<table>
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<th>Common Name</th>
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<td>dealbata</td>
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<td>Acer</td>
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<td>Achyrrachaena</td>
<td>mollis</td>
<td>blow wives</td>
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<td>Aesculus</td>
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<td>Chlorogalum</td>
<td>pomeridianum</td>
<td>soap plant</td>
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<td>Cichorium</td>
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<td>chicory</td>
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<td>arvensis</td>
<td>bindweed</td>
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<td>Cortaderia</td>
<td>selloana</td>
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<td>rotundus</td>
<td>nut sedge</td>
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<td>Danthonia</td>
<td>californica</td>
<td>California oat grass</td>
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<td>Daucus</td>
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<td>California poppy</td>
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<td>latifolia</td>
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<td>Galium</td>
<td>aparine</td>
<td>rough bedstraw</td>
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<td>Geranium</td>
<td>dissectum</td>
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<td>Hedera</td>
<td>helix</td>
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<td>Heracleum</td>
<td>lanatum</td>
<td>cow parsnip</td>
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<td>Hordeum</td>
<td>brachyantherum</td>
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<td>douglasiana</td>
<td>douglas iris</td>
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<td>Juncus</td>
<td>balticus</td>
<td>baltic rush</td>
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<td>Juncus</td>
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<td>rush</td>
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<tr>
<td>Lolium</td>
<td>multiflorum</td>
<td>annual ryegrass</td>
</tr>
<tr>
<td>Lotus</td>
<td>corniculata</td>
<td>bird's-foot trefoil</td>
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</table>
### Appendix A. Roseland Creek Plant List, Spring 2004.

<table>
<thead>
<tr>
<th>Genus</th>
<th>Species</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lupinus</td>
<td>nanus</td>
<td>lupine</td>
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<td>Lupinus</td>
<td>bicolor</td>
<td>miniature lupine</td>
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<td>Malus</td>
<td>spp.</td>
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<td>Medicago</td>
<td>hispida</td>
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<td>Parentucellia</td>
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<td>dilatatum</td>
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Appendix B

Bottom of Site
Station 1 + 00 to 22 + 78

Station 1 + 03
Drainage Area 1.07 mi²
Discharges (Q)
  Q Bankfull Stage = 52 cfs
Bankfull Width (BFW) = 17 ft
Mean Bankfull Depth = 1.6 ft
Cross Sectional Area = 24 ft²
Width/Depth Ratio = 10.6
Entrenchment = > 2.2
Wavelength (L) = 10.9 x BFW^{1.01} (range 10-14 x BFW)
  L = 191 ft, range 170 to 238 ft
Beltwidth (BW) = 11.4 x BFW, range 4 to 20 BFW
  BW = 193.8 ft, range 68 to 340 ft
Amplitude (A) = 2.7 x BFW^{1.1} (range 4 – 20 beltwidths - BFW)
  A = 60.9 ft, range 51 to 323 ft
Radius of Curvature (Rc) = 2.3 x BFW (range 1.5 to 4.5 x BFW)
  (Rc) = 39.1 ft, range 25.5 to 76.5 ft

Top of Site Station 22 + 78 to 33 + 00

Drainage Area 0.60 mi²
Discharges (Q)
  Q Bankfull Stage = 42 cfs
Bankfull Width (BFW) = 13 ft
Mean Bankfull Depth = 1.4 ft
Cross Sectional Area = 17 ft²
Width/Depth Ratio = 9.3
Entrenchment = > 2.2
Wavelength (L) = 10.9 x BFW^{1.01} (range 10-14 x BFW)
  L = 145 ft, range 130 to 183 ft
Beltwidth (BW) = 11.4 x BFW, range 4 to 20 BFW
  BW = 148.2 ft, range 52 to 260 ft
Amplitude (A) = 2.7 x BFW^{1.1} (range 4 to 20 beltwidths - BFW)
  A = 45.4 ft, range 39 to 247 ft
Radius of Curvature = 2.3 x BFW (range 0.5 – 1.5 x BFW)
  (Rc) = 29.9 ft, range 19.5 to 58.5 ft
Upper Colgan Creek Restoration Plan

Introduction

The City of Santa Rosa contracted with Quadriga to develop a conceptual habitat and urban open space enhancement plan for Colgan Creek between Santa Rosa Avenue and Petaluma Hill Road. The plan is designed to take advantage of the opportunities an urban creek can provide while retaining current adjacent land-uses. The objectives of the plan are to:

a) Improve the ecological function as a wildlife corridor and habitat for indigenous flora and fauna.
b) Build community stewardship through neighborhood linkages. Create cohesion between neighborhoods via user friendly, aesthetically inviting common space.
c) Enhance recreational opportunities within the community by providing functional linkage and alternative transportation options.

Project Need

Colgan Creek, within the project area, provides an opportunity to enhance a creek corridor adjacent to undeveloped, residential, and commercial lands. The degraded flood control channel lacks adequate riparian vegetation to shade the stream and provide habitat for fish and wildlife. The channel was also artificially straightened and lacks habitat diversity to support robust populations of fish and wildlife species. Public amenities are also lacking along the reach and improvements are needed to furnish recreational facilities and foster community stewardship.

Existing Conditions

Colgan Creek originates on the north side of Taylor Mountain, flows westerly into Santa Rosa, and then southwesterly before joining the Laguna de Santa Rosa downstream of Llano Road. Within the project reach, the creek is owned by the Sonoma County Water Agency (SCWA) and has been channelized in an earthen and riprap channel. The channelization straightened the creek and removed most of the woody vegetation. Habitat diversity is limited and the dominant plant species include cattail, Himalayan blackberry, and nutsedge, with some plantings of live oak, valley oak, and walnut on the upper banks. A few willow and cottonwood have come into the channel naturally within the reach. Invasive species present include Himalayan blackberry, pampas grass, and eucalyptus. A 10-foot asphalt pathway exists on the south side of the creek along the entire project area.

Near the upstream end of the project area, the channel is dominated by Himalayan blackberry, small oak trees, and willow in the channel. The vegetation is not tall enough to provide adequate shade to the creek channel. The substrate is dominated by riprap, cobble, and gravel. The banks are steeper near this part of the project as compared to downstream areas.

Adjacent to Colgan Creek Park, the channel is wide with area to add creek and recreational amenities. A low water crossing is actively used to traverse the channel during the low water season. The substrate is comprised of gravel and silt and riprap is present near storm drain outfalls.
Colgan Creek flows adjacent and under the Santa Rosa Marketplace parking lot near the downstream portion of the project area. Riprap reinforced areas exist along the banks and small oak trees dominate the woody vegetation. Himalayan blackberry and grasses comprise the herbaceous vegetation. The channel has little to no shade canopy and substrate is dominated by gravels and silt. Trash from the parking lot is regularly scattered in the channel and detracts from the creek experience.

Land use immediately surrounding the project site is dominated by residential uses through most of the reach. Residential uses include urban and rural single-family housing. Adjacent to the downstream end of the project area, land uses are comprised of current or zoned commercial properties. The Santa Rosa Marketplace encompasses a major commercial development on the south side of the creek. Colgan Creek Park (parkland) is also adjacent to the channel within the project area.

Public Input

Public input has been an important step in developing the Plan. A public workshop was held on March 31, 2001 to gather ideas and concerns from the community. Public meetings were also held before the Waterways Advisory Committee (September 27, 2001) and City Council (December 18, 2001) to gather additional public input. The input helped develop the concept plan with the following comments for habitat, water quality, recreation, and visual enhancements:

- Offer a varied educational experience.
- Dedicate open space and establish setbacks.
- Work with the creek and not just for human amenities.
- Plant native riparian vegetation for habitat and shading of the creek.
- Create an outdoor meeting place.
- Create a skateboard park.
- Establish regional and local trail connections for bicyclist and pedestrians.
- Preserve existing creek habitat.
- Encourage future development to bring people to the creek.
- Install visual enhancements to encourage use of the area.
- Consider future encroachment into the creek area by development.
- Creek Crossing needed near Colgan Creek Park.

Plan Components

The plan takes advantage of the opportunities a creek in an urban area can provide while retaining current land uses. Details are shown graphically and also described in narrative on the attached plan sheets. The primary focus is to restore the creek corridor ecologically and aesthetically. This approach addresses the creek corridor by defining the low-flow channel and adjacent banks to emulate natural dimensions based on a review of historical photos. The adjacent banks would be configured into curvilinear and varied topography, giving a more natural look and feel to the corridor. The corridor would also be revegetated to promote an adequate shade canopy to support native fish and wildlife species. Icons would also be developed to give the creek an identity based on environmental and cultural characteristics of the area. Adjacent structures would also be introduced or improved upon to visually enhance, provide improved access, augment
transitions and buffers, and present educational opportunities. The project would include the following specific components:

**Restoration Grading:** The channel would be graded to introduce meanders and other features and enlarged to accommodate the 100-year storm. The low-flow channel would be redesigned to emulate a form that more closely reflects the historic meander pattern of the creek, to the extent feasible within the existing SCWA right-of-way. Aquatic habitat diversity would be introduced to encourage development of pools, riffles, and other habitats. The adjacent banks would be reconfigured into the curvilinear and varied gradients, giving a more natural appearance to the creek corridor.

**Restoration Planting:** Riparian vegetation including trees and understory plants would be planted along the lower banks of Colgan Creek. Trees, understory plants, native grasses, and wildflowers would be planted along the upper banks. The corridor would be revegetated to stabilize banks and provide an adequate shade canopy to support native fish and wildlife species. Vegetation stock should be gathered from sources within the watershed and existing trees should be retained, wherever feasible. Planting on the south side of the channel would provide shade for the low-flow channel.

**Bicycle and Pedestrian Paths:** The existing 10-foot asphalt path along the southern edge of the Colgan Creek would be retained and realigned in some reaches providing greater aesthetic interest along the channel. An 8 feet wide bicycle/pedestrian path would be built along the northern side of the channel. Adjacent to the planned extension of Lumas Court, the path would be placed within a 47 foot right of way allowed for the roadway extension. In addition, unpaved spur trails would provide opportunities for walking closer to the water’s edge. A footbridge would also be installed adjacent to Colgan Creek Park to connect trails on both sides of the channel and allow crossing during winter flows. A future connection would be provided to the pedestrian crossing at Petaluma Hill Road and Breeze Way through the adjacent residential neighborhood. Streetscape enhancements would be provided along Petaluma Hill Road to Kawana Springs Road and along Colgan Avenue to Santa Rosa Avenue. Pedestrian linkage enhancements would be provided between Santa Rosa Marketplace and Colgan Avenue.

**Trail Markers:** Trail markers using natural materials and a trail icon would be placed at both ends of the trail and at key connection points along the creek. The trail marker is particularly important on the west end of the project area where the creek disappears into a concrete culvert. The trail markers would help to identify the creek corridor and create a connection to the riparian corridor. Overlooks, interpretive signage, and improved access points will enhance the overall experience of this linear creek corridor.

**Fence Treatment at Bedford Street:** The existing fence at Bedford Street would be softened to create more inviting passage for pedestrians at this location. The existing 6-7 foot fence creates a barrier to the creek. The fence would be designed as a stepped wooden fence, providing a more inviting entrance to the creek corridor.

**Fish/Wildlife Accessibility:** Rocks and other materials would be used at the east end of the project area to allow fish and other wildlife easier access through the culvert under Petaluma Hill Road, providing a connection to the riparian corridor upstream of Petaluma Hill Road.
Hydrology and Hydraulics

Philip Williams and Associates, Ltd. (PWA) supplied input to the conceptual design of the Upper Colgan Creek Enhancement Project in terms of project hydrology (flow rate) and hydraulics (flow stage and velocity). Flow rates and downstream flow depth were based on the draft Southern Santa Rosa Drainage Study conducted by Winzler and Kelly since that was the best available information at the time the analysis was being conducted. PWA's hydraulic model of proposed channel conditions was developed in HEC-RAS, a software model developed by the US Army Corps of Engineers for the purpose of analyzing open channel hydraulics. A hydraulic roughness value of 0.05 was used to model the conceptual design, which is higher than the roughness value of 0.035 used in the design of the existing channel. The proposed channel geometry and planting plan is consistent with the assumed roughness value. The roughness value is also consistent with Sonoma County Water Agency guidance as the lower end of a range of values appropriate for “constructed natural waterways”.

The proposed conceptual plan for Upper Colgan Creek, when evaluated with the most current understanding of hydrologic and hydraulic conditions, maintains the conditions that have previously been assumed to exist in the project reach. This conceptual plan is also consistent with the hydrologic and hydraulic design requirements of the Sonoma County Water Agency.

Maintenance

Colgan Creek, through the project reach, is owned by the Sonoma County Water Agency and it is their responsibility to maintain the hydraulic capacity of the channel. Once the project is constructed, periodic maintenance would likely be needed to maintain constructed slopes, replant riparian plantings, remove exotic species, and remove vegetation reducing the hydraulic capacity.

As the creek adapts to its new channel minor work may be needed as the creek reaches equilibrium. Minor bank areas could need maintenance to alleviate any erosion. Riparian plantings may also need maintenance to reduce competition and promote their growth. Volunteer vegetation could also need maintenance as cattails and willows develop in the newly constructed channel. Plantings will likely not be large enough to shade out these species and removal or trimming could be needed for up to 3 years after construction.
**Cost Estimate**

A preliminary cost estimate was developed based on recent estimates and restoration projects for the Brush Creek Restoration Project ($800 per linear foot), Lower Colgan Creek Restoration Project ($1,000 per linear foot), and the Pierson Reach of the Prince Memorial Greenway ($2,000 per linear foot). $1,500 per linear foot was used for restoration work along Upper Colgan Creek. Recreation, access, and transportation amenity costs were generalized and based on the quantities of individual items. Estimated costs include the following:

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<th>Description</th>
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* Applies to Recreation, Access, & Transportation project costs only.
Resolutions of the Council of the City of Santa Rosa

RESOLUTION NO. 25475

Adopts a Lower Colgan Creek Restoration Conceptual Plan

November 19, 2002

WHEREAS, the Council initiated development of a restoration concept plan for lower Colgan Creek in December 1999; and

WHEREAS, the Lower Colgan Creek Restoration Concept Plan proposes restoration of natural channel dimensions and patterns, use of in-channel habitat features, establishment of a native riparian forest and increased flood conveyance between Victoria Drive and Bellevue Avenue; and

WHEREAS, a public meeting and walking tour was conducted on June 28, 2000; and

WHEREAS, the restoration concept plan would implement goals of the General Plan; and

WHEREAS, acquisition of land adjacent to Colgan Creek is proposed for a neighborhood park and for enhancement of the riparian corridor; and

WHEREAS, two alternative conceptual plans were presented to the Waterways Advisory Committee in November 2000 and the committee recommended one of the alternatives for final development and presentation to the Council; and

WHEREAS, on November 19, 2002, Council approved and adopted the Negative Declaration for the Lower Colgan Creek Channel Restoration Concept Plan.

NOW, THEREFORE, BE IT RESOLVED that Council adopts the Lower Colgan Creek Restoration Conceptual Plan.

BE IT FURTHER RESOLVED that Council directs staff to proceed with implementation of the Lower Colgan Creek Restoration Conceptual Plan.

BE IT FURTHER RESOLVED that Council authorizes staff to pursue acquisition of open space adjacent to the concept plan reach of Colgan Creek.

IN COUNCIL DULY PASSED this 19th day of November, 2002.
SUMMARY REPORT

Conceptual Design for Colgan Creek Stream Restoration

October 31, 2002

EXECUTIVE SUMMARY
The conceptual design for Colgan Creek stream restoration presents a vision of restoring Colgan Creek between Victoria Drive and Bellevue Avenue in southwest Santa Rosa. The overall purpose of the project is to enhance fish and wildlife habitat and the quality of life for local citizens. The plan includes converting 1.3 miles of straightened and denuded channel into a beautiful and more natural creek setting by restoring more natural channel dimensions and patterns, installing habitat features, and establishing a native riparian forest. Human elements of the plan include the incorporation of neighborhood parks, a meandering bicycle path, and increased flood conveyance in the creek.

INTRODUCTION
In the southwestern area of Santa Rosa, Colgan Creek flows westward for approximately 1.28 miles from near Victoria Drive to near Elsie Allen High School along Bellevue Avenue. The creek flows through fields east of Dutton Meadow before turning west to parallel Bellevue Avenue. This reach has been relocated and channelized for flood conveyance, and is owned and maintained by the Sonoma County Water Agency (SCWA).

A unique opportunity exists to restore natural channel functions and values to Colgan Creek before the southwest area of Santa Rosa is further developed. There is undeveloped land adjacent to the creek throughout much of the project. The creek passes along the southern edge of Elsie Allen High School, and the City has plans for a proposed bike and footpath along the creek.
Restoration planning done at this time may be able to take advantage of these conditions to go beyond the customary limits of creek restoration within an urban environment. Benefits of a restored creek and riparian corridor include providing aquatic and wildlife habitat, improving water quality, providing public access and recreational opportunities, and enhancing flood conveyance, if feasible.

Public participation in the planning process has included one public meeting and walking tour, a presentation to the Santa Rosa Waterways Advisory Committee, and a planning meeting with SCWA staff. One of two conceptual alternatives has been selected and herein revised.

This report presents a revised conceptual plan for restoration of Colgan Creek. (See Figures 1, 2, and 3.)

**Existing Conditions**

Colgan Creek originates in the foothills on the north side of Taylor Mountain, flows northwesterly along Kawana Springs Road until it passes under U.S. 101 near Hearn Avenue, then turns and flows southwesterly until it meets the Laguna de Santa Rosa near the intersection of Todd Road and Highway 116. With exception of the headwater area along Kawana Springs Road, Colgan Creek is entirely confined to an artificially straightened flood channel. From Petaluma Hill Road east of 101 to Victoria Drive south of Hearn Avenue (the upper limit of the project zone), the channel is mostly constructed of concrete, including a flat bottom. From Victoria Drive to the Llano Road crossing (a distance of roughly four miles, including the project zone), the flood channel has mainly soil banks, supplemented with riprap or concrete in some areas, and a permeable, semi-natural bottom (i.e., silt or clay streambed, but unnaturally flat).

Throughout the project zone the stream is almost fully exposed to the sun, as there is essentially no functioning riparian tree corridor, although scattered immature valley oaks have been planted along the access road above the channel in some areas. A near-absence of shade persists downstream from the lower end of the project zone at Bellevue Avenue to Llano Road. Downstream from Llano Road, Colgan Creek continues as an artificially straightened flood channel, but a dense riparian strip of large, older cottonwood, willow, and other trees has been allowed to remain, both within and above the channel. These trees provide a nearly closed canopy shading the stream, and completely alter the stream habitat in beneficial ways.
Within the project reach, the water temperature in Colgan Creek near the Bellevue Avenue bridge on May 3, 2000 at 3:00 PM was 31°C (88°F). Higher stream temperatures are expected in summer, where water remains in this reach. The upper lethal thermal limit for steelhead or coho salmon is generally considered to be about 24°C (75°F), so temperature alone rules out any possibility of steelhead or coho juvenile rearing within the project zone under the existing conditions.

In addition to emergent grasses and weeds, the stream contains large amounts of thick, filamentous green algae, the growth of which is enhanced by the absence of shade, which would normally be provided by riparian trees and shrubs. The streambed throughout most of the project reach is either hard clay or clay overlain by silt. There is no gravel or cobble, and the only boulders appear to be isolated chunks of riprap that have fallen from the banks and been moved downstream at high flows. Aside from the few boulders and occasional shopping carts, there is very little instream structure available to provide shelter or living space for aquatic animals. The deepest water found was about three feet deep, in a short (10-foot long), narrow channel where the clay had been eroded to that depth. Most pools and glides were less than one foot deep. Two concrete and grouted riprap drop structures within the project reach represent significant barriers to upstream migration by fish, turtles, and other aquatic animals at all but the highest winter flows.

The stream fauna in the project zone are relatively impoverished. Only three species of fish were found, in small numbers: mosquito fish, threespine stickleback, and California roach. The latter two are native species; the mosquito fish are exotic species introduced to control mosquito larvae. Each of these are small-sized fish, the biggest of which is the roach, which may reach about five inches in length. These species are tolerant of high temperatures and poor water quality, and adapt to hide within algae and submerged vegetation. The only other aquatic vertebrates found were Pacific treefrog juveniles. Among the algae and emergent vegetation, invertebrates typical of ponds and sluggish streams were observed, including dragonfly larvae, dytiscid beetles, water striders, backswimmers, corixids, snails, and a few introduced swamp crawfish. Notable by their absence were the types of insect larvae (stoneflies, caddisflies, mayflies) associated with highly productive, rocky streams. Also absent were flatworms and leeches, which are common in perennial streams in this area, but cannot survive in streams that go dry in summer, and are slow to colonize new areas (unlike flying insects or good swimmers such as fish). Very few water-associated birds were observed during field reconnaissance on May 3, 2000 (one green heron, one kildeer, one pair of mallards).
The stream within the project zone lacks structural habitat diversity, is unshaded and subject to large fluctuations in temperature, dries up in the summer, and is relatively unproductive (lacks nutrients provided by decomposing leaves and twigs, which usually serve as the base of the food chain in small streams). As a result of these factors, aquatic life is poorly represented.

Special Status Species

Several special status species occur within the project area or within the vicinity of Colgan Creek. The California tiger salamander (federally-listed as endangered under emergency listing) occurs within close proximity to the project site. There are known breeding sites within one mile of the project site. The tiger salamander uses vernal pools for breeding and small mammal burrows in upland habitats for estivation.

Within the Russian River and some of its tributaries Coho salmon, chinook salmon, and steelhead are known to occur. Western pond turtle, Russian River tule perch, California roach, hardhead, river lamprey, and pacific lamprey are also found in the Laguna de Santa Rosa and/ or the Russian River. The California Roach is the only special status species known to be currently present within the project reach. Western pond turtles, foothill yellow legged frogs, and northern red legged frogs likely inhabited the project area historically.

The yellow-breasted chat (California Department of Fish and Game Species of Special Concern) is one of many riparian bird species that have suffered population declines in Sonoma County as a result of the loss of riparian woodlands in and around the Laguna de Santa Rosa. Chats are known to nest in dense riparian growth along waterways in isolated pockets of the county. Restoration of Colgan Creek will encourage the return of this and other riparian bird species.

The restoration of Colgan Creek will provide cover and create foraging and nesting opportunities for both resident and migratory birds, as well as resident amphibians and reptiles. The restoration will also have downstream affects to the special status species found within the Laguna de Santa Rosa and the Russian River. Restoration will have a positive impact on the survival of special status species by providing woody debris and food (insects, invertebrates, etc.).

Wetland delineation confirmed by the U.S. Army Corps of Engineers shows wetlands in the area immediately north of the Colgan Creek corridor between Burgess Drive and Dutton Meadow Road. Special status plant species that frequently are present in vernal pools within the Santa Rosa Plain include
Sebastopol meadowfoam, Burke's goldfields, Sonoma sunshine, and dwarf downingia.

**PUBLIC PARTICIPATION**

Public participation in the preparation of the conceptual plan included a meeting with the SCWA, a public meeting and walking tour of the project reach, a City Council study session, review by the Santa Rosa Waterways Advisory Committee and presentation to a class at Elsie Allen High School.

The public meeting and creek walk were held on June 28, 2000. Approximately 20 people attended the meeting. Overall, people were in favor of the project. Issues and questions raised by the public are listed below. City or consultant responses to questions are in italics.

- **Bike path, public access, and neighborhood safety.** This proposed configuration of the bike path is a big concern for neighbors, especially those in the Victoria Drive area. Of particular concern are vandalism, burglary, and police response. Are there comparison studies with the Santa Rosa Creek bike path regarding safety concerns? The Victoria Drive neighborhood is a County pocket within the City. Will City police respond to this area? Victoria Drive residents asked whether backyard fences would be redone as part of the project.

  The bike path should be blended with the creek restoration project. One suggestion was to put the path, or just the upper part of the path, along the west side of the creek. It was noted that the bike path should be accessible by road and follow existing or planned transportation patterns (such as the road planned with Marv's Meadows subdivision), and be less disruptive to wildlife corridors.

  Subsequent to the public meeting, Canine Companions for Independence objected to the proposal to put the bike path on the east bank of the creek.

  **Note:** In the revised conceptual plan, the bike path is planned for the west bank of the creek upstream (north) of Bellevue Avenue, terminating at the intersection of the creek and Dutton Avenue.

- **Level of flood protection.** Will the level of flood protection be the same in both alternatives? The conceptual channels are both designed to accommodate a 100-year storm event as determined using current SCWA hydrology. The current channel was designed to accommodate a 25-year storm event. Subsequent to the preparation of the concept plan, the hydrology for the Colgan Creek watershed is being reviewed. The level of flood protection that will be achieved with the restoration project will need to be determined after the new hydrological analysis is completed.
• **Taking private property.** It is not the intent of the City or the plan to “take” private property. Rather it is the intent of the plan to work with private property owners to improve their property as well as the creek through creative design alternatives and observance of creek setbacks. If, for any reason, no design solutions are available, and it is necessary for private property to be taken, landowners should be compensated at market value.

• **SCWA participation.** People asked about SCWA’s support of the conceptual designs and commitment to maintenance. SCWA will be reviewing the conceptual designs. On other creek restoration projects within the City, SCWA has performed hydraulic maintenance and the City has maintained bike paths, benches and other amenities. (The SCWA subsequently reviewed and supports the conceptual designs).

• **Will neighboring properties drain to the creek?** Yes.

• **Wetland impacts.** Will any Corps jurisdictional wetlands be impacted? Can the new channel be considered mitigation for any wetlands destroyed? If wetlands are impacted, we anticipate that mitigation wetlands would need to be created just as if the new channel were a development project. While the new channel would be waters of the U.S., it’s unlikely that the Corps would accept it as mitigation for wetland impacts.

  What about impacts to subsurface water and vernal pools and their special status species? The new channels will not be deeper than the existing channel. Vernal pools receive very little water from subsurface flow and should not be affected.

• **Community volunteers.** Can volunteers help with the project? Yes. The City is already working with the Community Development Academy and Elsie Allen High School. The school has a greenhouse that isn’t being used. Volunteers could help collect acorns and assist with planting.

• **Hearn Avenue recharge area.** It was noted that residences in the vicinity of Hearn Avenue have shallow wells. It’s important to consider that flood conveyance can decrease groundwater recharge.

• **Downstream Effects.** What happens downstream of this project and further downstream to the Laguna? This project could be a pilot project for future restoration along Colgan Creek.

• **Bridges.** It was noted that existing bridges would need retrofitting.

• **Spoils.** Are there any plans for the spoils? It could be used for the planned developments.
• **Conceptual plan park areas in Alternative #1.** Will the parks be depressed to increase flood storage? They could, although the storage would be minimal.

**PROPOSED CREEK RESTORATION**
The objectives for the Colgan Creek Conceptual Stream Restoration are to:

- Develop approximate bankfull channel dimensions that will maintain sediment transport through the project site with in-stream enhancements such as pools and riffles.
- Create flood plains to contain the 100-year storm and help minimize channel erosion.
- Restore the riparian corridor to improve water quality while providing aquatic and wildlife habitat enhancement.
- Provide a bike path and public access for recreational opportunities.
- Provide an educational opportunity for Elsie Allen High School.

**Channel Geometry**
Bankfull geometries for the conceptual stream channel were derived from field measurements of several stream reaches in the Santa Rosa Plain. Bankfull indicators were examined along Colgan Creek in the natural reach above Petaluma Hill Road (above development), the middle channelized reach, and the lower vegetated but modified reaches below Todd and Llano Roads. Roseland Creek was also measured below Llano Road in both the modified and natural reaches. Matanzas, Spring and Copeland Creeks were also investigated with less conclusive results. In addition, Dunne and Leopold’s regional curve for the San Francisco Bay region at 30 inches annual precipitation was consulted to determine an appropriate range for bankfull width, depth and cross sectional area. Plan view geometries were measured from historic aerial photographs of the Santa Rosa Plain from 1942. These measurements were used to develop acceptable ranges for meander length, amplitude, belt width and radius of curvature and fell mostly within the ranges reported throughout the United States by Leopold in “A View of the River.” The proposed new channel stream length is 7,281 linear feet vs. the existing pre-project length of 6,523 linear feet.

**Bankfull Hydrology**
Bankfull flows were analyzed using several methods for the project reach. The first method was the intensity formula from Plate No. B-2 of the SCWA Flood Control Design Criteria manual for the 1.4 year storm that resulted in 675 cubic feet per second (cfs) at the Bellevue Avenue bridge. The second method was Dunne and Leopold’s equation from “Water in Environmental Planning,” page 616, for the San Francisco Bay region for bankfull discharge to drainage area. This gave a bankfull flow of 185 cfs at the Bellevue Avenue Bridge. U.S. Geological Survey’s “Magnitude and Frequency of Floods in California” by
Waananen and Crippen for the 2-year storm computed to 535 cfs at the Bellevue Avenue bridge with much higher flows using the urbanization factors. A near bankfull storm occurred on February 13, 2000. Velocity and cross section were measured on site. A flow of 228 cfs was calculated for that event. Bankfull flow rates used for the conceptual design are presented at the end of this summary report.

**Bankfull Hydraulics**

Once bankfull geometry ranges and hydrology were developed for the project reaches, Manning’s equation was used to analyze channel hydraulics and develop conceptual bankfull channel design dimensions. Bankfull cross-sections were developed for four reaches with bankfull widths of 29.5 feet (Sta. 204+87 to 205+90), 28.5 feet (Sta. 205+90 to 224+21), 27.5 feet (224+21 to 233+30) and 26.5 feet (Sta. 233+30 to 269+40). Shear stress and bed material mobilization using the modified Shields curve were also considered. Further refinement should be made in the final design phase including detailed analysis of streambed core (core samples) and streambed surface composition (pebble counts). The Manning’s roughness used for the bankfull channel hydraulic calculations was 0.032.

**Floodplain Hydrology and Hydraulics**

Floodplain analysis was done for the 10, 25 and 100-year storms using SCWA flood control hydrology and by using the Manning’s equation on the reaches with 28.5 feet and 26.5 feet bankfull widths. Reaches with 29.5 feet (very short reach) and 27.5 feet bankfull widths have some of the floodplain dimensions assumed. Numerous cross section and flood plain dimensions were analyzed. Minimum floodplain widths were developed that would contain the 100-year storm, with a minimum freeboard of 2 feet. The floodplain widths vary throughout the design where room permits. A Manning’s roughness of 0.060 was used for vegetated floodplain and banks above bankfull.

An additional 100-year storm analysis was conducted using an over-estimated Manning’s roughness of 0.060 for the bankfull channel and 0.150 for the vegetated floodplain and banks above bankfull. The analysis showed the 100-year storm still passed through the project area with 0.5 foot of freeboard.

Philip Williams & Associates, Ltd. performed a hydraulic analysis for Colgan Creek as part of the restoration concept plan project. Their report is titled Lower Colgan Creek: Hydraulic Analysis and dated May 14, 2001. The analysis assessed the hydraulic capacity of the channel with the implementation of the concept plan, including the effects with and without existing bridge street crossings in place. The report concluded that under the proposed restoration concept plan, with the assumption of reasonable vegetation management in the enlarged
channel, removal of the private driveway bridge and replacement of the Dutton Meadow bridge, channel conveyance in the study reach will increase to carry the 100-year, ultimate development condition peak flow.

Any new hydrologic flood flow data available for the 10, 25 and 100-year storms should be used for modeling in the final design phase.

**Bridges**

It was assumed that the bridges throughout the project reach are undersized and would have to be modified in the final design stage. No backwater condition was assumed for the conceptual channel hydraulic analysis.

**Channel Gradient**

For purposes of this conceptual design, an average stream slope (riffle crest to riffle crest) of 0.002 ft/ft was used. This is a simplification of the existing channel gradient variations. The channel gradient of 0.002 ft/ft used between boulder drop structures works for the conceptual design as one possible scenario. It may not be the finished gradient used for the final design phase. For example, the average gradient could be steeper through the upper reaches where the channel is confined by development. Achieving the 0.002 ft/ft gradient in the lower reaches will require modifying the 3 feet concrete drop control structure at the bottom of the site to an 18-inch drop. This allows additional flood conveyance through the laterally constricted lower reaches along Bellevue Avenue and keeps the channel bottom below storm drain outlets.

**Channel and Habitat Features**

The conceptual plan includes drawings of boulder bank protection, drop structures, vanes, and woody debris habitat structures to explore the possibilities that should be considered in the final design phase. The conceptual design assumes all 1:1 bank slopes will have vegetated boulder armoring to bankfull and vegetated fabric reinforced earth fills above. 2:1 slopes on outside bends may need boulder toe protection or biotechnical bank protection. Any slope 3:1 or flatter will be protected by native plant reforestation. Boulder armor at outside bends can be designed to enhance aquatic habitat.

**Next Phase of Planning and Design**

The plan shows a conceptual representation of how the stream may look after construction. It also shows the boundary lines for the restoration project. In order to develop a final set of construction plans, the following will be necessary:

- Obtain onsite hydrologic, geomorphic and biological monitoring data during at least two rainy seasons.
• Procure revised flood flow calculations (Q100, etc.) for Colgan Creek.
• Procure accurate topographic map with property lines.
• Prepare design and specifications.
• Obtain environmental regulatory permits for the project.
• Prepare a monitoring plan to gauge the success of the project and gather information for adaptive management.
APPENDIX A
GEOMORPHIC AND HYDRAULIC DESIGN DATA

Note: Station numbers refer to pre-project SCWA stationing. For a glossary of geomorphic and hydraulic design data terms, see Appendix B.

**Bottom of site**
Sta. 204+87 to 205+90

- \( Q_{bf} = 240 \text{ cfs} \)
- \( Q_{10} = 1,021 \text{ cfs} \)
- \( Q_{25} = 1,189 \text{ cfs} \)
- \( Q_{100} = 1,501 \text{ cfs} \)

  - Bkf Width = 29.5’
  - Bkf Mean Depth = 2.31’
  - XS area = 68 ft²
  - \( W/D = 12.7 \)
  - Channel bottom width = 18’
  - Bkf Velocity = 3.53 ft/sec.
  - Bkf shear stress = 0.27 lbs/sq.ft.
  - Assumed slope = .002 ft/ft.
  - Min. Entrenchment = 2.2; flood prone width = 65’

  - 100yr width = 64’
  - 100y. depth = 7.5’
  - 100 yr. velocity = 5.5 ft/sec
  - 100 yr. shear stress = 0.55 lbs/sq.ft.

  - Top of bank min. width = 76’
  - Top of bank height (existing) 10’ free board = 2.5’
  - Meander length (10.9W₁.₀₁) = 333’ range (10-14 bkf widths) = 295’ – 413’
  - Amplitude (2.7W₁.₁) = 112’
  - Radius of curvature (2.3BkfW) = 68’ range to from field measurements (4BkfW) = 118’
  - Riffle to riffle (5-7W) = 147’ - 205.5’

**Downstream Culverts to Dutton Meadows Road**
Sta. 205+90 to 224+21 (along Bellevue)

- \( Q_{bf} = 230 \text{ cfs} \)
- \( Q_{10} = 979 \text{ cfs} \)
- \( Q_{25} = 1,139 \text{ cfs} \)
- \( Q_{100} = 1,437 \text{ cfs} \)

  - Bkf width = 28.5’
  - Bkf Mean Depth = 2.31’
XS area = 65.9 sq.ft.
W/D = 12.3
Channel bottom width = 17'
Bkf Velocity = 3.52 ft/sec.
Bkf shear stress = 0.27 lbs/sq.ft.

100yr width = 62.5'
100yr. depth = 7.35'
100yr area = 272 sq.ft.
100 yr. velocity = 5.28 ft/sec
Shear stress = .54 lbs/sq.ft.
Assumed slope = .002 ft/ft.
Min. Entrenchment = 2.2; flood prone width = 62'

Top of bank min. width = 75'
Top of bank height (existing) = 10'

Meander length (10.9W_{1.01}) = 321' range (10-14 Bkf widths) = 285' – 399'
Amplitude (2.7W_{1.1}) = 107'
Radius of curvature (2.3 BkfW) = 65.5' range to (4 BkfW) = 114'
Riffle to riffle (5-7W) = 142'-200'

Optimum belt width (using 10.9w=ML, 2.7w=A, 2.3w=Rc) = 140'
With 2:1 side slopes belt width = 176' Range 120' to 180'

Dutton Meadows to 90-Degree Bend Outlets at Bellevue Ave.
Sta. 224+21 to 233+30

Q_{bf} = 214 cfs   Q_{10} = 910 cfs   Q_{25} = 1,057 cfs   Q_{100} = 1,334 cfs

Bkf width = 27.5'
Bkf Mean Depth = 2.25'
XS area = 62.5 sq.ft.
W/D = 12.3
Channel bottom width = 16.5'
Bkf Velocity = 3.46 ft/sec.
Bkf shear stress = 0.28 lbs/sq.ft.

100yr width = 60.5'
100yr. depth = 7.5
100 yr. velocity = 5.28 ft/sec
Shear stress = .54 lbs/sq.ft.
Assumed slope = .002 ft/ft.
Min. Entrenchment = 2.2; flood prone width = 60.5'

Top of bank min. width = 73'
Top of bank height (existing) = 10'

Meander length (10.9W_{1.01}) = 309'; range (10-14 bkf widths) = 275' – 385'
Amplitude (2.7W_{1.1}) = 103'
Radius of curvature (2.3W) = 63' range to (4W) = 110'
Riffle to riffle (5-7W) = 137.5'–192.5'

90-Degree bend at Bellevue to top of Project
Sta. 233+30 to 269+40

Q_{bf} = 200 \text{cfs} \quad Q_{10} = 910 \text{cfs} \quad Q_{25} = 1,057 \text{cfs} \quad Q_{100} = 1,334 \text{cfs}

Note: Q 10, 25, 100 were not provide by SCWA.

Bkf width = 26.5'
Bkf Mean Depth = 2.21'
XS area = 58.82 sq.ft.
W/ D = 12.0
Channel bottom width = 15.5'
Bkf Velocity = 3.41 ft/sec.
Bkf shear stress = 0.27 lbs/ sq.ft.

100yr width = 59.27
100yr. depth = 7.32
100yr area = 254 sq.ft.
100 yr velocity = 5.23 ft/sec
Shear stress = 0.5 lbs/ sq.ft.
Assumed slope = .002 ft/ ft.
Min. Entrenchment = 2.2; flood prone width = 58.3'

Top of bank min. width = 72'
Top of bank height (existing) = 10'

Meander length (10.9W_{1.01}) = 298.5'; range (10-14 bkf widths) = 265' – 371'
Amplitude (2.7W_{1.1}) = 99'
Radius of curvature (2.3W) = 61' range to (4W) = 106'
Riffle to riffle (5-7W) = 132.5'–185.5'
APPENDIX B

GEOMORPHIC AND HYDRAULIC GLOSSARY

aggrade, aggrading, aggradation — with relation to stream systems, to fill with sediment over time; the raising of a stream-channel bed over time due to the deposition of sediment that was eroded and transported from the upstream watershed or the channel.

amplitude — the distance, perpendicular to the valley, between the centers of the channel over one half of the wavelength. Related to the distance of meandering between two consecutive bends in the channel.

bankfull — stage at which sediment transport is most effective.

bankfull channel — channel formed by the dominant discharge (see definition below); also referred to as the active channel.

bankfull discharge — flow that results in the average morphic characteristics of the channel; see definition of dominant discharge below.

bankfull mean depth (Bkf Mean Depth) — the mean depth of the bankfull flow.

bankfull shear stress (Bkf shear stress) — the average shear stress exerted by the bankfull flow at a given location.

bankfull velocity (Bkf Velocity) — the average velocity of the channel at a given location during the bankfull flow.

bankfull width (Bkf Width) — the width at the top of the bankfull channel.

barrier — the stoppage of materials, energy, and organisms.

bed — bottom of a channel.

belt width — outside width of meandering of the bankfull channel.

channel — a natural or artificial waterway of perceptible extent that periodically or continuously contains moving water. It has a definite bed and banks which serve to confine the water.

core samples — a sample of what lies below the bed of the stream. Can be used to determine the size and type of gravels that are moving through the system.

cross-sectional area (XS area) — the area of a stream, channel, or waterway opening, usually taken perpendicular to the stream centerline.

degradate, degrading, degradation — with relation to stream systems, to cut down or lower the channel bottom over time; the lowering of a stream-channel bed over time due to the erosion and transport of bed materials or the blockage of sediment sources.

dimension — in this document, refers to the cross section measurement of the bankfull channel and flood-prone area.

discharge — volume of water passing through a channel during a given time, usually measured in cubic feet per second.
drop structure — a structure in the bed of the stream where the flow drops vertically over it.

entrenched stream — a stream deeply incised or degraded, cut into bedrock or consolidated deposits, often with over-steepened banks and abandoned flood plains.

entrenchment ratio — an indicator of how entrenched, or vertically contained a stream is. Quantitatively, it is the ratio of the width of the flood-prone area to the surface width of the bankfull channel. The flood-prone area width is measured at the elevation that corresponds to twice the maximum depth of the bankfull channel.

ephemeral stream — one that flows briefly only in direct response to precipitation in the immediate locality and whose channel is at all times above the water table.

flood flow — a flow above bankfull discharge.

floodplain — flat area adjacent to the bankfull channel at the elevation where flows overtop the bankfull channel; land adjacent to a channel at the elevation of the bankfull discharge, which is inundated on an average of about two out of three years.

fluvial — of, pertaining to, or inhabiting a river or stream; formed or produced by the action of flowing water.

groundwater flow — water that moves through the subsurface soil and rocks.

habitat — the spatial structure of the environment that allows species to live, reproduce, feed, and move; provide necessary elements of life including space, food, water, and shelter.

hydrology — study of flows resulting from rainfall; study of the properties, distribution, and effects of water and ice on earth’s land surfaces, in the soil and underlying rocks, and in the atmosphere.

intermittent stream — a seasonal stream; is in contact with the ground water table that flows only at certain times of the year as when the ground water table is high and/or when it receives water from springs or from some surface source such as melting snow in mountainous areas; it ceases to flow above the streambed when losses from evaporation or seepage exceed the available stream flow.

Manning’s “n” Roughness Coefficient — an empirical coefficient for computing stream bottom roughness used in determining water velocity in stream discharge calculations.

meander — a sinuous channel form.

meander amplitude — the width of the meander measured at the center of the bankfull channel and measured perpendicular to the valley.
meander length — also called “wavelength.” The distance, along the creek, between two successive points in the wave that are characterized by the same phase of oscillation.

minimum entrenchment (min entrenchment) — the design minimum allowable value of entrenchment.

morphology — study of shape, form, or structure of, in the case of this report, streams.

100-year depth — the depth of flow at the peak of the 100-year storm.

100-year shear stress — the average shear stress exerted on the channel at the peak of the 100-year storm.

100-year storm — the storm event of such intensity that it occurs only once in one hundred years.

100-year velocity — The average velocity within the channel at the peak of the 100-year storm.

100-year width — The top width of flow during the peak of the 100 year storm.

pattern — as used in this report, the channel’s form as observed in plan view; the channel pattern is described in terms of its sinuosity, belt width, wave length, and related geometric relationships.

pebble — stone ½ to 3 in. in diameter, including coarse gravel and small cobble.

pebble count — used to determine particle size distribution by measuring 100 bed particles at specified locations.

perennial stream — one that flows continuously throughout the year.

pool — location in an active stream channel where the water is deepest and has reduced current velocities.

radius of curvature — radius of the circle defining the curvature of an individual bend, measured between adjacent inflection points.

reach — a section of a stream’s length.

regional curve — a plot of bankfull channel dimensions by drainage area.

riffle — a shallow rapid.

riffle to riffle — the distance between consecutive riffles, generally five to seven bankfull widths.

riparian — pertaining to anything connected with or immediately adjacent to the banks of a stream or other body of water.

sediment — fragmental material that originates from weathering of rocks and decomposition and erosion of organic material that is transported by, suspended in, and eventually deposited by water or air, or is accumulated in beds by other natural phenomena.

sediment transport — see definition of sediment above.

sinuosity — the amount of curvature in the channel.
stream bank — side slopes of an active channel between which the stream flow is normally confined.
streambed — see definition of bed above.
stream slope — riffle crest to riffle crest
toe — break in slope at the bottom of a slope.
top of bank minimum width — minimum width of top of highest banks.
top of bank height — distance from lowest point in channel to top of highest bank.
velocity — the rate of motion of objects or particles
watershed — an area confined by topographic divides that drains a given stream or river.
Width/depth ratio (W/D) — the ratio of the bankfull surface width to the mean depth of the bankfull channel.
woody debris — woody material that is introduced into the stream channel.
## APPENDIX F Site Specific Santa Rosa Citywide Creek Master Plan Projects by Creek Reach

<table>
<thead>
<tr>
<th>City Project # (Capital Improvement Program - CIP)</th>
<th>Project Name</th>
<th>Type of Project</th>
<th>Creek Habitat Restoration</th>
<th>Parks &amp; Open Space</th>
<th>Alternative Transportation Modes</th>
<th>Water Quality</th>
<th>Flood Control</th>
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<tbody>
<tr>
<td>Santa Rosa Creek Watershed</td>
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<td>Santa Rosa Creek Watershed Reach 1 Highway 12</td>
<td>Calistoga Road</td>
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<td>Farmers Lane</td>
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</table>

- **Santa Rosa Creek**
  - Reach 1 Highway 12: Calistoga Road
  - Reach 2 Calistoga Road: Farmers Lane
  - Reach 3 Farmers Lane: E Street
  - Reach 4 E Street: Pierson Street
  - Reach 5 Pierson Street: Stony Point Road
  - Reach 6 Stony Point Road: Pinier Creek
  - Reach 7 Pinier Creek: Willowside Road
  - Reach 8 Willowside Road: Laguna de Santa Rosa

- **Outside UGB**
  - Santa Rosa Creek Watershed Reach 1: Ridgley Avenue
  - Santa Rosa Creek Watershed Reach 2: College Creek Trail from Willowside Road to Guerneville Road

- **College Creek**
  - Reach 1 Santa Rosa Creek: College Creek Trail Connection to College Creek
  - Reach 2 Santa Rosa Creek: College Creek Trail from Willowside Road to Guerneville Road

- **Alternative Transportation Modes**:
  - Trail Bridge
  - Trail Under Xing
  - Trail Access Point
  - Trail Access Point

- **Water Quality**
- **Flood Control**
## APPENDIX F Site Specific Santa Rosa Citywide Creek Master Plan Projects by Creek Reach

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<th>Flood Control</th>
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APPENDIX F Site Specific Santa Rosa Citywide Creek Master Plan Projects by Creek Reach
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