Pre-print Final Report
Sanborn County Park
Trails Master Plan
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County of Santa Clara
Parks and Recreation Department
Sanborn County Park Trails Master Plan
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EXECUTIVE SUMMARY

The Sanborn County Park Trails Master Plan defines an expanded trail system to meet the changing recreational and interpretive needs of a diverse and growing population. Sanborn County Park is estimated to be operating below visitor capacity, thus the 3,688-acre park provides an immediate opportunity to attract and serve more park visitors. Sanborn County Park has the lowest density of trails (trail miles per park acreage) of all the County parks that do not include large reservoirs. Expansion of the trail system makes the park more available and attractive to the park users.

The Sanborn County Park Trails Master Plan approximately doubles the length of the existing trail system. The current trail system provides 19 miles of trails for hikers and equestrians. This Trails Master Plan expands the system to approximately 38 miles of trails for hikers, dog walkers, equestrians and mountain bikers. Thirty-nine named trails are proposed ranging from short one-quarter mile loops to five-mile long distance trails.

Three regional trails are planned within Sanborn County Park: the Bay Area Ridge Trail, the Juan Bautista de Anza National Historic Trail and the Saratoga to Sanborn Trail. These trails support dual use or multiple use. These regional routes reflect current visitor demands for multiple use trails. Trail uses within the park will be expanded based upon the changing interests of the public. The once rural and agricultural character of the “Valley of Heart’s Delight” has steadily been giving way to the high tech culture of “Silicon Valley.” This cultural evolution has brought with it a change in desired trail uses. This plan reflects the trail use changes of the regional trail systems and of the residents of Santa Clara County.

The plan opens the park to new trail user groups, dog owners with dogs on-leash and mountain bikers. Dogs on-leash are recommended on all trails with the exception those that pass through sensitive resources areas. Mountain biking is opened along Skyline Ridge and on several planned long-distance trails. A park visitor hiking, mountain biking or horseback riding through Sanborn County Park could cover over nine miles of trail before leaving the park boundary to enter Midpeninsula Regional Open Space District preserves or California State Park lands.

This plan realigns portions of the existing trail system and weaves segments of these trails into the new routes, which are better located for the park’s mountainous terrain and natural resources. The majority of the existing system is integrated into this plan, but in two areas the trails are reorganized, and in some instances closed or rerouted, to better protect park resources, improve circulation and reduce visitor confusion. The two areas of trail reorganization are the Day Use Area situated between the Youth Science Institute and Walden West and the parklands located east of Sanborn Road near the confluence of Sanborn and Aubry Creeks. In addition, two trails are proposed for major realignment, the Peterson Trail and San Andrews Trail.

The Trails Master Plan identifies alignments for three planned regional trails, improves internal park circulation between distant regions of the park, strengthens and expands the environmental education use of the trails in the center of the park, adds diversity to the trail experiences and provides both short-term and long-range solutions to trail access from the central Day Use Area.

The Trails Master Plan is currently being reviewed under the guidelines of the California Environmental Quality Act (CEQA). The environmental documents are under preparation for public review. Upon completion of the environmental review
process, the Trails Master Plan and associated environmental documents will be adopted by the County Board of Supervisors. Adoption of these documents is the first step toward implementing the expanded trail system.

The Trails Master Plan consists of four chapters.

Chapter 1 – Trail Overview provides an introduction to the park setting, discusses the goals of the trails master plan and highlights the public involvement process and methodology used to develop the trail system.

Chapter 2 – Site Analysis describes in detail the hydrologic, geologic and biologic resource opportunities and constraints to trail development. The chapter concludes with a description of the trail suitability factors and analysis of the park landscape.

Chapter 3 – Trail Routes and Uses describes the trail system, identifies changes to the regional trail alignments and proposes trail access improvements and staging areas. The thirty-nine trails are categorized by trail user access: hiking, hiking/equestrian, hiking/mountain biking and multiple use. The chapter details existing trails proposed for closure or rerouting and notes areas of the park deemed unsuitable to support trail development.

Chapter 4 – Implementation proposes construction phasing and describes the trail ranking criteria and tiered prioritization used to develop the phasing plan. Construction budget estimates and staffing needs are identified for the expansion of the trail system. The chapter also highlights trails design guidelines unique to Sanborn County Park and identifies specific trail construction projects that can be built by volunteer groups.
INTRODUCTION

The 2003 County Parks Strategic Plan identifies trail development action items. One of the objectives calls for the preparation of three park-specific trail master plans over a ten-year period to increase multiple-use trails and to ensure consistency with the 1995 Santa Clara Countywide Trails Master Plan and 2003 Santa Clara County Parks Strategic Plan. In 2003, the County Parks and Recreation Commission identified Sanborn County Park as the first park in which to develop a trails master plan to meet this Strategic Plan objective.

The Sanborn County Park Trails Master Plan provides a comprehensive long-term plan for management of a multiple use trail system. The trails master plan complements the rugged, mountainous park that affords visitors a wilderness experience in Santa Clara County. The majority of the trails identified in this plan are relatively narrow in width due to the challenging, physical constraints of the terrain and due to the public’s desire for a sense of remoteness (2003 Strategic Plan).

The plan provides trail opportunities for all self-propelled trail users including hikers, mountain bikers, equestrians and dog walkers, in keeping with the 1995 Countywide Trails Master Plan and the 2003 County Parks Strategic Plan which both promote an increase in multiple use trails. The trails master plan identifies short-range and long-range goals for implementing the trail vision using current land holdings and expanding the system as other lands become available.

LOCATION AND PARK AMENITIES

Sanborn County Park is nestled in the Santa Cruz Mountains between the City of Saratoga and Skyline Boulevard (See Map 1 – Regional Setting Map). This 3,688-acre park is the headwaters of Saratoga Creek draining to the north. The area east of Lake Ranch flows to a tributary of Los Gatos Creek that drains southeast through Lyndon Canyon. The park contains redwood forests, mixed evergreen forests of black oaks, tan bark oaks, madrone and Douglas fir, riparian corridors, meadows and chaparral habitats. The park elevations range from 840 feet to 3,160 feet with an overall elevation change of 2,320 feet. The San Andreas Fault extends through the park. The steep terrain and unique geological conditions present challenges to locating trail alignments in suitable areas.

Sanborn County Park offers wilderness experiences just a short drive from the City of Saratoga. This mountainous park provides walk-in campsites for families and youth groups from spring through fall and a year-round RV campground. In addition, the Sanborn Park Hostel, a member of American Youth Hostels, Inc., operates from the historic Welch-Hurst home (ca. 1913) within the park.

The park also serves two environmental education centers and the Park Management Program offered by West Valley College. The Youth Science Institute operates out of the Dyer House (ca. 1915) located near the Day Use Area. The Walden West Outdoor Education Center, a program of the Santa Clara County Board of Education, is located on land surrounded by Sanborn County Park. These environmental education and community college programs use the park as their outdoor classroom. Their students are the principle users of the trail system.
Map 1 – Regional Setting Map
Existing Trail System

The current trail system includes approximately 19 miles of trails that are open to hikers and equestrians only. Large portions of the park have no existing trails. Sanborn County Park has the lowest density of trails (trail miles per park acreage) of all the County parks that do not include large reservoirs. The primary areas lacking trails are the Lyndon Canyon drainage that extends from the Lake Ranch area to Lexington Reservoir County Park in the southeast and the Bonjetti Creek and McElroy Creek watersheds in the northwest. The current trail system offers spectacular vistas and tranquil landscapes, but can be quite challenging due to the steep grade encountered on many of the trails. Much of the trail system is also unsuitable for the multiple use regional trails envisioned for Sanborn in the 1995 Santa Clara Countywide Trails Master Plan.

A persistent problem at Sanborn is the prevalence of volunteer trails coursing through the park, especially between the Visitor Center situated near the Day Use Area and Walden West and the Youth Hostel located off Pick Road. These trails often do not meet the standards set forth in the Uniform Inter-jurisdictional Trail Design, Use and Management Guidelines (1995) and were never approved by the Board of Supervisors. These volunteer trails often occur in sensitive habitats causing damage to natural resources.

PUBLIC INVOLVEMENT PROCESS

The public involvement process included regular meetings with a Technical Advisory Committee and Project Team. The process included outreach to trail users and stakeholders through a public scoping meeting and individual stakeholder meetings. The Technical Advisory Committee is comprised of eleven members representing various trail user groups, nearby residents and trail organizations (See Appendix A – Technical Advisory Committee Roster). The Project Team includes representatives from the various County Parks and Recreation Department divisions including planning, operations, maintenance, natural resources and interpretation (See Appendix B – Project Team Roster). These two groups met regularly for a period of one-year to provide input on the development of the trail plan. A public scoping meeting was held at the beginning of the planning process to gather suggestions on trail uses and potential routes for the expansion of the trail system. In addition, stakeholder meetings were held with adjoining property owners throughout the planning process to further the investigations of specific trail corridors.

A Preferred Trail Alternatives Plan was developed at the mid-point in the planning process to provide the Parks and Recreation Commission, Technical Advisory Committee, Project Team and public an opportunity to comment on the plan prior to the preparation of the trails master plan and environmental documents. This interim report was a preliminary compilation of the comments received from the public, the Project Team, Technical Advisory Committee and staff and the analysis conducted in the field by staff and the consultant team. Comments received on this interim report were evaluated and incorporated into this trails master plan.

The Sanborn County Park Trails Master Plan and environmental documents will be reviewed by the Project Team, Technical Advisory Committee and Parks and Recreation
Commission before the documents are forwarded to the Board of Supervisors. Each of these reviews provides additional opportunities for public input on the Sanborn County Park Trails Master Plan.

TRAILS MASTER PLAN GOALS

The Sanborn County Park Trails Master Plan goals were derived from the trail concepts generated by Technical Advisory Committee members, the Project Team, comments received during the public scoping meeting and trails proposed in previously completed plans including the 1995 Countywide Trails Master Plan, Bay Area Ridge Trail Plan, Juan Bautista de Anza National Historic Trail Plan and the County Park Strategic Plan. The goals guided the planning process and the investigation of trail corridors (See Table 1 – Trails Master Plan Goals).

<table>
<thead>
<tr>
<th>Trail Master Plan Goals</th>
</tr>
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<tbody>
<tr>
<td>♦ Develop trail routes and uses for Regional and Connector Trails identified in the 1995 Countywide Trails Master Plan.</td>
</tr>
<tr>
<td>♦ Identify trail access for all users to meet both short-term needs as well as long-range planning consistent with all existing land agreements.</td>
</tr>
<tr>
<td>♦ Locate a mid-elevation route running northwest to southeast to provide a greater variation in trail difficulty.</td>
</tr>
<tr>
<td>♦ Develop more loop routes to provide a greater range of trail opportunities.</td>
</tr>
<tr>
<td>♦ Create a route from the Day Use Area to the Lake Ranch Area to eliminate the need for park users to walk on Sanborn Road.</td>
</tr>
<tr>
<td>♦ Introduce multiple-use trails into the park to meet the regional trail goals of the Bay Area Ridge Trail and Juan Bautista de Anza National Historic Trail and to be consistent with the 1995 Countywide Trails Master Plan.</td>
</tr>
<tr>
<td>♦ Evaluate existing trails relative to natural resources and reroute trails as necessary to enhance and preserve habitats.</td>
</tr>
<tr>
<td>♦ Evaluate opportunity for multiple use single-track trails that provide more of a remote wilderness experience.</td>
</tr>
<tr>
<td>♦ Evaluate the opportunity to provide more fully accessible trails for users of all abilities.</td>
</tr>
<tr>
<td>♦ Identify trail staging areas for all users: hikers, mountain bikers and equestrians.</td>
</tr>
<tr>
<td>♦ Identify partnership opportunities with landowners and agencies to implement common objectives.</td>
</tr>
</tbody>
</table>

Table 1 – Trail Master Plan Goals
These goals reflect the changing trail user demographic in Santa Clara County. The population in Santa Clara County is expected to grow by 23%, or about 380,000 residents, by the year 2025. This growth will increase the population to more than 2,000,000 people. Sanborn County Park is estimated to be operating below capacity (2003 Strategic Plan). Expansion of the trail system will make more areas of the park available to the park users of today and those of the future.

Prior to the commencement of this trails master plan, three regional trails were planned within Sanborn County Park. The Bay Area Ridge Trail, Juan Bautista de Anza National Historic Trail and Saratoga to the Sea Trail are all planned to support dual or multiple uses. In addition to a growing population, trail uses within the park will be expanding based upon changing interests of the public. The once rural and agricultural character of the “Valley of Heart’s Delight” has steadily been giving way to high tech culture of “Silicon Valley.” This change has brought with it a change in desired trail uses as equestrian demand diminishes and mountain biking requests expand. This plan reflects the trail use changes of the regional trail systems and of the residents of Santa Clara County.

**Methodology**

The Sanborn County Park Trails Master Plan included a landscape level analysis using Geographic Information System (GIS) data, field investigations to directly observe field conditions along desired trail corridors and surveys of all existing trails. The initial physical evaluation of the park terrain used the County Geographic Information System (GIS) data for geology, landslides, vegetation, sensitive species and cultural resources to produce suitability maps of the terrain. Site-specific trail corridor conditions were undertaken through an extensive fieldwork program conducted from January through November 2006. This fieldwork effort was strengthened by park staff members from the various divisions who conducted many additional trail corridor evaluations to arrive at this trails master plan. The existing trail system was also assessed and evaluated for incorporation into this trails master plan.

**Landscape Level Analysis**

The site conditions were initially analyzed using the County’s GIS data to develop graphic maps that portrayed the ability of the landscape to accommodate trail construction. Many factors that constrain trail development are present within Sanborn. The park has unique geology including unusual rock formations; the major geological fault located in California, the San Andreas Fault; and many geological units of varying suitability to support trails. These geological conditions contribute to the significant landslides that are observed throughout many areas of the park.

The GIS mapping provided graphic representations of areas most-to-least suitable for trail development. Four different physical parameters were used to estimate the general suitability of the landscape to support trail development. The four parameters included the erodibility of the geologic units in the park, presence of landslides, landscape slope and riparian zones. This analysis focused the placement of trail corridors and helped to refine the areas of fieldwork (See Appendix C – Opportunities and Constraints Analysis for Geology and Hydrology).
TRAIL PLAN OVERVIEW

TRAIL CORRIDOR FIELDWORK

Trail corridors desired by the Technical Advisory Committee, Project Team, public and staff were investigated through direct field observations. On several occasions these field reconnaissance visits resulted in trail corridors being eliminated from the trail plan altogether. In other instances the fieldwork verified the possibility of trail development or shifted the trail corridor to nearby areas. Staff and the consultant team conducted 30 field investigations.

EXISTING TRAILS SURVEY

In addition to the fieldwork undertaken to investigate new trail corridors, all 19 miles of existing trails were assessed. This work was primarily undertaken by the trail maintenance crew and planning staff. The trail crew collected data on trail length, grade, cross-slope, creek crossings, maintenance issues and unique features found along the routes (scenic view, waterfall, rock formation, unusual habitat, etc.). This data was used to reorganize and reroute existing trails (See Appendix D – Trail Inventory Form).

Meadow and mixed evergreen habitat as viewed from the proposed Valley Vista Trail.
HYDROLOGIC SETTING

DRAINAGES

The watersheds and sub-watersheds within Sanborn County Park range in elevation from 840 feet to 3,160 feet. The park receives average annual rainfall that ranges from 38 inches at the lower entrance of the park to 54 inches at the highest elevations along the southwestern boundary (Rantz, 1971). The drainages tend to be steep, and the creek channels are generally filled with boulders. Sanborn Creek occupies the valley eroded along the San Andreas Fault zone. The fault-zone valley serves as the master drainageway for the park. The steep tributaries drain northeastward into this valley. The main valley drains both to the northwest (Sanborn Creek towards Saratoga Creek) and to the southeast (Lyndon Canyon Creek towards Lexington Reservoir). Lake Ranch Reservoir is at the tipping point of these two drainage directions, with impoundment structures at both ends of the reservoir. Lake Ranch Reservoir is managed for water production by the San Jose Water Company.

“Filled” DRAINAGES

Certain sections of the drainage channels seem to have been partially filled at some point in the past by debris-flow/landslide deposits (colluvium). These deposits often take on the appearance of a flat-bottomed section of an otherwise “V-shaped” valley, or a small rocky ridge in a valley bottom with alternate stream channels on both side of the ridge. Where we have observed such valley fill, it is often 5 to 15 feet in depth (Todd Creek, the west-most branch of Aubry Creek, the headwaters of Sanborn Creek above Lake Ranch reservoir, and another unnamed channel draining to Lyndon Canyon. Some of these deposits appear to have occurred after the slopes were logged, others seem to have occurred before logging (based on large, old, cut stumps which grew on top of the fill deposits).

The importance of noting this is that filled drainages are evidence that the steep landscape of Sanborn County Park has evolved by way of the processes of landslides and debris flows (which have filled the bottoms of the drainages). Therefore we can expect more landslides and debris flows to occur as time marches on. Also, this valley fill material can be unstable and prone to rapid erosion. Trails and stream-crossing structures built on this type of fill can be lost if the fill material erodes. This erosion can happen gradually, such as by headward migration of knickpoints, but can also happen catastrophically during a single large storm.

Tree roots are stabilizing much of this fill, so trail building in the filled riparian areas should be conscious of this, and preserve as many trees and tree roots as possible.

“Braided” DRAINAGES

Either as a result of “filled” drainages or due to other causes, some sections of creek channels in Sanborn Park have multiple flow paths and are similar to “braided” stream channels. These are most common in the flat-bottomed drainages mentioned above. This braided type of channel form may be due to the creek channel working its way through
SITE ANALYSIS

old debris-flow deposits. Typically the valley bottoms in these locations are filled with boulders as well as growing redwoods or other trees.

Whatever the cause, these braided drainages present a challenge to trail crossings, because the location of the active channel is likely to shift over time (from month to month or from year to year).

SEEPS AND SPRINGS

Ground-water contribution to creek flow is important, and becomes increasingly evident toward the end of the dry season. During sites visits in September 2006 (when it had not rained appreciably since April), many small drainages had active surface-water flow. These are more common lower in the watershed, where there is more uphill elevation to contribute to the groundwater flow. Persistent late-season flow is important to sustaining riparian vegetation, stream biota, as well as providing potential water sources to equestrian trail users (piped to fill a trough rather than drinking from creek). Water year 2006 was unusually wet (approximately 140 to 160 percent of average annual rainfall), so these instances of late-season water will likely be less abundant after a dry year or series of dry years.

GEOLOGIC SETTING

REGIONAL GEOLGY

Sanborn County Park lies within the Santa Cruz Mountains, part of the southern Coast Range of California. The Coast Range was formed at the boundary of two major tectonic plates, the Pacific plate and the North American plate. As a result, the region contains several major fault systems, including the well-known San Andreas Fault, along with many minor fault traces—both active and inactive.

On the eastern side of the fault zone are the Franciscan, Santa Clara and Great Valley complexes, which make up the majority of the Central and Northern Coast Ranges. The Franciscan complex is a highly-sheared, jumbled mix of marine sedimentary, and altered volcanic and igneous rocks of basaltic composition that are locally called diabase. These rocks have a complex geologic history, and as might be expected, vary considerably in their properties from place to place. The Great Valley complex, typically exposed further east from the fault zone is composed of relatively un-metamorphosed sedimentary units of the intact overriding plate that were uplifted along with the Franciscan mélange after the plate margin changed from a subduction zone to a transform fault, approximately 25 million years ago (Alt and Hyndman, 2000).

West of the fault zone, younger sedimentary rocks of mid-Tertiary age underlie nearly all the park. The Vaqueros formation, principally a fine-grained sandstone with frequent shale interbeds, is the predominant unit, forming the bold cliffs and steep slopes that typify the park. The shales and mudstones of the San Lorenzo formation underlie most of the lower slopes west of the main valley. Small pockets of Mindego basalts are exposed where they have intruded both formations, as is typical of the central Santa Cruz Mountains from Pilarcitos Creek to Soquel Creek.
Much of the geologic history of the Santa Cruz Mountains is exposed in Sanborn Park and the trail-accessible adjoining ridges to the east and west, as described below. At the regional scale, Sanborn County Park provides the lynchpin of a magnificent transect running from Montebello Ridge through Sanborn Park to the Skyline-to-the-Sea Trail corridor connecting Castle Rock and Big Basin State Parks. This transect may well offer the premier opportunity to see and appreciate the complicated geologic history of the Coast Ranges available anywhere in the state.

**LOCAL GEOLOGY**

Sanborn County Park is divided in a northwest/southeast direction by the San Andreas Fault zone, though most of the park lies on the western side of the fault. Consequently, the geology of the park varies significantly from one side of the fault to the other. The following section summarizes the various rock units that outcrop within Sanborn County Park, consistent with the most current stratigraphic descriptions of Brabb, Graymer, and Jones (2000), but drawing upon a rich history of local and regional published work.

**EASTERN SANBORN PARK**

The San Andreas Fault crosses the park in the northeast corner, and continues southeastward near the eastern boundary of the park, through Lake Ranch Reservoir to the southern tip of the park. East of the fault, there are two primary units exposed within the park. Nearest the fault is a strip of unnamed sedimentary units, mostly mudstone and shale with some sandstone. Given the estimated age of these units (Eocene), it is likely that they are associated with the sedimentary units across the fault, and may represent a change in location of the fault trace (a slight, local jump from east to west) within the broader fault zone.

Further east of the fault, along the eastern edge of the fault zone, a band of diabase/gabbro is exposed. This unit may represent a piece of oceanic crust that was sheared off the subducting plate and incorporated into the Franciscan mélangé. At the very eastern edge of the park, the Franciscan complex proper is exposed. Most of the Franciscan complex within the park is composed of highly sheared greywacke, siltstone, and shale, though some bands of Franciscan argillite (weakly-metamorphosed shale), and coarse-grained sandstone with interbedded shale are present as well, most notably in the northeastern corner of the park.

**WESTERN SANBORN PARK**

The granitic rock that makes up a large part of the basal Salinian block on the western side of the fault is not exposed at the surface within the park, though it is presumably present at depth. Therefore the geology on the western side of the fault within the park is dominated by marine and nearshore sedimentary units that were deposited on top of the granite before the Coast Range was uplifted.

The Vaqueros formation underlies most of the western side of the park. This unit is composed predominately of coarse-grained sandstone, though layers of shale and mudstone are locally present, with beds up to 3 meters thick in places. The Mindego
basalt is exposed in this area as well, as tabular intrusions within the Vaqueros, however exposures are very limited.

East of the exposed Vaqueros rocks, a sliver of the San Lorenzo formation is exposed. This unit, stratigraphically below (older than) the Vaqueros, consists mainly of shale, mudstone, and siltstone, representing a deeper depositional environment. Within the park the San Lorenzo formation is exposed only in the lower reaches of the northeastward-draining canyons along the San Andreas Fault, and the unit is truncated by the fault on its eastern side.

Near the northeast corner of the park, a significant expanse of alluvial fan and alluvium is present. These sediments, predominately dense gravelly and clayey sand, were deposited within a small tectonic basin within the San Andreas Fault zone.

**ERODIBILITY**

The geologic units within Sanborn County Park erode at different rates due to a variety of factors. Units that are poorly consolidated, such as the artificial fill and alluvial fan/alluvial units, can rapidly erode or incise under certain conditions. Other units that are well-cemented, such as the Vaqueros sandstone, or are composed of resistant igneous material, such as the Mindego basalt, can be resistant to erosion. Geologic units such as the San Lorenzo and portions of the Franciscan, are moderately-well consolidated and have a resistance to erosion somewhere between the two extremes.

Erosion rates can also be affected by secondary tectonic processes that alter the strength of the rock unit. For example, portions of the Franciscan complex have been highly sheared, both initially during deposition and uplift more than 100 million years ago and during the past 20 million years associated with movement along the San Andreas Fault zone. These units are more erosive and prone to downslope movement (‘mass wasting’) than other units within the Franciscan complex that have not undergone extensive shearing.

Erodibility also depends on position within the surrounding landscape. Steep-slope areas, like much of the area within Sanborn Park, are also high-energy environments for erosion processes (primarily stormwater runoff and mass wasting in this case). Rilling, gullying, slumping and sliding all contribute to higher erosion rates in these areas than on similar material in low-slope areas. Low-lying areas with low slope are typically depositional environments, though these deposits may be prone to other erosion triggers.

While generalizations can be made about the erodibility of various rock formations on a broad scale, these estimates do not necessarily hold up on a localized scale. For example, on the whole the San Lorenzo formation has a moderate resistance to erosion compared to other units in the area. However, this formation includes a fairly broad range of sedimentary units, some of which can be highly erodible. Hence, these generalizations are useful for broad-scale planning of trails, but cannot be substituted for careful, site specific planning in the field and/or the use of appropriate on-site, erosion-reduction techniques in trail design.
GEOLOGIC HAZARDS

SEISMIC ACTIVITY

The San Francisco region is one of the more highly active seismic areas in the world, at the junction between two major tectonic plates—the North American and Pacific plates. The region is cut by several major faults, including the San Andreas, Hayward, and San Gregorio Faults, and numerous minor fault traces as well. Several major earthquakes have been recorded on these faults over the past two hundred years, including events in 1838, 1868, 1906, and 1989.

The United States Geologic Survey (USGS, 2003) estimates that there is a 21% chance that an earthquake magnitude greater than 6.7 will occur on the San Andreas Fault within the San Francisco Region sometime between 2003 and 2032. When considering all of the fault systems in the area, the USGS estimates a 67% chance of an earthquake greater than 6.7 occurring somewhere in the region by 2032. For reference, the 1989 Loma Prieta earthquake was a magnitude 6.9.

Sanborn Park straddles the San Andreas Fault zone, and therefore is likely to be affected by a major quake in the area. A major earthquake in the region could result in damage to park structures, rupture of utilities crossing the fault, earthquake-induced flooding and/or landslides (see below) and potential loss of life. However, damages would be of much smaller scale than in densely urbanized areas (where the threat of earthquake-induced fire is high), and in areas underlain by unconsolidated sediments (where ground-shaking is accentuated by the loose underlying material).

EARTHQUAKE-INDUCED FLOODING

During a large seismic event ground-shaking could weaken the earthen dams at Lake Ranch Reservoir (which are located at both the Lyndon Canyon and Sanborn Creek ends of the reservoir), as well as the impoundments of other small ponds in the northeastern portion of the park. A breach of any of these structures could result in rapid release of the water and flooding of downstream reaches. This could result in property damage and/or loss of life in some of the more highly utilized sections of Lyndon Canyon Creek and Sanborn Creek, and in tributary watersheds of Sanborn Creek that contain ponds.

LANDSLIDES AND DEBRIS FLOWS

The steepness of the terrain within Sanborn Park and the presence of active faults in the area contribute to the high occurrence of landslides within the park. Much of the park is prone to landslide activity, especially near the San Andreas Fault. The unconsolidated alluvial fan and fluvial deposits within the Sanborn Creek Valley in the northeastern corner of the park, as well as colluvial deposits that fill in many of the tributary valleys in the area, are evidence of previous landslide and debris flow events. While some slides likely correspond to watershed disturbance during past logging activity, others certainly occurred pre-settlement, a reflection of the high uplift rates and tectonic activity within the region.
SITE ANALYSIS

Landslides preferentially occur during wet periods—not just while it is raining, but throughout the entire wet season (when the ground is saturated even when it is not raining) and even more so when rainfall has been above average for a year or for multiple years. Water seeping underground at the bottom of a landslide serves to “lubricate” slip planes, decreasing a slope’s resistance to slippage.

SCARP COLLAPSE

At several locations within the park, vertical or overhanging scarps were observed at the head and sides of previous landslide and debris flow scars (specifically at the northwest end of the Earthquake trail). These over-steepened areas are prone to collapse and present a significant hazard within the park. Often, these scarps are stabilized by tree roots and other vegetation that, if removed, could destabilize the material even further. Also, the scarps may be seen as good viewpoints by park visitors, without realizing that the scarps are unstable and represent a potential hazard.

RAPID INCISION OF VALLEY FILL

Many of the small tributary valleys and drainages are partially filled with debris flow and landslide deposits, creating a relatively flat valley floor bounded by steep walls. Because of the unconsolidated nature of the material, these areas are prone to incision during later storm event, sometimes at a very rapid rate. This incision can then leave steep-walled ‘chasms’ that present a real danger to hikers and other trail users, especially if the incision crosses or occurs next to an established trail. In many places these valley fill deposits are stabilized primarily by deep-rooted trees and other vegetative cover. Removal of vegetation in these areas could destabilize the deposits and induce rapid incision of the channel during storms.

BIOLOGICAL RESOURCES

HABITATS AND VEGETATION

The habitat types found within Sanborn County Park include redwood forest, mixed evergreen forest, riparian, oak woodland, chaparral, pond areas and grassland. These habitats exist in various amounts with the most abundant being redwood forest and mixed evergreen forest. Common plant species found within the redwood forest include coastal redwood (Sequoia sempervirens), California bay (Umbellularia californica), sword fern (Polystichum munitum), and common snowberry (Symphoricarpos laevis). Riparian habitat along creeks and the fringes of ponds contains plants such as willows (Salix spp), cottonwoods (Populus spp.), western sycamore (Platanus racemosa), rush species (Juncus effusus and Juncus patens), horsetail (Equisetum arvense), and marsh aster (Aster chilensis). Plant species found within mixed evergreen and/or oak woodland habitats include coast live oak (Quercus agrifolia), California black oak (Quercus kelloggii), California buckeye (Aesculus californica), madrone (Arbutus menziesii), tan oak ( Lithocarpus densiflorus), toyon (Heteromeles arbutifolia), and poison oak (Toxicodendron diversilobum). Grasslands, generally dominated by non-native species, occur in small areas throughout the park. Typical species found within the grasslands are wild oat (Avena fatua), ripgut brome (Bromus diandrus), purple needlegrass (Nasella pulchra), and California oatgrass (Danthonia californica). Brushy areas are found on southern facing
slopes and contain California sage (*Artemisia californica*), California coffee berry (*Rhamnus californica*), coyote bush (*Baccharis pilularis*), hollyleaf cherry (*Prunus ilicifolia*), and sticky monkey flower (*Mimulus aurantiacus*).

A search of the California Natural Diversity Database (CNDDDB) and the California Native Plant Society On-line Inventory of Rare and Endangered Plants resulted in a total of 11 special status plants documented within a five-mile radius of the park that have some potential to occur within the park boundaries. Nine of the eleven plants require serpentine soils to grow. Due to the lack of serpentine soils recorded in the park and the lack of field observations of serpentine soils, there is very low potential that suitable habitat exists within the park for these nine plant species.

The majority of the 11 plant species are listed by the California Native Plant Society (CNPS) as 1B, which means they are rare, threatened or endangered in California or elsewhere. These include King’s Mountain Manzanita (*Arctostaphylos regismontana*), Round-headed coyote-mint (*Monorella villosa ssp. globosa*), Loma Prieta hoita (*Hoita strobilina*), Metcalf Canyon jewel-flower (*Streptanthus albicus ssp. albicus*), Most beautiful jewel-flower (*Streptanthus albicus ssp. peramoenus*), Mt. Hamilton thistle (*Circium fontinale var. campylon*), Santa Clara Valley dudleya (*Dudleya setchellii*), Fragrant fritillary (*Fritillaria lilacea*), and Smooth lessingia (*Lessingia micranedia var. glabrata*). One plant, woolly-headed Lessingia (*Lessingia hololeuca*), is a CNPS List 3, which serves as a review list because more information is needed about the plant. Coyote ceanothus (*Ceanothus ferrisae*) is listed as endangered under the Federal Endangered Species Act.

**WILDLIFE**

Sanborn County Park offers large areas of relatively undisturbed habitat for a variety of wildlife species. The park represents only a small portion of much larger tracks of protected land throughout the Santa Cruz Mountains. In that respect, Sanborn County Park provides corridors for movement and a prey base for large predators such as mountain lion (*Felis concolor*), bobcat (*Lynx rufus*) and coyote (*Canis latrans*). The mix of habitat types also provides a wide range of forage options for the black-tailed deer (*Odocoileus hemionus columbianus*). Neotropical bird migrants including olive-sided flycatcher (*Contopus cooperi*), tree swallow (*Tachycineta bicolor*), and black-headed grosbeak (*Pheucticus melanocephalus*) nest in Sanborn County Park. The ponds provide overwintering habitat for migratory ducks including ring-necked duck (*Aythya collaris*), bufflehead (*Bucephala albeola*) and scaup species (*Aythya sp.*).

Reptile species either observed or expected to occur within the park include western fence lizard (*Sceloporus occidentalis*), western skink (*Eumuces skiltonianus*), northern alligator lizard (*Elgaria coerulea*), gopher snake (*Pituophis catenifer*), California king snake (*Lampropeltis getula californiae*) and northern Pacific rattlesnakes (*Crotalus viridia oreganos*). Downed woody debris can provide a suitable micro-climate including cover and invertebrate forage for amphibian species such as California slender salamander (*Batrachoseps attenuatus*), western toad (*Bufo boreas*), and ensatina (*Ensatina eschscholtzi*). California newts (*Taricha torosa*) are abundant throughout the park and migrate after the first fall rains to their breeding grounds within the park’s ponds and creeks. At the conclusion of breeding, approximately May, they will spend the summer months under rocks, bark, or rotting wood.
SITE ANALYSIS

Results of the literature search and CNDDB search conducted for Sanborn County Park resulted in finding five special status animal species that have the potential to be present within the park. These include California red-legged frog (*Rana aurora draytonii*), Cooper’s hawk (*Accipiter cooperii*), long-eared owl (*Asio otus*), white-tailed kite (*Elanus leucurus*), and San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*). Additionally, one species, western pond turtle (*Clemmys marmorata*), is known to occur within the park.

**SUITABILITY FOR TRAIL DEVELOPMENT**

The hydrology, geology, biology and cultural resources of Sanborn County Park provide opportunities and constraints to trail development. These physical processes and natural resources presented challenges to the park’s early settlers. In some areas 100-year old logging and farm roads exist within the park and in some cases are used today as part of the trail system. However, many of these early transportation corridors have been returned to a more natural state by the hydrologic and geologic processes at work in the park. In an effort to build trails that will last with a minimum amount of maintenance, these processes were mapped to evaluate the suitability of the terrain to accommodate trail development. Trails have been sited to minimize maintenance, but it must be noted that the physical processes at work in the park will continue and that trails at Sanborn County Park will require higher levels of maintenance than those sited in less active landscapes.

The trail planning effort began with the development of a general trail suitability map based on several major factors that reflect potential constraints to trail development. It must be noted that this analysis was completed for general purposes only, as each of the factors considered in the overall suitability can vary significantly at any individual site. Fieldwork evaluated site-specific conditions along the trail corridors. This work will be an on-going effort as each individual trail is staked out in the field prior to construction.

**TRAIL SUITABILITY FACTORS**

Four different physical parameters were used to estimate general sensitivity to trail construction: riparian zones, erodibility of geologic units, presence of landslides, and landscape slope.

**RIPARIAN ZONES**

While riparian areas often offer flat, scenic areas for trail construction, they are actually poorly-suited for trail construction, as plant species tend to be highly sensitive to heavy use, and trails are likely to create preferential flow-paths that erode during flooding events. In order to protect these areas buffer zones were established around the creeks. A 30-foot buffer around minor creeks within the park, a 75-foot buffer around Sanborn Creek, and a 150-foot buffer around Lyndon Canyon Creek were designated as poorly-suited terrain on the suitability map.
ERODIBILITY OF GEOLOGIC UNITS

The geological units were divided into three erodibility categories based on general geologic characteristics. Units that are typically highly erodible, such as unconsolidated alluvial fan material, were given a ranking of 3. Relatively resistant units, like the Vaqueros Sandstone and the Mindego Basalt, were given a ranking of 1. Other units that fall in between the two extremes were given a ranking of 2.

It must be noted that in order to keep this analysis relatively simple (as is warranted for the broad-scale, preliminary study) we used a generalized classification of erodibility based on the stratigraphic descriptions (Brabb, Graymer, and Jones, 2000) and our professional knowledge of the geology of the region. We did not attempt to incorporate some of the more involved erosion indices that have been used for more extensive watershed analyses in the region. Reliable soil maps are not currently available for the Sanborn area, and therefore soil erodibility factors are not included in this analysis.

LANDSCAPE SLOPE

Areas of high slope are higher-energy environments in which erosion is more pronounced. This suitability analysis calculated a “percent slope” map of Sanborn Park using the USGS 10-meter resolution digital elevation model (DEM). Slope values were then placed into three categories (0-10 percent, 10-20 percent, and greater than 20 percent) and each class was given a suitability ranking (the lowest class given a value of 1, the highest a 3).

PRESENCE OF LANDSLIDES

Areas of high landslide activity are poorly suited for trail construction. A GIS landslide layer (USGS database from www.seamless.gov) was used to highlight areas of landslide activity. Where landslides were present, a suitability ranking of 3 was assigned. Where no landslides were present, a ranking of 1 was assigned.

SUITABILITY ANALYSIS

A generalized suitability GIS layer was created for each of the above factors, using the suitability groupings (1,2,3) for each factor. The layers geology, slope, and landslides were overlain and combined, adding the suitability number for each factor to create areas of composite suitability numbers (minimum being a value of 3--all three factors highly suitable; and maximum being 9--all three factors being poorly suited). Because of their particularly sensitive nature, all areas within the riparian buffer zones were automatically delineated as poorly suited for trails.

The resulting maps show a broad-scale perspective of areas that are most and least suitable for trail development (See Map 2 - North Sanborn County Park Trail Suitability Map and Map 3 - South Sanborn County Park Trail Suitability Map). The suitability map was then used to provide the background for preliminary trail planning.

In general, the northwestern portion of the park is well-suited for trail development, primarily because of the presence of predominately erosion-resistant rocks, and
generally lower slopes in that area. Regions of poor trail suitability are mostly concentrated along the San Andreas Fault zone, as this is where much of the landslides occur, and where the geologic units tend to be more erodible. The region between the western side of the park and the San Andreas Fault zone falls into the intermediate category for trail suitability. In this area the geology is relatively non-erodible but the slopes are fairly high and there are still landslides present, presumably an artifact of being close to the fault zone.

It must be noted that this suitability analysis was not the only factor considered in the planning phase (others included trail purpose, access, and defined Park needs, among others), and therefore there are trails still planned for poorly suited areas according to this analysis. However, using the suitability map, planners can anticipate where special planning efforts, construction methods and maintenance will be needed to overcome obstacles present in poorly suited areas.

Generalized suitability differs from a local portrayal of trail resiliency within the landscape. In many cases, more detailed site-specific mapping of vegetation, age and nature of landslide occurrence, stable bedrock ledges, or naturally-cemented beds may minimize or obviate the suitability constraints mapped at the planning scale. In other cases, trails may be engineered to be suitable in areas designated as ‘poorly-suited’, albeit at greater cost, needed care, or maintenance effort. For example, raised trails (boardwalks) can limit impacts of trails in riparian areas, or targeted studies could show that landslide deposits in a specific area are very old, and that re-activation of those slides is unlikely.

Finally, the generalized suitability map may not always reflect how the trail system may respond during and following the natural episodic events that occur and are a resource in a park managed for its wildland values. By their very nature, the processes that create episodic disturbances and predominate there during months or years of natural recovery often are not the same ones which prevail during more normal, or ‘chronic’, conditions; similarly, management measures to anticipate the effects of wildfires, storms, droughts and landslides can sharply modify how these events will affect suitability during such periods.
SUMMARY

The Sanborn County Park Trails Master Plan approximately doubles the length of the existing trail system. The current trail system provides 19 miles of trails for hikers and equestrians. This trails master plan will expand the system to approximately 38 miles of trails for hikers, dog walkers, equestrians and mountain bikers (See Map 4 – Sanborn County Park Trails Master Plan Map). Thirty-nine named trails are proposed ranging from short, one-quarter mile loop trails to five-mile long distance trails (See Table 2 – Trail Route Summary).

The plan opens the park to new trail user groups, dog owners with dogs on-leash and mountain bikers. Dogs on-leash are recommended on all trails with the exception those that pass through sensitive resources areas. Mountain biking is opened along Skyline Ridge and on several planned, long-distance trails. A park visitor hiking, mountain biking or horseback riding through Sanborn County Park could cover over nine miles of trail before leaving the park boundary to enter Midpeninsula Regional Open Space District preserves or California State Park lands.

This trails master plan realigns portions of the existing trail system and weaves segments of these trails into the new routes. The majority of the existing system is integrated into this plan, but in two key areas the trails are reorganized, and in some instances closed or rerouted, to better protect park resources, improve circulation and reduce visitor confusion. The two areas of trail reorganization are the Day Use Area situated between the Youth Science Institute and Walden West and the parklands located east of Sanborn Road near the confluence of Sanborn and Aubry Creeks. In addition, two trails are proposed for major realignment, the Peterson Trail and San Andreas Trail.

The trails master plan provides through travel routes for three regional trails, improves internal park circulation between distant regions of the park, strengthens and expands the environmental education use of the trails in the center of the park, adds diversity to the trail experiences and provides both short-term and long-range solutions to trail access from the central Day Use Area.

REGIONAL TRAILS AND THE 1995 COUNTYWIDE TRAILS MASTER PLAN

This plan identifies trail alignments for three regional trails that extend through Sanborn County Park. Two of these routes, the Bay Area Ridge Trail (Route R5-A) and the Juan Bautista de Anza National Historic Trail (Route R1-A), are identified in the 1995 Countywide Trails Master Plan. All three of the regional trails use segments of existing and planned trails (See Map 4 – Sanborn County Park Trails Master Plan Map).

The Bay Area Ridge Trail currently extends 5.2 miles through the park along the Skyline Trail. This section of trail was the first segment of Bay Area Ridge Trail dedicated in Santa Clara County. The Bay Area Ridge Trail is lengthened an additional 4.2 miles within Sanborn County Park and Lexington County Park through this plan. The route will descend into the Lake Ranch area along the John Nicholas Trail and then extend northeast to El Sereno Open Space Preserve on the Faultline Trail. The entire route within the park will total 9.4 miles when complete. The route then continues on existing trails within El Sereno Open Space Preserve.
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</tr>
<tr>
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<tr>
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<td></td>
<td></td>
<td></td>
<td>8-10'</td>
<td>399</td>
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</tr>
<tr>
<td>6 C</td>
<td></td>
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</tr>
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<td>6 D</td>
<td></td>
<td></td>
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<td>1,182</td>
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<td>6 E</td>
<td></td>
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</tr>
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<td>6 F</td>
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</tr>
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<td>7 C</td>
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<td>Walden Pond Connector</td>
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<tr>
<td>16</td>
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<td>Native Garden Trail</td>
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<td>798</td>
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</tr>
<tr>
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<td>ALL</td>
<td>Welch-Hurst Trail</td>
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<td>2-4'</td>
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<td>ALL</td>
<td>Partridge Farm Trail</td>
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<td>7%</td>
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<tr>
<td>19</td>
<td>ALL</td>
<td>Walden Pond Connector</td>
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<td>2-4'</td>
<td>746</td>
<td>7%</td>
</tr>
<tr>
<td>20</td>
<td>ALL</td>
<td>Native Garden Trail</td>
<td>W</td>
<td>2-4'</td>
<td>798</td>
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</tr>
<tr>
<td>21</td>
<td>ALL</td>
<td>Welch-Hurst Trail</td>
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## Trail Route Summary

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<th>Use</th>
<th>Width</th>
<th>Length</th>
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<tr>
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<td>9%</td>
</tr>
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<tr>
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<td>2630</td>
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<td>8%</td>
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<td></td>
<td></td>
<td>8-10'</td>
<td>2,251</td>
<td>16%</td>
</tr>
</tbody>
</table>
In the future, the Bay Area Ridge Trail will extend an additional 5.8 miles across the Trout Creek drainage to reenter County parkland at the Sycamore Property located on the shore of Lexington Reservoir before crossing Highway 17.

The Bay Area Ridge Trail alignment varies from that described in the 1995 Countywide Trails Master Plan. The route uses the Faultline Trail and trails in El Sereno Open Space Preserve to reach Lexington Reservoir. Originally, this route was proposed to stay within Sanborn County Park traversing the Lyndon Canyon drainage that lies in the southern most region of the park and is above the San Andreas Fault. The route through Lyndon Canyon was abandoned early in the planning process due to geological hazards including the fault, large active landslides and the need for numerous creek and tributary drainage crossings. The alignment along the Faultline Trail and through El Sereno Open Space Preserve will achieve the goals of the Bay Area Ridge Trail and will provide stunning views of the Santa Clara Valley.

The Juan Bautista de Anza National Historic Trail crosses Highway 9 to enter the northeast corner of the park on the Mt. Eden Trail. The selection of the Highway 9 crossing location will be explored in a future study. The Mt. Eden Trail connects to the Peterson Trail that extends upstream along the ridge separating the Sanborn Creek and Aubry Creek drainages. The Peterson Trail extends across Sanborn Road near the park entrance to reach the Day Use Area (See Roadway Crossings, Staging Areas and Trail Amenities). The Juan Bautista de Anza Trail follows the Valley Vista Trail, one of the most beautiful new routes in the park, from the Day Use Area. The Valley Vista Trail slowly climbs the ridge behind the Day Use Area and the campground to join the John Nicholas Trail. Along the way there are views of the undeveloped Sanborn Park, and at times, glimpses of Santa Clara Valley and southern San Francisco Bay. The Juan Bautista de Anza Trail descends into the Lake Ranch on the John Nicholas Trail where the route shares the same trail alignment with the Bay Area Ridge Trail to Lexington Reservoir. This route is 7.7 miles.

The Juan Bautista de Anza Northern Recreation Retracement Route was planned to extend through the Stuart Ridge property as identified in the 1995 Countywide Trails Master Plan. This previously planned route (Route R-1A) was also dependent upon other easements or acquisitions. This trails master plan moves the retracement alignment fully into Sanborn County Park and uses planned trails to reach El Sereno Open Space Preserve. This new route should allow the Juan Bautista de Anza National Historic Trail to open to the public sooner. The originally planned Northern Recreation Retracement Route (Route R-1A) should be retained to provide other important park connections and trail user functions. At this time, existing deed restrictions limit a portion of this route to dual use for hiking and horseback riding. If opportunities arise to modify these restrictions, the community desires multiple use access along the original Route R-1A.

The 1995 Countywide Trail Master Plan should be updated to reflect the new route designations for the Bay Area Ridge Trail (Route R5-A) and Juan Bautista de Anza National Historic Trail (Route R1-A). These two routes are planned as multiple use trails serving hikers, equestrians and mountain bikers as proposed in the 1995 Countywide Trails Master Plan (See Map 4 – Sanborn County Park Trails Master Plan Map).