EL Encanto

Azusa River Wilderness Park

Azusa River Wilderness Park Project
Site Programming, Site Planning and
Overall Site Concept Development
for the El Encanto Property

Watershed Conservation Authority
October 22, 2007

BlueGreen CONSULTING

Exhibit E - 2007 RWP Site Programming, Planning & Concept Report

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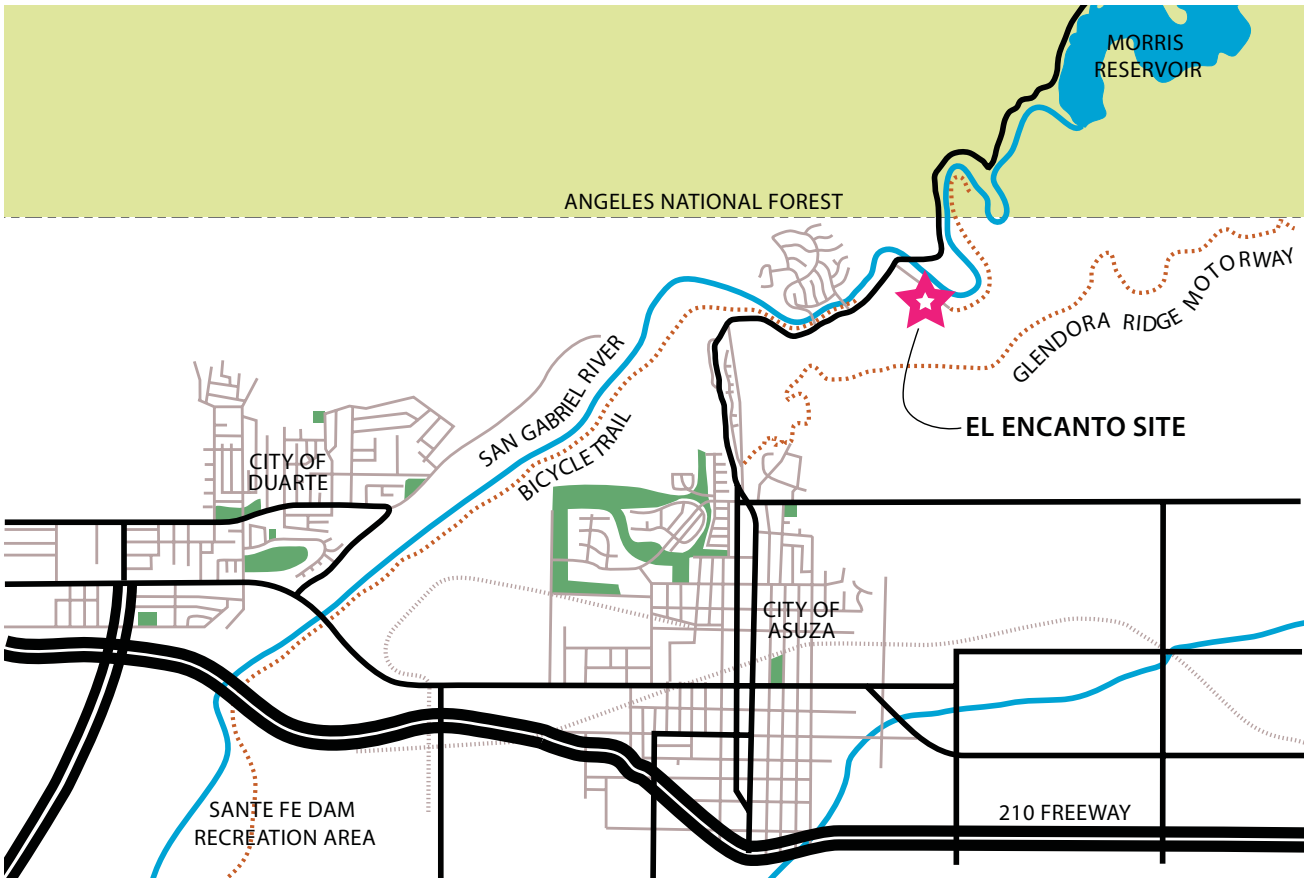
Chapter 1:
INTRODUCTION

The purpose of this document is to develop a site program and design guidelines for the El Encanto property located at 100 N. Old San Gabriel Canyon Road, in the City of Azusa. This verdant 40-acre property is located at the scenic entrance to the Lower San Gabriel Canyon. The site is regionally known for its "enchanting" natural beauty and has long been considered one of the natural "crown jewels" of Southern California. Its most stunning visual feature is a sweeping canyon meander against the backdrop of the steep San Gabriel Mountains. Another notable feature of the site is the former El Encanto Restaurant structure, originally built in the 1920s to house the San Gabriel Canyon Forest Ranger.

The property consists of two parcels. The smaller northern parcel (8.9 acres) is part of a large river point bar, currently in use by an equestrian training facility. The larger parcel (31 acres) lies on the southern side of the river. Approximately 3 acres of the southern parcel are developed, and the remainder is open space. The developed area includes an expansive asphalt parking lot, a mobile home park with 11 units, 3 residential units, and the former restaurant building. The majority of the southern parcel (27 acres), is very steep vegetated open space.

Fig. 1.1,
Regional Map



The property was purchased in February of 2006 by the Watershed Conservation Authority (WCA) for inclusion into the planned Azusa River Wilderness Park. The Azusa River Wilderness Park is the vision of a larger river park that would include several parcels and a total of 89 acres. This extended park project has been receiving strong public support and has been designated a priority within the San Gabriel River Corridor Master Plan.

The Azusa River Wilderness Park is of great regional importance, because it is located at one of the major gateways to Angeles National Forest. Millions of visitors pass by this location each year on their way into the mountains. On a regional scale, it is envisioned that the Azusa River Wilderness Park and the El Encanto property will connect the mountains with a multitude of projects along the San Gabriel River, the Rio Hondo, and the Los Angeles River. On a local scale, there are opportunities to connect the site to the San Gabriel River Bike Path, Fish Canyon Trail, the Forest Service Entrance Station, Roberts Creek Trail, Garcia Trail, and the Glendora Ridge Motorway.

Fig. 1-2,
Aerial Photo of the
Azusa River Wilderness Park Vision

Proposed boundaries of the Azusa River Wilderness Park

El Encanto Site within the Wilderness Park

Chapter 2:
PLANNING PROCESS

2.1 Planning Entities and Authority

Implementation of the Azusa River Wilderness Park Vision has been spearheaded by the City of Azusa and the Watershed Conservation Authority (WCA). The Watershed Conservation Authority is a joint powers entity of the San Gabriel & Lower Los Angeles Rivers & Mountains Conservancy (RMC) and the Los Angeles County Flood Control District (LACFCD). This partnership was established to conduct joint projects and provide comprehensive programs to expand and improve the open space and recreational opportunities within the San Gabriel and Lower Los Angeles Rivers watersheds with extended benefits to flood protection, water supply, groundwater recharge, and water conservation.

The San Gabriel & Lower Los Angeles Rivers & Mountains Conservancy (RMC) was created by the California legislature in 1999. It is one of 11 conservancies within the California Resources Agency. Its mission is to preserve open space and habitat in order to provide for low-impact recreation and educational uses, wildlife habitat restoration and protection, and watershed improvement within its jurisdiction.

The authorizing statute which created the RMC required formulation of a San Gabriel and Lower Los Angeles Parkway and Open Space Plan. This plan, entitled "Common Ground, from the Mountains to the Sea" is now adopted and in effect, including a grant program to distribute and administer bond funds in accordance with this plan. Funding for the program has come largely from three ballot propositions approved by California voters—Proposition 40, 50, and 84.

The City of Azusa has long recognized the vital importance of the San Gabriel River. This led up to the formulation of the "Rio San Gabriel Vision Plan and Design Guidelines" to provide a framework for future restoration and watershed sensitive development of the San Gabriel River and Azusa Canyon within its incorporated boundary. The plan's goals include facilitation of ecosystem restoration, public access to natural resources, recreational and educational opportunities and the preservation of open space and natural resources. The City of Azusa has further adopted its new "General Plan" that outlines an open space component that will restore and reconnect residents with the river. The City has recently invested in several projects along the San Gabriel River, including the US Forest Service Gateway Interpretive Center, extension of the regional bike trail along the river, and parking and staging area.

In 1999, the County of Los Angeles Board of Supervisors directed the Department of Public Works to prepare the "San Gabriel River Corridor Master Plan" in order to develop a shared vision of the river. A steering committee representing cities, other public agencies, water groups, and community and environmental groups was formed to assist in the plan preparation. The San Gabriel River Corridor Master Plan (SGRMP) was adopted by Los Angeles County Board of Supervisors in 2006.

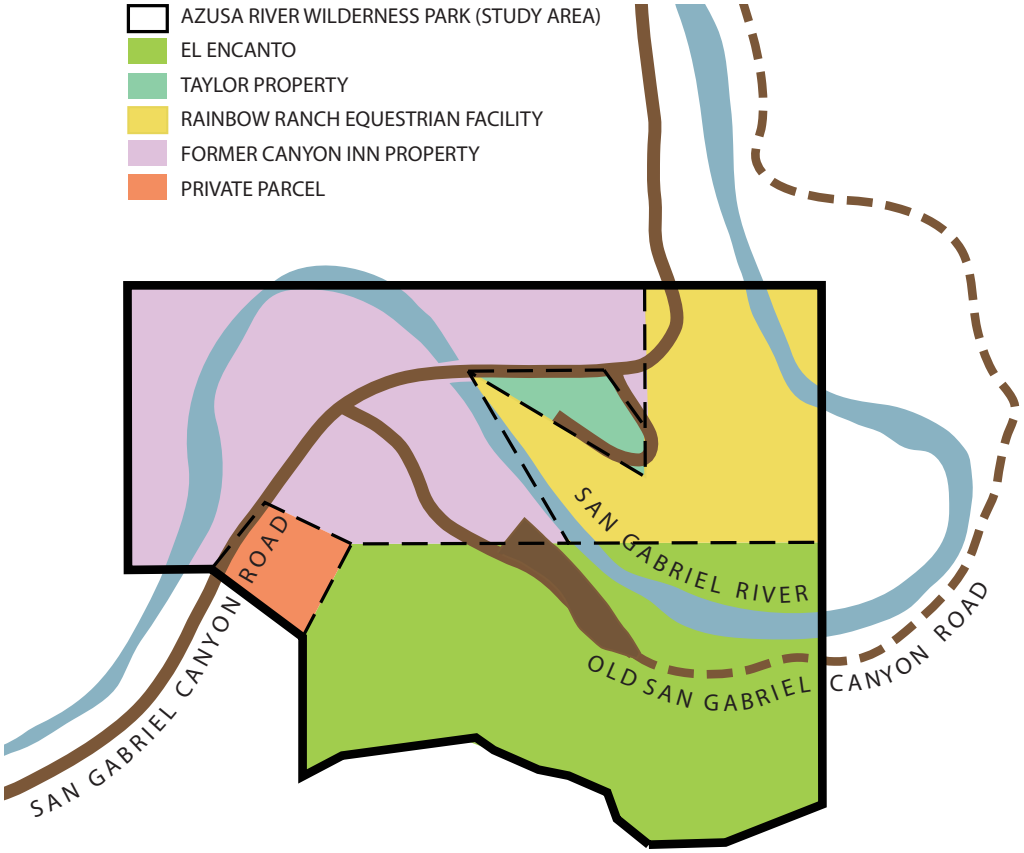
The goal of this consensus-based document was to address and integrate multiple objectives such as flood protection, water supply, natural habitat, recreation, open space, and economic development in a guiding framework. The cities along the river are encouraged to join with the County of Los Angeles and other participating entities in implementing and planning projects to make this shared vision a reality.

In summary, the planning efforts of this document are authorized and supported through inclusion of the Azusa River Wilderness Park area in the "Common Ground", the "San Gabriel River Corridor Master Plan" and the City of Azusa's "Rio San Gabriel Vision Plan" and General Plan.

2.2 Acquisition History

The first step in the creation of the Azusa River Wilderness Park was accomplished by the City of Azusa in establishing the initial boundaries and identifying the property parcels of interest. This was followed by several grant applications in 2001 to purchase these properties. In October 2001, the State of California Resources Agency approved a grant to the San Gabriel and Lower Los Angeles Rivers and

Fig. 2.1
Azusa River Wilderness Park Study Area, Property Ownership



Mountains Conservancy in the amount of $1 million that was made available to the City of Azusa from Proposition 13 funds. In November 2002, the City purchased the first 1.8–acre parcel, referred to as the "Taylor Property".

When the El Encanto Restaurant closed, the City of Azusa approached the RMC and WCA to evaluate the opportunity of another property acquisition for the park. In the ensuing negotiation, the WCA agreed to become the responsible agency for the grants awarded to the Azusa River Wilderness Park Project and ownership of the property acquired. The land was purchased for $3.5 million in February 2006. The initial planning efforts were made possible through a grant awarded to the WCA by the RMC.

In 2007, the WCA approved a Memorandum of Understanding (MOU) between the City of Azusa and the WCA, transferring operation and maintenance of the Taylor Property to the WCA to be operated as part of the larger Azusa River Wilderness Park. The City continues to own the Taylor Property in fee. The WCA has placed the California Resource Connections, a local non-profit organization, in the Taylor House to further develop community partnerships and programs at the Azusa River Wilderness Park as well as improve the Taylor House site. The California Conservation Corps (CCC) will soon have a crew working out of Taylor House as well as making it their base to recruit members and work on projects and programs on the upper San Gabriel River.

Fig. 2.2
The bend in the San Gabriel River at El Encanto

Chapter 3:
EL ENCANTO MASTER PLAN COORDINATION

3.1 Planning Process

The Master Plan production was a collaborative effort that involved a variety of public entities and the public. The consultant team and the WCA developed a master plan coordination and outreach strategy that was comprised of a series of meetings and interviews to obtain direction and guidance from agencies and the public. The planning team met with regulatory agencies and evaluated zoning, easement, utility, access, and land use issues, and performed an extensive evaluation of physical and biological site conditions in order to identify opportunities and constraints of potential program elements.

A Steering Committee was created to guide the planning process, and a Technical Advisory Committee (TAC) was created to provide expertise. The team coordinated three meetings with the Steering and Technical Advisory Committees as the project progressed. Each set of meetings was conducted prior to three public meetings in order to include any recommendations by the committees. Meetings were attended by team technical experts and discipline leaders.

List of Steering Committee Participants:

RMC
Belinda Faustinos
Executive Officer
Jane Beesley
Project Manager

City of Azusa
Robert Person
Assistant City Manager

County of Los Angeles
Mickey Chaudhuri
Watershed Manager
Jared Deck
Watershed Manager

US Forest Service
Marty Dumpis
District Ranger, ANF

Army Corps of Engineers
Nedenia Kennedy
Chief, Environmental Policy Group

3.2 Steering Committee

The purpose of the Steering Committee was to ensure that the final site concept plan reflected both the needs of the stakeholders and the mission of the WCA to the best possible extent. The very first meeting led to the formulation of the following project goals and plan objectives:

Objectives
- Restore natural habitat.
- Increase connectivity to and from Angeles National Forest, other open spaces, trails, parks and river parkways.
- Identify opportunities for multi-purpose uses.
- Provide a regional portal for research, education, and interpretive resources.
- Integrate best management practices and sustainable design elements.

List of Technical Advisory Committee Member Agencies:

RMC
City of Azusa
County of Los Angeles
US Forest Service
California Department
Army Corps of Engineers

The Steering Committee consisted of the following agencies: Los Angeles County Department of Public Works, Lower Los Angeles and San Gabriel Rivers and Mountains Conservancy (RMC), City of Azusa, U.S. Forest Services and U.S. Army Corps of Engineers.

3.3 Technical Advisory Committee

The Technical Advisory Committee included the same agencies as the Steering Committee. The following additional agencies and entities were included in a series of meetings, field trips, and interviews:

- California Department of Fish and Game
- California Department of Transportation
- Mountains Recreation and Conservation Authority, Park Rangers
- Sierra Club
- California Resource Connections
- City of Azusa Planning and Transportation Department
- County of Los Angeles Department of Public Works, Watershed Management Division
- County of Los Angeles Department of Public Works, Operations and Water Resources

These agencies and interested parties provided valuable data and input to the analysis and program development. Their early involvement and understanding of the project issues and needs were critical for plan development

3.4 Community Involvement Program

The first step was to create a community involvement program that outlined the number, content and nature of interviews, workshops and focus group meetings, including meeting schedules and strategies to inform and notify the public. The second step was to notify the public of the stakeholder process.

In cooperation with the steering committee, the team developed a list of interested individuals that had previously participated in stakeholder meetings for the San Gabriel River Master Plan. In addition, the team solicited direct support from key institutional stakeholders. Finally the team identified user groups, communities, and individual parties with special interest in the planning process who were directly notified through e-mail and phone calls.

The broader public was notified through direct mailing of invitations to over 5,000 residents and businesses within a defined geographic radius, announcements during televised Azusa City Council meetings, and by including announcements in the City of Azusa public newsletter.

In the time leading up to the actual community meetings, the consultant team began the stakeholder process by interviewing engaged individuals and focused user groups. The objectives were to obtain a preliminary understanding of concerns and needs, and to solicit participation for successful community involvement. Owners and representatives of neighboring properties were also interviewed including the owner and manager of Rainbow Ranch, the owner and manager of the former Canyon Inn site and the property manager of the Buddhist Temple; and the future managers of the Taylor House facility.

Finally, three community meetings were held consisting of presentations by team members that illustrated objectives, goals, and site opportunities and constraints. Presentations were followed by workshops or subgroup discussions to build consensus on project components.

3.5 Stakeholder Presentations and Workshops

Three stakeholder events were held consisting of presentations by team members that illustrated objectives, goals, site opportunities and constraints. Presentations were followed by workshops or subgroup discussions to build consensus on project components.

Community Meeting #1 November 2006

The consultant team presented existing conditions of the El Encanto Site and summarized the vision for the Azusa River Wilderness Park. The planning process and schedule was described. Major themes in the discussions included the following:

- Visioning for long-term use and enhancement of the project area.
- Restoration of natural habitat lost due to urban encroachment.
- Flooding, vector, and security issues.
- Increasing connectivity to other open spaces, trails, and parks within the adjacent communities and drawing design inspiration from the local surrounding area.
- Elimination of conflicts between park users and vehicles through improved circulation of pedestrian, bicycle and vehicular traffic.
- Benefits of water quality improvement and promoting community participation in National Pollution Discharge Elimination System (NPDES).

A series of three questionnaires were distributed and collected. Information and data was collected and later organized for analysis of preferred project components.

Community Meeting #2 February 2007

Three design alternatives were presented and each illustrated with photographs and illustrative plans. Components of each plan were described.

- Habitat Restoration Alternative
- Visitor Services Alternative
- Nature Experience Alternative

Meeting participants were asked to comment and vote on the three alternatives, and to provide feedback on individual plan components. The preferred alternative selected by the meeting participants was the "Nature Experience".

Community Meeting #3 May 2007

The "Nature Experience" preferred alternative was presented with additional detail. Five focus areas of the plan were presented through photographs and plan drawings. The consultants led a discussion of the selection process and plan components. Comments were taken, postcards were passed out to solicit further mail-in comments.

Following each meeting, additional material, plans and diagrams were posted on the WCA's website, along with the project managers contact information.

Chapter 4:
COMPREHENSIVE SITE INVENTORY AND ANALYSIS

4.1 Location and Description of Property

The Azusa River Wilderness Park is located in the southern San Gabriel Mountains at the border to Angeles National Forest. The dominant physical feature of the site is a deeply incised canyon meander of the San Gabriel River. The watershed area above the site is approximately 220 square miles of rugged mountainous terrain with steep drainage divides and a maximum elevation of 10,064 feet at Mount San Antonio (Mt. Baldy), the highest peak in the area. The San Gabriel Mountains upstream of the site are a complex mix of igneous and metamorphic rock units that are highly fractured, faulted, and tectonically active. Downstream of the site, the river extends south through the San Gabriel Valley past Whittier Narrows, before entering the coastal plain and joining the Pacific Ocean between Long Beach and Seal Beach.

The El Encanto property is surrounded by open space with a few scattered developments on adjacent parcels. Notable topography of the property includes a portion of a river point bar, a rocky alluvial river channel, an elevated terrace above the river and steep hillsides to the south with elevations ranging between 820 and 1,400 feet above sea level. The project site is located on the United States Geological Survey (USGS) Azusa, California 7.5 minute Topographic Quadrangle.

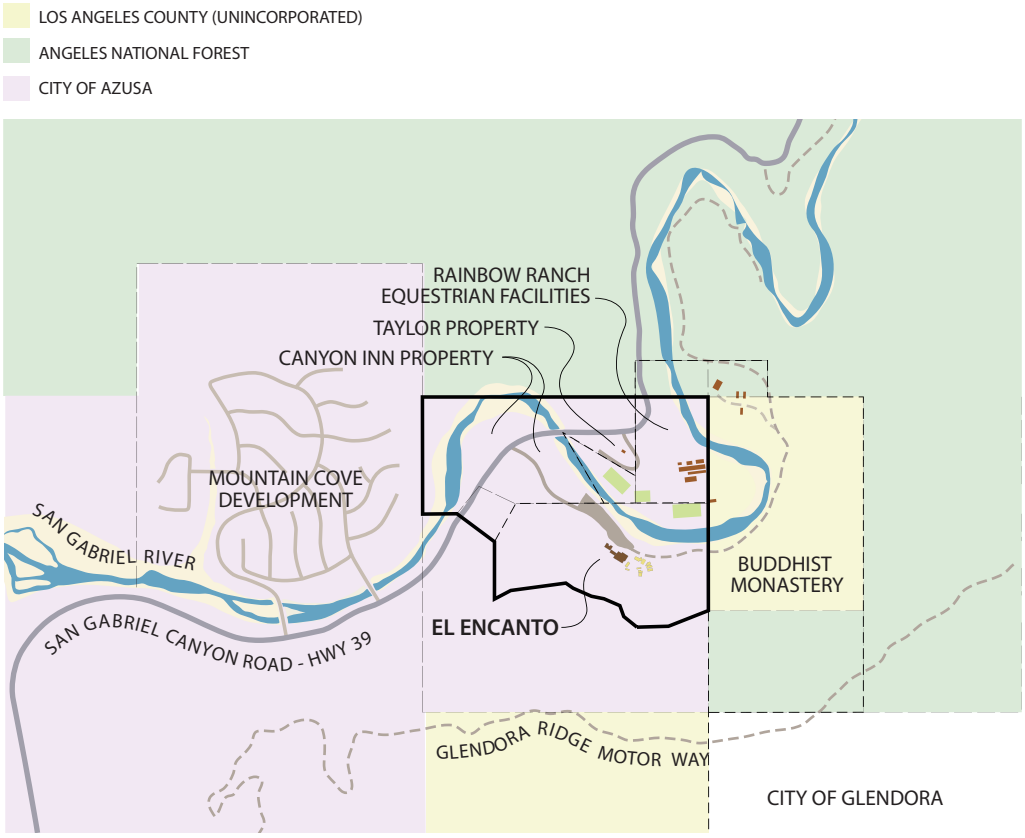


Fig. 4.1
Study Area and
Surrounding Properties

The property consists of two parcels. The smaller northern parcel (8.9 acres) is part of the point bar and is currently leased to an equestrian training facility. The larger parcel (27acres) lies on the southern side of the river. Approximately 3 acres of the southern parcel are developed, and the remainder is open space. Several structures exist on the site, most notably the former El Encanto Restaurant structure. The original structure was built in the 1920s as "Camp One" to house the San Gabriel Canyon Forest Ranger and has been expanded and remodeled multiple times in a piecemeal of styles. The developed area also includes an expansive asphalt parking lot, a mobile home park with 12 units, an apartment unit attached to the former restaurant via a breezeway, and a separate duplex currently housing a park ranger.

Adjacent property owners include the Buddhist Monastery, the Rainbow Ranch equestrian training facility, the former "Canyon Inn Property", currently owned by a Christian organization. The bordering slopes to the south are undeveloped lands owned by the City of Pasadena. The south eastern corner of the property is adjacent to the Angeles National Forest. Notable surrounding properties are the historic Taylor House, next to the equestrian training facility, which was acquired through the Rivers and Mountains Conservancy and is now owned by the City of Azusa. This property will be made available for public use in the future. Another neighboring area is the Mountain Cove gated community, perched on top of an alluvial fan at the mouth of Roberts Canyon.

4.2 Abounding Jurisdictions

Many important jurisdictional areas and boundaries are located near or close to the park site. Federal agency stakeholders are the National Forest Service, owning the vast majority of land north of the property. The Army Corps of Engineers owns

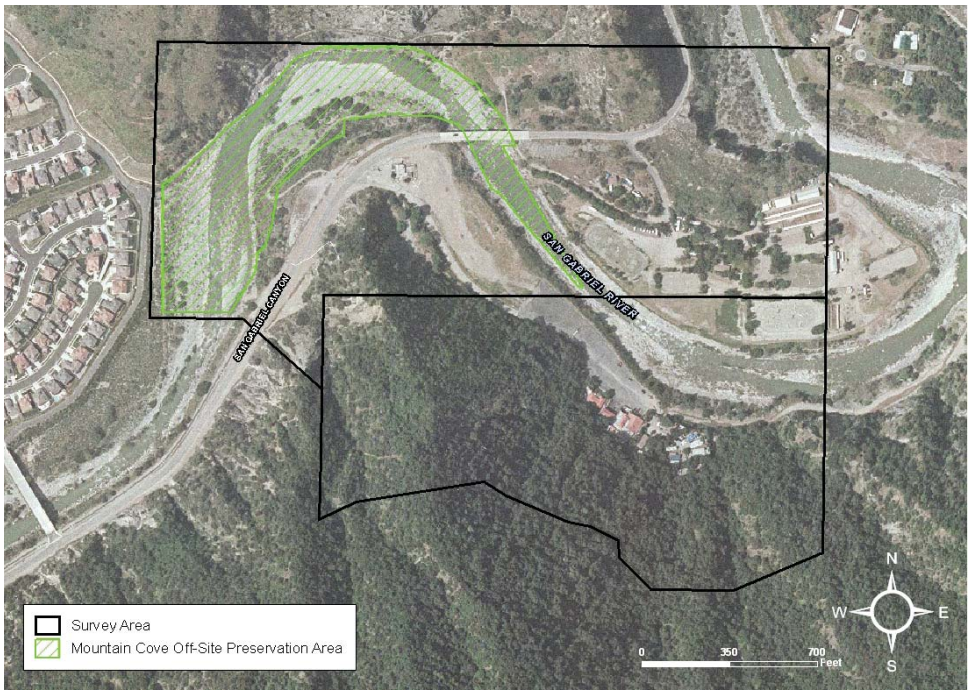


Fig. 4.2
California Fish & Game has jurisdiction of the conservation easement on the former Canyon Inn Site

and manages the flood control channel of the San Gabriel River just one mile below the site. They also have a mandated interest in the management of the dams and channels upstream and have jurisdiction over any changes to the stream channel at the site.

The State of California Department of Transportation has jurisdiction over State Highway 39 and the bridge across the San Gabriel River. California Department of Fish and Game has jurisdiction over the biological resources of the stream and holds an adjacent conservation easement in the river channel and along the banks just downstream of the site. (Fig. 4.2) The State Water Resources Control Board and Regional Water Quality Control Board have jurisdiction on matters related to water conservation and water quality at the site.

The channel at the site is owned and operated by the County of Los Angeles Flood Control District. Morris Dam is owned by the Metropolitan Water District (MWD) and managed and operated by the County of Los Angeles Flood Control District.

The project site is located in the City of Azusa which has jurisdiction over a variety of important property issues including zoning and building safety. Figure 4.3 shows

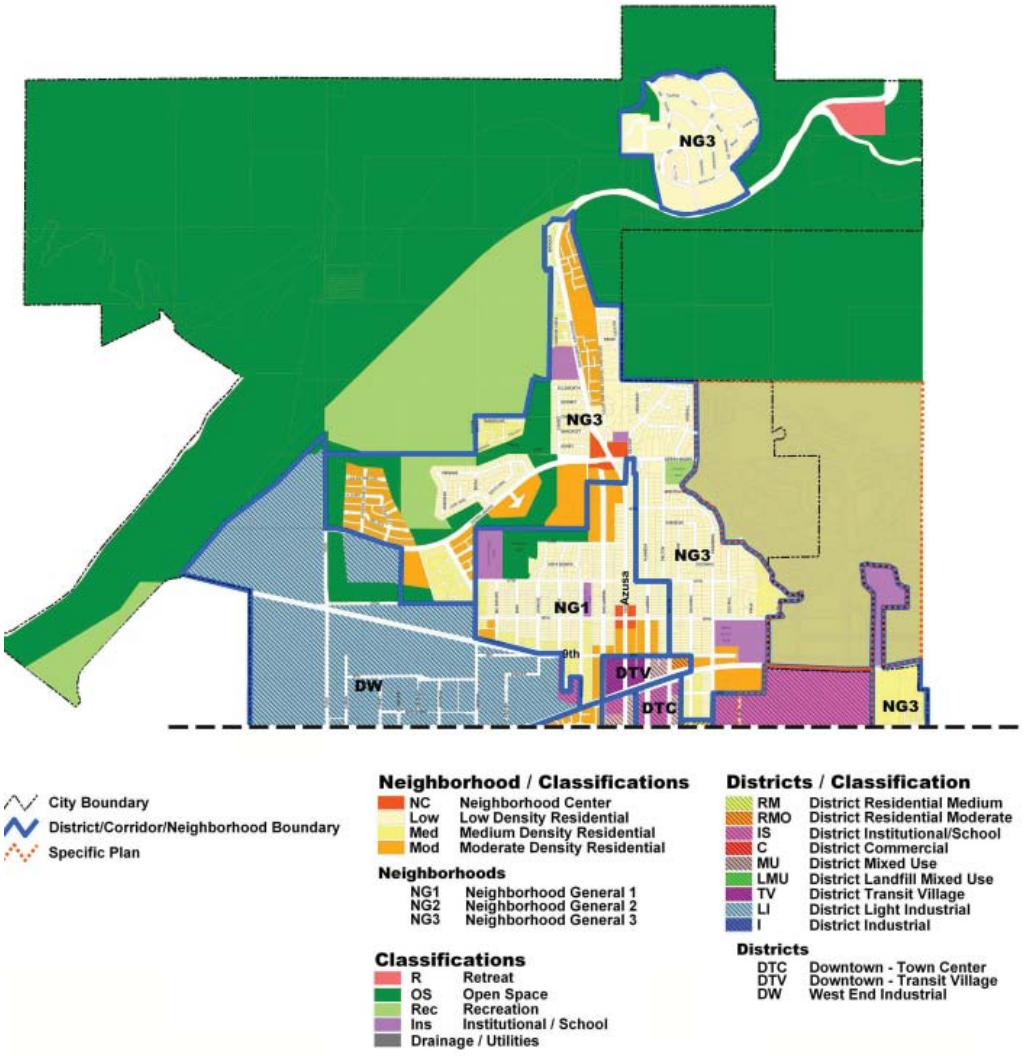


Fig. 4.3
Zoning Map of north portion of the City of Azusa

the current Azusa zoning map. The eastern property boundary touches both, the City of Glendora, and County of Los Angeles unincorporated area. The property access road leading through the parking lot is owned by the City of Azusa, and the dirt road continuing to the County Gaging Station is a county road, maintained by the County. (see Appendix A for Maps of Jurisdictional Boundaries)

4.3 Physical Site Conditions

Climate

The climate of the area is temperate and semi-arid with warm, dry summers and mild, moist winters. Higher elevations tend to have more moderate summers and colder winters with significant amounts of precipitation including snow in winter. The majority of rainfall occurs between the months of December and March. Extended rainless periods in the summer months are common.

The majority of rainfall events in the area result from winter storms that are associated with extra-tropical cyclones originating in the North Pacific. The mean annual precipitation of the area is about 21 inches. Snow is common above 6000 feet. The average daily minimum and maximum temperatures in winter range from about 44 to 62 degrees Fahrenheit. Summer average daily minimum and maximum are around 68 and 91. All-time low and high extremes of temperature are 23 and 110 degrees Fahrenheit, respectively (Department of Commerce, NOAA, 2002, 2004). (see Appendix B1 for more detailed climate information)

Geology

The El Encanto Property is situated in the southeastern portion of the San Gabriel Mountains within the central part of the Transverse Range Province. The San Gabriel Mountains are bounded to the north by the active right-lateral San Andreas fault separating the San Gabriel Mountains from the Mojave Desert and the San Bernardino Mountains to the east. In the south, the San Gabriel Mountains are bounded by a series of active left-lateral reverse faults. These faults include the Cucamonga, Sawpit Canyon, and Sierra Madre Faults. Tectonic motion along these faults, has been responsible for the ongoing uplift of the mountain range. These faults also form the boundary to the Peninsular Range Province in the south and are considered active. To the north, the San Gabriel Mountains are further dissected by another east-west trending fault, the right-lateral San Gabriel Fault. The block of the San Gabriel Mountains between the Sierra Madre and San Gabriel Fault zones consist of a set of Late Cretaceous plutons of medium-grained granitic rocks. The El Encanto property and the lower San Gabriel Canyon are located on this tectonic block. (Fig. 4.4)

This granitic block of the San Gabriel Canyon is currently thrust upwards along the Sierra Madre Fault Zone. The fault zone, only less than a mile south of the property is only poorly visible, as it is currently buried under the alluvial fan deposits at the mouth of the Lower San Gabriel Canyon. The Sierra Madre fault is a reverse-thrust-

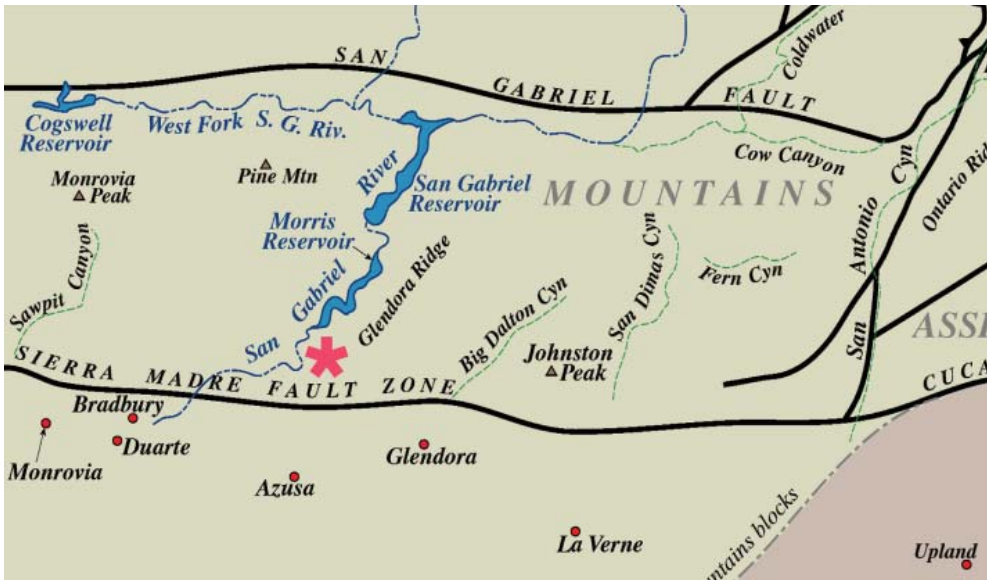


Fig. 4.4
Fault Zones
The south eastern block of the San Gabriel Mountains is bound by the San Gabriel Fault and the Sierra Madre Fault and consists of a number of Cretaceous granitic plutons (source: Morton and Miller, 2003, USGS Open-File Report 03-293, sheet 5)

ing fault where the larger granitic block is sliding upward and above the valley deposits, and over the margins of the Peninsular Range Province to the south. During the intrusion of the plutons, the former geologic base was moved upwards and towards the north. Remnants of these units are still present and are visible as a patchwork of old Proterozoic metamorphic rocks north of the property. (Fig. 4.5)

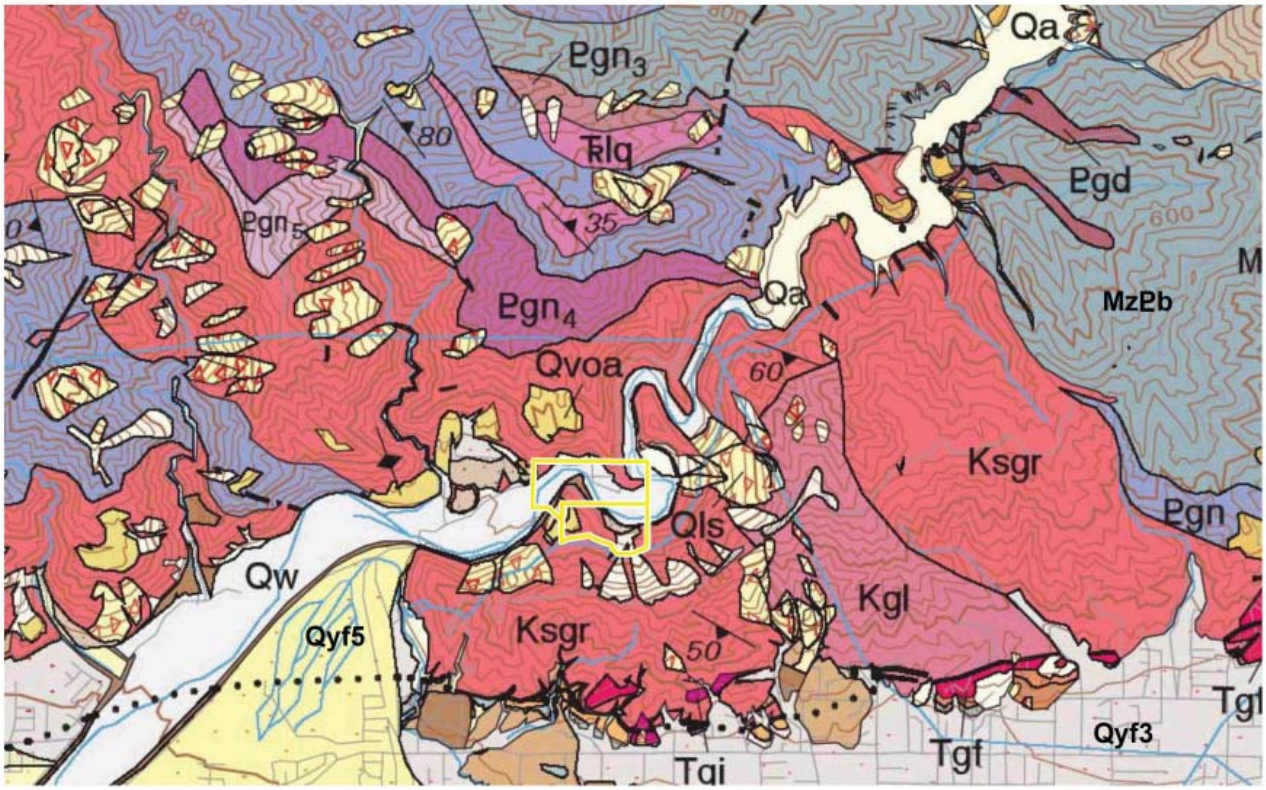
Soils

The soils of the southern San Gabriel Mountains are part of the larger CIENEBA-EXCHEQUER-SOBRANTE soil unit. On steep slopes of granitic rocks, soils generally fall into the Cieneba series. These are very shallow, somewhat excessively drained soils that formed in weathered materials of the parent rock. Cieneba soils occur on uplands with slopes between 9 to 85 percent.

The detailed Soil Survey Geographic (SSURGO) Database for the vicinity of the El Encanto property shows two dominant soil units. On the densely vegetated north-facing slopes we find Mollisols of the Tollhouse-Stukel-Wrentham families. On the south-facing exposed slopes of the area we find Entisols of the Vista-Trigo, granitic substratum-Modesto families. Since both soil units have developed within the weathering products of the underlying cretaceous tonalite it appears that the primary genetic difference between the two are related to climatic exposure.

The Mollisols at the site are characteristic of a dry Mediterranean climate. In Southern California they are commonly associated with annual grasses, oak species, and California Chapparal on steep slopes. At the project site this is the case on the steep north-facing slopes behind the existing buildings. Shaded from late afternoon exposure by the sun they enjoy a moister and cooler meso-climatic environment allowing for the development of dense chaparral. Accumulation of leaf litter ultimately leads to the formation of darker, organic-rich top horizons among the otherwise shallow and coarse soils of the surrounding area.

Geologic Map of the El Encanto Area



0 1 2 Miles

El Encanto Property and Extended Azusa River Wilderness Park

Source:
Morton, D. M., and Miller, F. K. (2003): Preliminary geologic map of the San Bernardino 30' x 60' quadrangle, California, Open-File Report 03-293, U.S. Department of the Interior, U.S. Geological Survey.

Geologic Units:

Qw
Very young wash deposits (late Holocene)

Qyf5
Young alluvial-fan deposits, Unit 5 (late Holocene)

Qyf3
Young alluvial-fan deposits, Unit 3 (middle Holocene)

Qvoa
Very old alluvial-valley deposits (middle to early Pleistocene)

Qls
Very young landslide deposits (late Holocene)

MzPb
Mixed metamorphic and granitic rocks of Big Dalton Canyon (Mesozoic and Proterozoic)

Ksgr
Tonalite of San Gabriel Reservoir (Cretaceous)
Biotite-hornblende tonalite, ranging to granodiorite and quartz-bearing diorite. Forms east-west elongate body at front of San Gabriel Mountains on both sides of San Gabriel Canyon.

Kgl
Mixed leucocratic and granitic rocks (Cretaceous)
Leucocratic dike rocks. Intrude Cretaceous quartz diorite and older rocks between San Gabriel and San Antonio Canyons

TR lq
Porphyritic quartz monzonite and quartz monzodiorite (Triassic)

Pgn
Layered gneiss, undifferentiated (Proterozoic)
Thinly layered, fine-grained gneiss probably derived from texturally diverse volcanic, fine grained intrusive, and immature sedimentary protoliths.

Fig. 4.5, *left*
Geologic Map (Source: Morton and Miller, 2003, USGS Open-File Report 03-293)

Conversely, the Entisols of the south-facing slopes experience a dryer and hotter environment with less dense vegetation. This results in higher erosion rates, less overall soil development, and the lack of organic top horizons on the otherwise identical parent material of sandy-skeletal regolith of decomposed granite.

Entisols of the Vista Family

Order:	Entisols
Suborder:	Orthents
Greatgroup:	Xerorthents
Subgroup:	Typic Xerorthents
Family:	Coarse-loamy, mixed, thermic Typic Xerorthents
Phase:	Vista-Trigo, granitic substratum-Modesto families complex, 40 to 70 percent slopes Soil Series: Vista family

Mollisols of the Tollhouse Family

Order:	Mollisols
Suborder:	Xerolls
Greatgroup:	Haploxerolls
Subgroup:	Entic Haploxerolls
Family:	Loamy, mixed, mesic, shallow Entic Haploxerolls
Phase:	Tollhouse-Stukel-Wrentham families complex, 60 to 90 percent slopes
Soil Series:	Tollhouse family

Geomorphology

The general geomorphology of the study area is that of an incised, bedrock-controlled canyon meander. The formation of this incised meander is due to massive tectonic uplift of the south eastern granitic block of the San Gabriel Mountains. The formation of the canyon topography is antecedent to tectonic uplift where the rate of down cutting of the canyon is approximately equal in magnitude to the tectonic uplift.

Approximately 1 mile downstream of the study site the stream transitions into a large alluvial fan complex forming the margin of the San Gabriel Mountains. This foothill region is a large deposition area for immense volumes of river gravels that have historically been weathered and eroded in the mountains, transported through the canyons, and deposited over the Sierra Madre Fault Zone in the form of alluvial fans.

While the channel base is near bedrock, there are substantive alluvial gravel deposits stored within the canyon bottom. These are commonly reworked and redistributed throughout the canyon floor by fluvial sediment transport during floods. The resulting channel morphology is a string of larger gravel bars flanking the main channel. In the wider and more curved portions of the canyon, a complex meander topography has evolved that includes a set of large gravel-based point bars. The larger of these point bars is a dominant feature of the El Encanto proper-

ty and the Azusa River Wilderness Park. Here, the lower San Gabriel Canyon widens greatly and a sudden drop of stream power allows for natural deposition of sandy sediments and the formation of a sandy floodplain deposit in the upper portions of today's equestrian area.

These thick sandy deposits of the equestrian area are the only significant accumulation of sand in the area, although it appears that most of the larger gravel bars may have originally been topped by sandy deposits. These have been lost forever, as they have been slowly eroded during floods following closure of the upstream reservoirs. This is a common process in many western streams, where dam closures cut off the natural sediment supply for downstream channels. The result is that large floods erode, but do not rebuilt sandbars, a process commonly referred to as "sediment starvation". This ultimately leads to channel degradation and vertical entrenchment of the main channel.

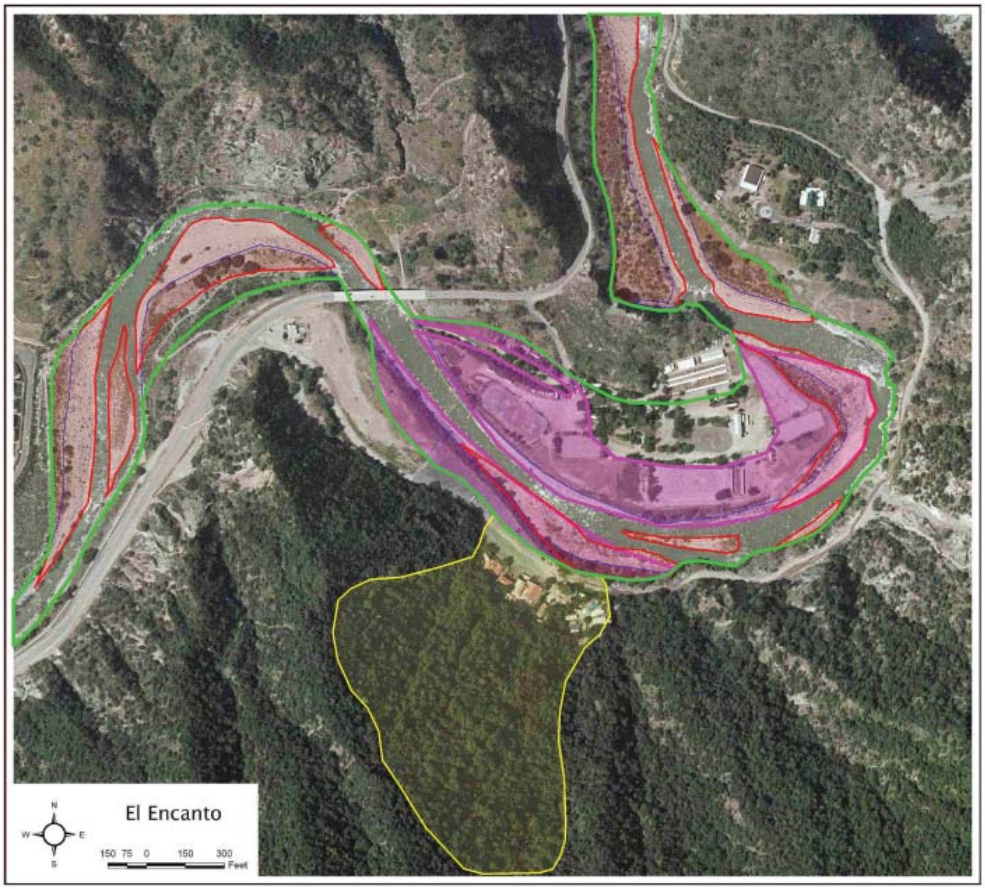


Fig. 4.6
Geomorphologic Map of the Azusa River Wilderness Park

- Maximum Extent of Alluvial Valley Fill
- Previously Active Gravel Bar
- Currently Active Gravel Bar
- Landslide Area

Hydraulic analyses (Appendix B3) indicate that the thalweg of the San Gabriel River may have lowered by as much as 7-10 ft since closure of Morris Dam. The negative effect of reservoir management and entrenchment of the main channel is that flood waters do not reach the high floodplain elevations anymore. Sandy bank materials, historically an important part of the riparian ecology, are disconnected from the flow, and riparian habitat becomes over-aged, because a major element in their cyclical rejuvenation – regular flooding, was eliminated.

The southern parcel of the El Encanto property constitutes a cut bank positioned opposite the sandy point bar. This area has originally been the location of an elongated gravel bar that was later buried by landslides originating from the southern slopes. This situation is characteristic of the lower canyon topography, where several smaller landslides can be observed impinging on the river channel, often associated with the formation of boulder riffles, where extremely large, poorly rounded clasts can be observed amidst the river channel.

The landslide scar on the southern slope of the property is not very visible and is heavily vegetated indicating that this landslide may have occurred many decades to centuries ago. The materials underlying today's mobile home area constitute the unaltered toe materials of the original landslide. (Fig. 4.7) Within the area of the old restaurant these slide deposits were moved to make room for the buildings and the old San Gabriel Canyon Road. It appears that the majority of the material was moved towards the stream, where it is now incorporated into the base of the parking lot and the graded southern river bank.

The pre-slide topography likely included a relatively large gravel bar that is now buried under the parking lot and the neighboring property. The southern stream bank is now significantly steeper and the river channel is narrower than this would be the case under natural conditions.

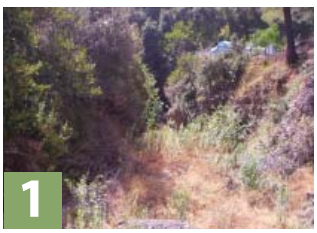
There are indications of ongoing mudslides and debris flows emanating from the smaller drainages and historic slide scars behind the El Encanto property. Visual field inspection suggests that the majority of these slide processes are slope wash related to erosion and down cutting of drainage channels within the depositional toe materials of the ancient slide. (Fig. 4.7)

Fig. 4.7
Angular matrix-supported landslide deposits underlying the mobile home park and lower slopes surrounding the buildings.

Generally, these landslide materials tend to be well drained without finer clay-bearing horizons, making large-scale or "deep seated" mobilization of the landslide deposit relatively improbable. However, slopes in the area are very steep and this will always cause materials to mobilize and wash off during larger rainfall events. Nevertheless, it is highly recommended that a more detailed study of the area is performed by geotechnical experts before major project implementation.

In detail, four separate drainage channels traverse the developed area of the southern parcel emanating from the historic slide scar. (Fig. 4.8) One channel passes the mobile home area to the east. The channel has cut down dramatically to the level of the old San Gabriel Canyon Road and the eastern set of mobile homes are perched above the western bank of the gully. The gully outlet across the road is blocked by materials that were removed from the road. A second drainage traverses the center of the mobile home park and enters into a large drain pipe under the access road to the mobile homes. This drain is filled-in with debris and does not function properly. The debris accumulates in the center of the trailer park and excess water runs down the driveway, where it exits onto the road.

Fig. 4.8
Mapped Drainages on the El Encanto Property
Small images show the locations where sediment and water currently traverse the parking lot and road.



The third drainage currently passes in-between the main building and the apartment through the breezeway. Finally, a fourth drainage passes the building structure on the west side and currently exits onto the parking lot. There are no structural improvements or channels to lead any of these drainages into the San Gabriel River.

San Gabriel River Hydraulics

Stream flow at the site is regulated by three dams within the watershed: Cogswell, San Gabriel, and Morris Dams. The small Cogswell Dam was built in 1934 for flood control and water conservation purposes and is located along the West Fork of the San Gabriel River. It is operated and maintained by Los Angeles County Department of Public Works (LACDPW). San Gabriel Dam, the largest of the three dams, about 5 miles upstream, was completed in 1939 for water conservation purposes and is also owned by the County of Los Angeles. Finally, Morris Dam, only two miles upstream of the El Encanto property, is owned by the Metropolitan Water District (MWD). It was originally constructed by the City of Pasadena as Pine Canyon Dam in 1934 and sold to the MWD in 1935. The dam is currently operated by LACDPW but remains in ownership of the MWD.

LADPW is currently working on substantially improving the outlet structures of Morris Dam (LACDPW, 2007), which are outdated and allow very little flexibility in the way water is being released. The modifications will allow LADPW to conjunctively manage reservoir discharges to efficiently conserve water at its downstream spreading grounds. It is anticipated that larger releases would stay within the historic range of outflows and would continue to fluctuate from year to year based on annual rainfall inflow

About 1 mile downstream of the El Encanto Property, the Army Corps of Engineers maintains and owns the flood control channel between the Cities of Azusa and Duarte, which includes a series of 7 invert stabilizers and 10 drop structures. The trapezoidal channel with grouted rock revetments has a capacity of 98,000 cfs.

Stream flow of the San Gabriel River at the El Encanto property is characterized by high flood peaks of relatively short duration, substantially moderated or delayed by upstream storage. The release patterns at Morris Dam are essentially unmanaged due to problems related to clogging of intakes by sediment. During smaller floods, the intake valves are kept closed until storm inflow is on the falling limb. Only then, once the largest load of sediments has entered the reservoir and has settled are the valves opened to reduce reservoir levels to a normal operating level. Only during the largest floods of "spillway magnitude" are the valves used as a relieve outlet when spillway flow reaches 2000 cfs. The valves are then opened to their maximum, contributing around 5,000 cfs at that moment. The result is that lower to medium flood frequencies are reduced and that floods reach their peak rapidly once Morris Reservoir is full to capacity.

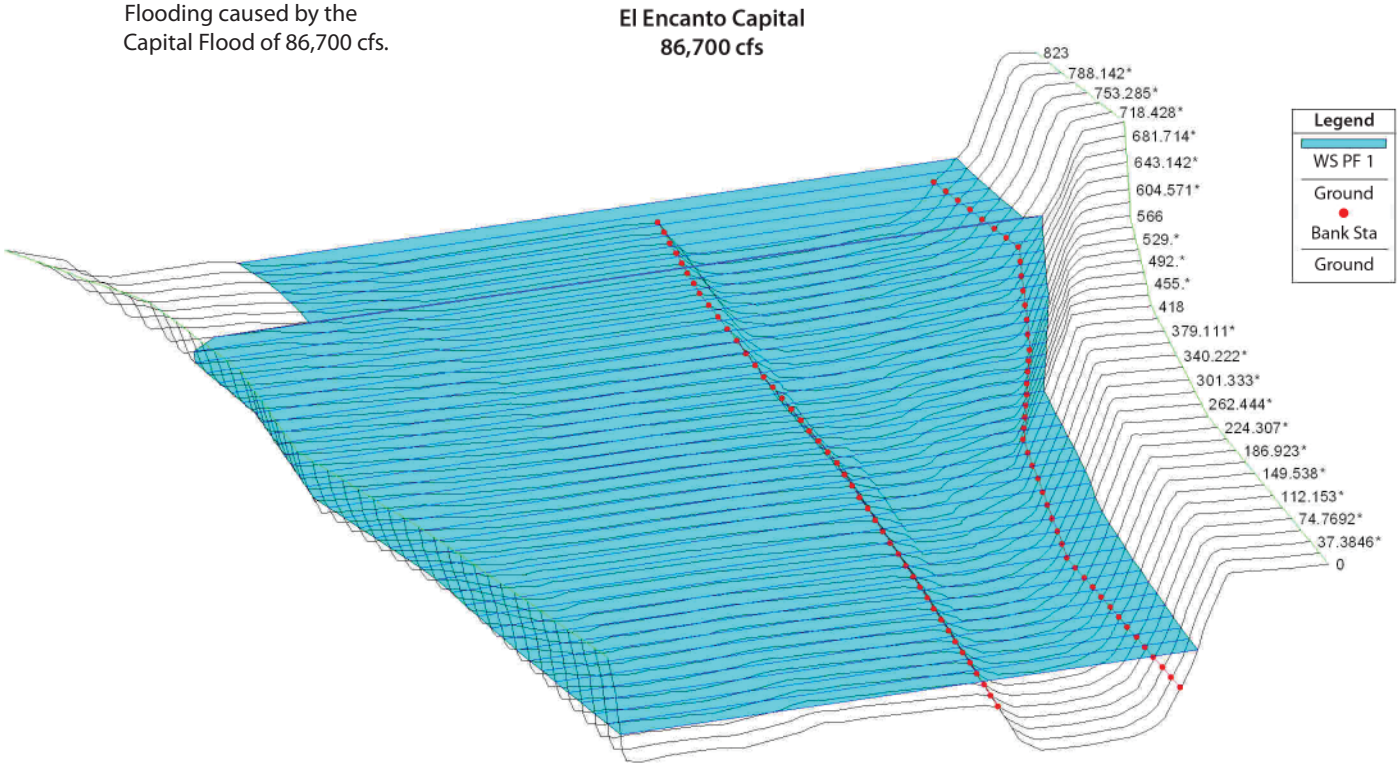
Notable floods of record include the flood of January 18, 1916 with 40,000 cfs before closure of the dams. The two largest floods after dam closure occurred in 1938 and 1969 with discharges of 65,700 cfs and 29,850 cfs, respectively. These discharges were measured at the Azusa Gaging Station just one mile upstream of the El Encanto property site. (The entire flood record is available as Appendix B3.)

Since the channel along the project site is within the jurisdiction of the County of Los Angeles, any permanent conveyance structures and bridges across the San Gabriel River must satisfy the County of Los Angeles Standards for Flood Protection – in this case, the Capital Flood. The capital flood for this reach is 86,700 cfs based on a 1948-study performed for Morris Dam (LACDPW, 2007, Mr. Jared Deck)

In order to develop an understanding of the implications of a flood of this magnitude, a preliminary HEC-RAS model was developed for the existing conditions. (see Appendix B3). The model for the capital flood (Fig. 4.9) shows substantial flooding across the majority of the study area and virtually the entire point bar.

While a flood of this magnitude is unprecedented within the historical record of the area, it constitutes somewhat of a "worst case scenario" for planning considerations. Within the preliminary set of potential planning elements, only two components would have to adhere to the safety standards set by this flood: a potential bridge crossing, and any stream channel alterations that would change current water surface elevations.

Fig. 4.9
Flooding caused by the Capital Flood of 86,700 cfs.



For habititat restoration activities, it is important to understand the most likely extent and probabilities of more frequent flood inundations. A preliminary analysis of flood recurrence intervals was performed to obtain a better understanding of these probabilities. Since the flood record for the site is complex, and is somewhat compromised by the closure of the dams and subsequent alterations in reservoir management, it was decided to minimize statistical inference and use a graphical fit to simplify rank-ordered probabilities to represent flood recurrence intervals. This approach is generally acceptable for habitat restoration work, but additional statistical analyses may be required for engineering work. The graphical fit is shown in Figure 4.10.

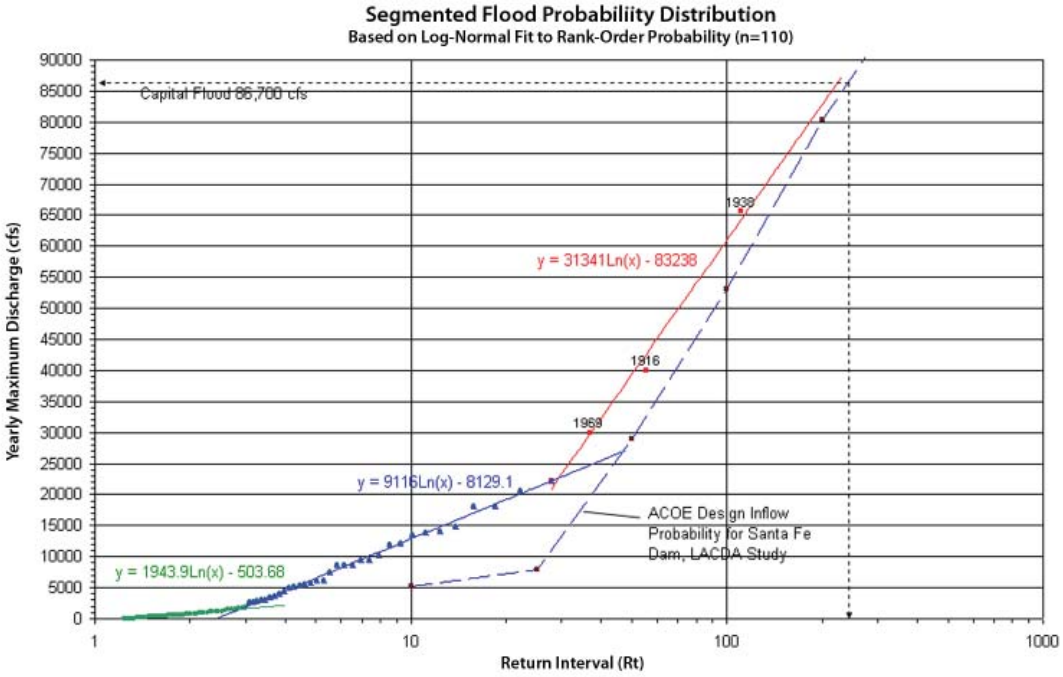


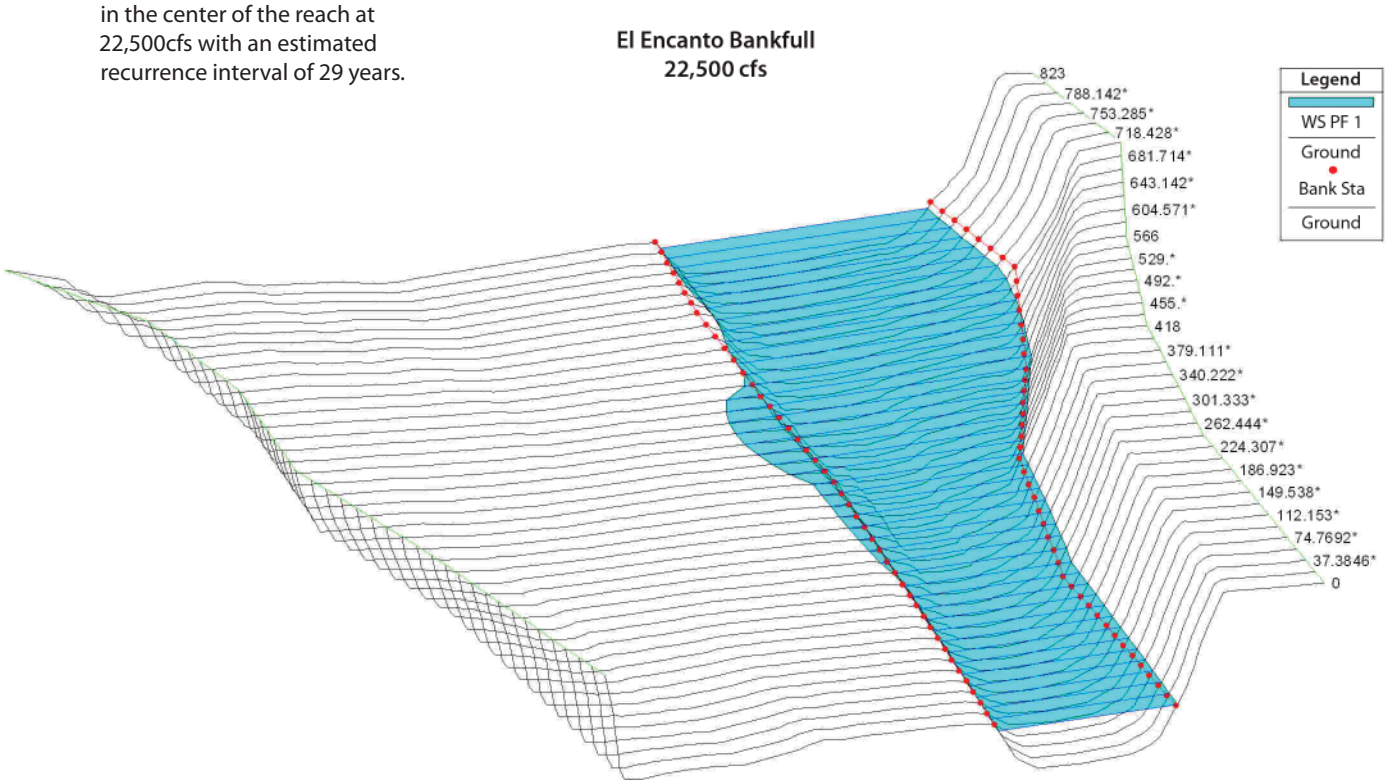
Fig. 4.10
Suggested Flood Recurrence Intervals for Planning Purposes of Plan Elements not requiring Capital Flood Protection. Inflow probabilities for Santa Fe Dam, approximately five miles downstream based on surface runoff models used by the Army Corps of Engineers (USACOE, 1991) are shown for comparison.

Using the obtained recurrence intervals, combined with the flow model allows the calculation of the bankfull discharge and its probability. This is often considered a diagnostic tool to evaluate whether the existing channel and floodplain topography is morphologically "in-tune" with the hydraulic flow regime. Flooding is an integral part of a natural stream's mechanics and the amount of discharge required for the initiation of flooding and its statistical frequency is considered one of the more important measures.

A general rule of thumb for naturally functioning streams is that they would exceed their channel capacity about every 2 years and subsequently inundate the floodplains. In semi-arid canyon environments this value is often adjusted upward to account for larger variability of discharges and more complex channel shapes and sedimentary dynamics. Using the HEC-RAS model by incrementally increasing discharge until water levels rise above the northern banks, it was determined that bankfull discharge amounts to about 22,500 cfs. Using the recurrence intervals of Figure 4.10 this would be approximately the 29-year flood.

Clearly, this value is much higher than one would usually obtain in a natural system. Generally, one would expect that in a natural canyon type environment, even a large and complex point bar would be at least partially inundated every 5-10 years. The observed discrepancy is likely due to the cumulative effects of the upstream dams on the sediment supply of the channel.

Fig. 4.11
Onset of floodplain inundation in the center of the reach at 22,500cfs with an estimated recurrence interval of 29 years.



4.4 Biological Resources

In order to describe and summarize the existing biological resources, a biological reconnaissance survey of Azusa River Wilderness Park Project Site was conducted by BonTerra Consulting in October of 2006. A search of available literature to identify special status plants, wildlife, and habitats known to occur in the vicinity of the site was conducted. The California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (CIMPS 2005) and the California Department of Fish and Game (CDFG) California Natural Diversity Database (CDFG 2004) were reviewed. During the field survey, vegetation types were described and evaluated for their potential to support special status plant and wildlife species. Plants were identified using keys in Hickman (1993) and Munz (1974). Finally, potential biological constraints were evaluated and site specific recommendations for potential enhancement or restoration of biological resources were presented. The entire assessment is included as Appendix B2.

Regional Vegetation Communities

The variety of topography, soil types, slope aspects and water availability within the San Gabriel Canyon region create a range of physical habitats which support numerous plant species. Many of these species, although often different in their growth form, prefer similar habitat characteristics and are often found in recurring assemblages to form plant communities. Ten major plant communities are found within the San Gabriel Canyon area:

- *Big-cone spruce-canyon oak forest* is an open to dense forest dominated by big-cone spruce (*Pseudotsuga macrocarpa*) 50 to 80 feet tall over a dense canopy of canyon oak (*Quercus chrysolepis*). It is found scattered throughout the canyon sides at elevations generally above 2,500 feet where it occupies rocky substrates. It commonly occurs in fairly small enclaves within chaparral.

- *White alder riparian forest* is found along the upper reaches of many drainages in the San Gabriel Canyon area. This community is dominated by white alder (*Alnus rhombifolia*) which grows 30 to 40 feet high over a shrub understory. It typically grows along streams in bedrock-constrained, steep-sided canyons, resulting in a fairly narrow riparian corridor.

Fig. 4.12, left
Alluvial fan scrub plant community on the river margins

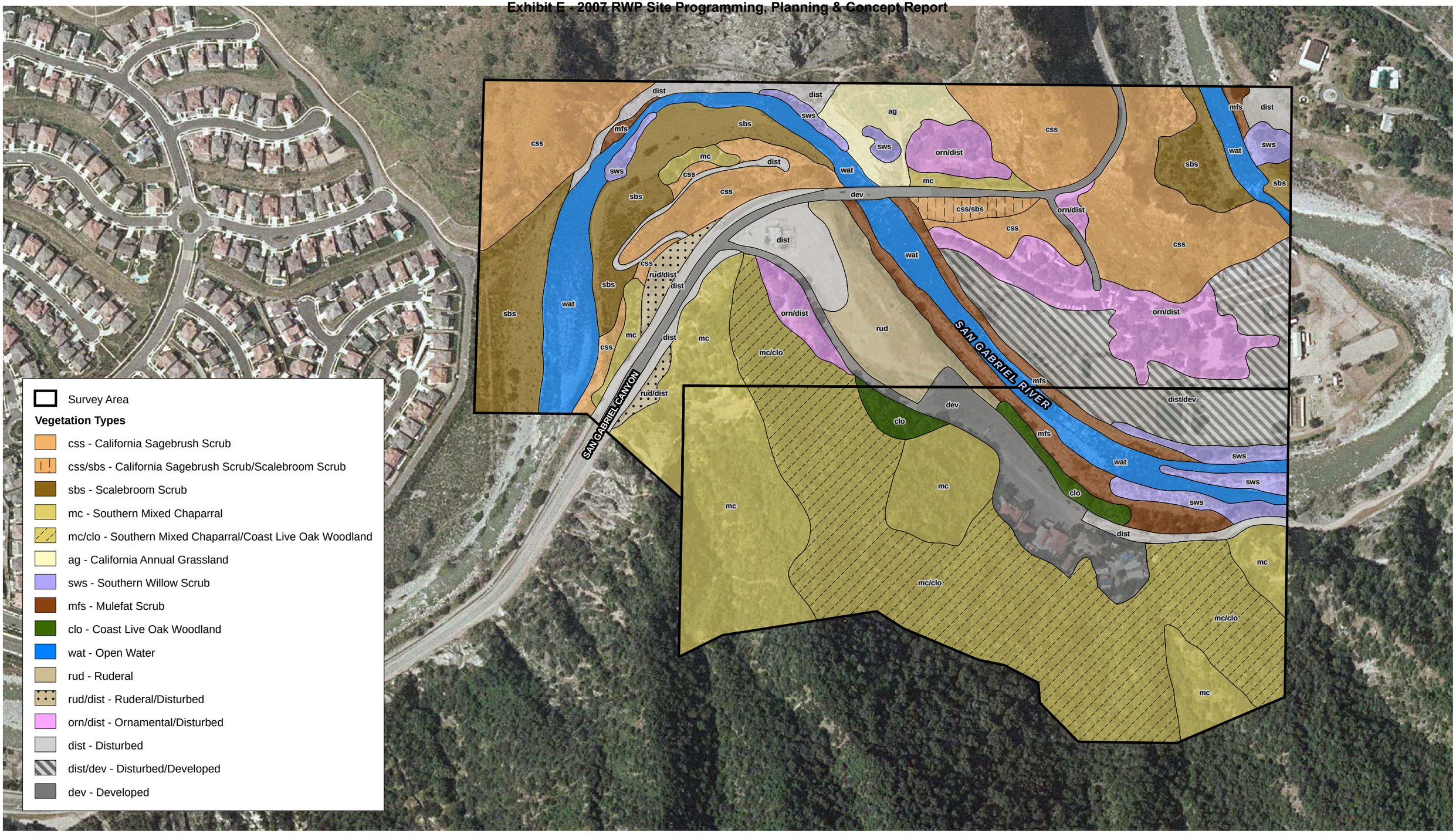
Fig. 4.13, above
Yellow blooms on the Scalebroom, the indicator species for alluvial fan scrub

■ *Alluvial fan scrub* is a shrub community characterized by harsh substrates subject to episodic flooding and scouring. It is generally restricted to broad canyon outwashes, or alluvial washes. It is found at the San Gabriel Canyon mouth where it forms open shrub vegetation within areas of bare, scoured ground in-between.

■ *Oak woodland* is a plant community dominated by species of the genus Quercus. Within the San Gabriel Canyon area, this community includes coast live oak (*Quercus agrifolia*) which typically grows to heights of 20 to 40 feet and the somewhat smaller interior live oak and canyon oak, and forms either closed or open tree canopies. Understory vegetation varies from grassland in level areas to shrubs where topography is steeper. It may also intergrade with shrub communities. Within the San Gabriel Canyon area, oak woodland is scattered throughout and most prevalent on north-facing slopes and in drainage bottoms.

Fig. 4.14, *fold out*
Vegetation Map of Study Area

■ *Oak riparian forest* is a highly related community found in the San Gabriel Canyon area as well. This community is also dominated by coast live oak (canyon oak at higher elevations). The primary difference between oak woodland and oak riparian forest is the greater availability of water in riparian situations which is expressed in a denser tree canopy and higher density of trees. There are also a greater number of hydrophytic (moisture favoring) plant species in the understory. Typical riparian trees such as western sycamore (*Platanus racemosa*) and willow (*Salix* spp.) occasionally occur as well. Oak riparian forest is best developed within broader, more level gradient drainages of the area.



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Vegetation Types

Exhibit 1

BlueGrn J001 - Azusa River Park

N W E S

300 150 0 300

Feet

BonTerra CONSULTING

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Exhibit E - 2007 RWP Site Programming, Planning & Concept Report

■ *Walnut woodland* often intergrades with oak dominated woodlands or develops as a distinct community. This community is dominated by the southern California black walnut (*Juglans californica*) which grows 10 to 30 feet high. More often than not, walnut woodland in this area is highly intermixed with oak woodland and chaparral and large monotypic stands are uncommon.

■ *Southern willow scrubs* are found along widely scattered reaches of several drainages throughout the area. This community is dominated by species of willow (*Salix* spp.) which form nearly monotypic stands due to their dense growth with an occasional cottonwood. These stands generally reach 10 to 20 feet in height with little understory vegetation.

■ *Chaparral* is a shrub community composed of robust species. Within the area, a number of chaparral sub-communities are found according to their dominant plant species. These include chamise (*Adenostoma fasciculatum*), buck brush (*Ceanothus cuneatus* var. *cuneatus*), ceanothus (*Ceanothus* spp.), scrub oak (*Quercus berberidifolia*), interior live oak (*Quercus wislizenii*) and even mosaics of these depending on mixes of species and elevation. These and other shrub species form dense vegetation covers growing five to ten feet in height. The development of chaparral is pronounced over large hillside areas throughout the San Gabriel Canyon area.

■ Coastal sage scrub is a shrubland community exhibiting less robust structure than chaparral. This plant community is dominated by California sagebrush (*Artemisia californica*), bush sunflower, (*Encelia californica*), white sage (*Salvia apiana*), black sage (*Salvia mellifera*), and California buckwheat (*Eriogonum fasciculatum*). It also forms dense stands which grow three to four feet in height. Within the area it is generally found in scattered patches which are highly integrated with mixed chaparral. These are primarily located in the lower elevation hillsides of the San Gabriel Canyon area.

■ Non-native grassland is dominated by non-native annual grasses and forbs. These opportunistically growing species include brome grasses (*Bromus* spp.), wild oats (*Avena fatua*) and mustards (*Brassica* spp.). Characteristic of other parts of Southern California, this community became established as a result of livestock grazing and agriculture, as native vegetation is removed, sometimes by mechanical means, and replaced by more adventitious species. Non-native grassland is found throughout the area.

Vegetation Types at the El Encanto Project Site

Vegetation types at the El Encanto property were identified and their spatial extent was mapped on an aerial photography. (Fig. 4.14) The following types were specifically identified:

- California Sagebrush Scrub
- Scalebroom Scrub
- Southern Mixed Chaparral
- California Annual Grassland
- Southern Willow Scrub
- Mule Fat Scrub
- Coast Live Oak Woodland

Scrub and chaparral vegetation types dominate the hillsides, and also occur in the alluvial areas west of San Gabriel Canyon Road. An annual grassland patch is located in the north-central portion of the site. Riparian habitats are present along the edges of the San Gabriel River, east of San Gabriel Canyon Road. Oak woodlands are intermixed with chaparral on the hillsides throughout the southern portion of the site. Miscellaneous map classes include Open Water, Ruderal, Ornamental, Disturbed, and Developed.

Wildlife Populations

Wildlife populations within the San Gabriel Canyon area are diverse and abundant due to the region's physiographic diversity, its relative isolation, and its location within and adjacent to Angeles National Forest. The San Gabriel Canyon area is likely to support healthy populations of a diverse assortment of invertebrate species based on the undisturbed nature and variety of habitats. Fair numbers of amphibians are expected to be present primarily due to the aquatic and semi-aquatic habitats provided within the numerous drainages and several reservoirs. Reptile abundance and diversity are expected to be characteristic for the habitats present, (Fig. 4.15) although areas closer to urban development along the southern boundaries of the area likely to be suppressed due to edge effect.

Fig. 4.15

Bird use, diversity, and abundance within the San Gabriel Canyon area is expected to be high for several reasons. In general, this area provides habitat for a wide range of shrubland, woodland, forest, and riparian species that occur at varying elevations. In particular, the riparian habitats found in drainages throughout this area provide essential habitat for riparian-obligate and riparian-favoring species. In addition, a number of migratory birds use this area to move across the northern portion of the Los Angeles Basin. These include a wide spectrum of birds including songbird, waterfowl, and raptorial species.

Similarly, the mammalian fauna is expected to be very diverse and abundant. Perhaps, more influential on this taxa, than the diversity of habitats, is the vast open space of the Angeles National Forest. Virtually all mammalian species found in the forest (with the exception of bighorn sheep) are expected to be found in this area. Frequent observations of black bear and mountain lion in foothill communities attest to the range of species expected.

Wildlife movement within the San Gabriel Canyon area takes on two major forms. First, due to the extreme intervening topography, it is logical to expect considerable movement of wildlife up and down countless drainages which connect the forest interior with the foothill areas. A rule of thumb is that the volume of movement increases with the size of watersheds. This type of movement occurs on a seasonal and more frequent basis, particularly for large mobile mammals whose full range of habitat needs are typically met over broad areas.

The second major type of movement occurs across the flanks of the foothills and lower mountains, in an east-west direction. Particularly for riparian-favoring migratory birds, a corridor linking riparian habitats of lower elevations in the San Gabriel Canyon area is of high use and importance. In addition to providing essential habitat for resident riparian birds, this area contains some of the best developed riparian habitat for birds which are seasonal visitors to cismontane Los Angeles County.

Wildlife populations on the site are expected to be representative of the habitat types on site. Underdeveloped portions of the site are expected to be particularly abundant in wildlife due to the diversity of plant communities and valuable river resources.

Special Status Resources

The San Gabriel Canyon area supports several habitat types considered sensitive by resource agencies, namely the California Department of Fish and Game (CDFG) California Natural Diversity Database (CNDDB, 2006), because of their scarcity and their being habitat for a number of state and federally listed endangered, threatened, and rare vascular plants, as well as several sensitive bird and reptile species. These communities include: oak riparian woodland, walnut woodland, southern willow scrub, coastal sage scrub and alluvial fan scrub. They are considered highest-inventory priority communities by the CDFG, indicating that they are experiencing a decline throughout their range. Sensitive species include those listed, or candidates for listing by the United States Fish and Wildlife Service (USFWS), CDFG, and California Native Plant Soceity (CNPS) (see the biological resources report, Appendix B2 for an extensive tabulation).

Several special status habitats occur on the project site including: California sage-brush scrub, scalebroom scrub, southern willow scrub, mule fat scrub, and coast live oak woodland. The following is a list of special status plant and wildlife species which have been determined to have some potential, albeit low in some cases, to occur on the site based on the range of the species and the habitat available on and surrounding the site:

Plants

- Greata's aster (*Aster greatae*)
- Braunton's milk-vetch (*Astragalus brauntonii*)
- Nevin's barberry (*Berberis nevinii*)
- Thread-leaved brodiaea (*Brodiaea filifolia*)
- Slender mariposa lily (*Calochortus clavatus var. gracilis*)
- Plummer's mariposa lily (*Calochortus plummerae*)
- Slender-horned spineflower (*Dodecahema leptoceras*)
- San Gabriel River dudleya (*Dudleya cymosa ssp. crebrifolia*)
- San Gabriel Mountains dudleya (*Dudleya densiflora*)
  –*thought to occur on the site
- Mesa horkelia (*Horkelia cuneata ssp. puberula*)
- Robinson's pepper-grass (*Lepidium virginicum var. robinsonii*)
- Rayless ragwort (*Senecio aphanactis*)
- San Bernardino aster (*Symphyotrichum defoliatum*)
- Sonoran maiden fern (*Thelypteris puberula var. sonorensis*)

Fig. 4.16
San Gabriel River dudleya growing on a dry rock outcrop near the park entry

Fig. 4.17
Sonoran maiden fern along Old San Gabriel Canyon Road.

Wildlife

- Cooper's hawk (*Accipiter cooperii*)
- Sharp-shinned hawk (*Accipiter striatus*)
- Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*)
- Coastal western whiptail (*Aspidoscelis tigris stejnegeri*)
- Santa Ana sucker (*Catostomus santaanae*)
- Yellow warbler (*Dendroica petechia brewsteri*)
- Willow flycatcher (*Empidonax traillii*)
- Southwestern pond turtle (*Emys (=Clemmys) marmorata pallida*)
- Arroyo chub (*Gila orcuttit*)
- Yellow-breasted chat (*Icteria wrens*)
- San Diego black-tailed jackrabbit (*Lepus catifornicus bennettii*)
- Big free -tailed bat (*Nyctinomops macrotis*)
- Los Angeles pocket mouse (*Perognathus longimembris brevinasus*)
- Coast (San Diego) horned lizard (*Phrynosoma coronatum* [*blainvillii population]*)
- Coastal California gnatcatcher (*Polioptila californica californica*)
- Santa Ana speckled dace (*Rhinichthys osculus* ssp. 3)
- Coast Range newt (*Taricha torosa torosa*)
- American badger (*Taxidea taxus*)
- Two-striped garter snake (*Thamnophis hammondii*)
- Least Bell's vireo (*Vireo bellii pusillus*)

Of the above species, eight are either state or federally listed as threatened or endangered. The potential for these species to occur on the site is considered very low. One species, the San Gabriel River dudleya, although not a listed species, is very rare and is known to occur in the immediate vicinity of the property. Proposed plans should avoid impacts to this species if feasible.

Summary of Regional Biological Value

The San Gabriel Canyon and surrounding area support a rich diversity of biological resources within close proximity to urban areas. The canyon area contains habitat of rare species such as the San Gabriel bedstraw and the San Gabriel Mountains dudleya, as well as several plant communities that are CDFG highest inventory priority communities due to their restricted distribution in the Southern California region. These communities include: walnut woodland, oak riparian woodland, southern willow scrub, coastal sage scrub, and alluvial fan scrub.

The major canyons of the region support well developed and diverse riparian woodlands, as well as a source of water for most, if not all, of the year. These represent important stopover and over-wintering areas for a wide variety of migratory birds and essential habitat for resident species. These canyons support seasonal and more frequent movement for wide-ranging mammals which must move over large areas to fulfill their habitat requirements.

Virtually all of the native biotic communities within this area are relatively undisturbed over most of their extent. As such, and because urbanization throughout much of the foothill regions has removed large expanses of these communities, those in the San Gabriel Canyon area are particularly important to the region's natural heritage.

4.5 Open-Space Connectivity

A stated goal for this project is to spatially tie the El Encanto site into the existing open space and develop much needed connectivity. The project is an opportunity to connect the mountains with the multitude of projects along the San Gabriel River, the Rio Hondo and the Los Angeles River to the Pacific Ocean. (Fig. 4.18)

The most important regional open space connection is the County of Los Angeles Bikeway, which runs alongside the entire San Gabriel River between the Pacific Ocean and the Lower San Gabriel Canyon in Azusa. Currently, the bikeway ends only a few hundred feet away from the project site. One of the major goals of this planning effort is to extend the bikeway to the new park site and provide further open space access through trails.

This bikeway connection is of high importance because it also links the San Gabriel Mountains to many other urban park sites. It provides a link to the planned Emerald Necklace, a 17-mile loop of greenways and parks connecting 10 cities in the San Gabriel Valley along the Río Hondo and San Gabriel River. The Necklace will connect several key recreational areas including the Whittier Narrows Recreational Area, the San Gabriel River Discovery Center, Peck Park, and the future Woodland Duck Farm Park.

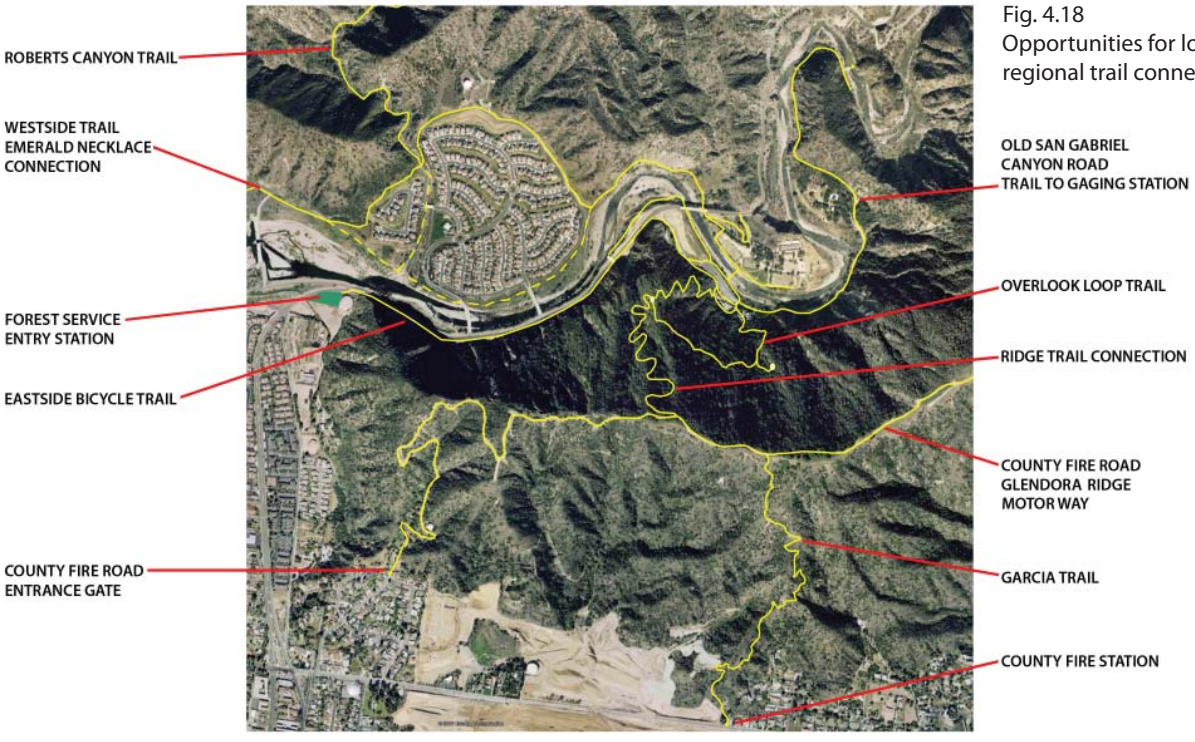


Fig. 4.18
Opportunities for local and regional trail connections.

Fig. 4.19
Route 39 Bridge over the San Gabriel River

Along the way, the bikeway also makes a connection to the Santa Fe Dam Recreation Area and passes by the new National Forest Service Entry Station, currently under construction at the canyon entrance.

Other plans include the development of nature trails opposite the current bikeway through the Cities of Duarte and Azusa, effectively allowing regional trail connections to the canyons on the north side of the river, most notably, Fish Canyon and Roberts Canyon. A trail on both sides of the river would essentially extend the Emerald Necklace into the mountains. (Fig. 4.19)

On the local scale, several open space and trail connections are possible. One is to improve access to the Old San Gabriel Canyon Road between the project site and the old River Gaging Station. This picturesque area along the river is of high interest to naturalists with access limited to pedestrian traffic. Another important connection would be to the Glendora Ridge Motor Way which currently follows the mountainous ridge south of the property. A trail going up to the ridge would allow a connection to other trails along the Motorway, most notably the Garcia Trail, a popular trail on the south face of the ridge in the City of Azusa.

4.6 Buildings and Structures

The planning efforts for this study included the development of an overall use program for the site including the buildings and all other structures of the site. (Fig. 4.20) In order to determine the preliminary feasibility of some of the possible site uses, the building structure and layout had to be thoroughly evaluated. This was done by Alan Bernstein Architects, AIA + ASLA, the architectural consultants for the project. A more detailed report is attached as Appendix B4.

Fig. 4.20
Existing buildings

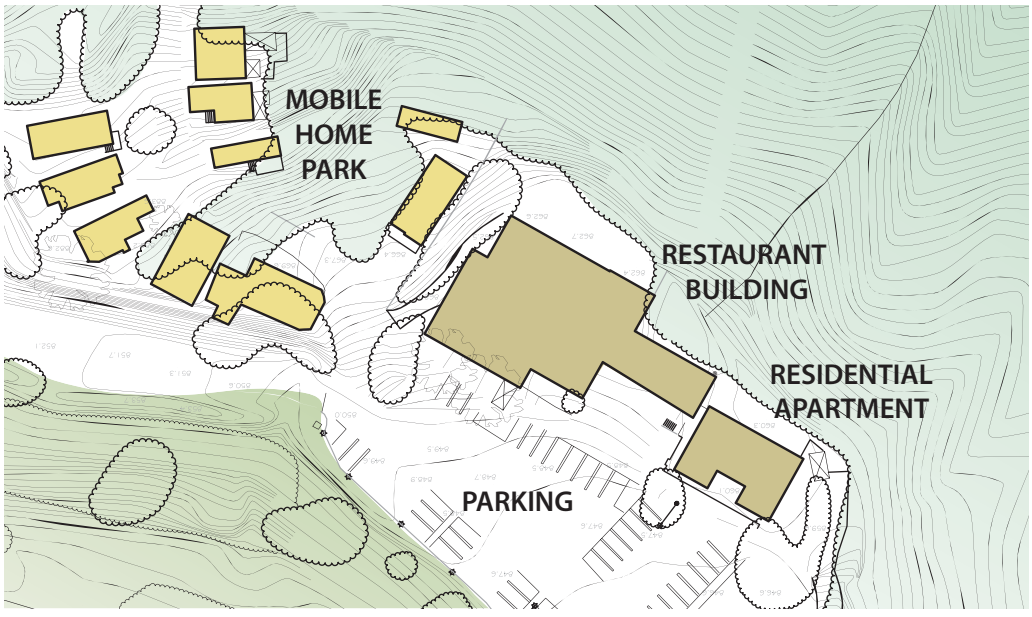


Fig. 4.21, *above*
Original residence before conversion to a restaurant

Fig. 4.22, *above*
Entrance to the restaurant

Fig. 4.23, right
Back patio of restaurant

The El Encanto Restaurant building was originally a two-story single-family residence in Mediterranean style with stucco walls, Spanish clay tile roof, and wood lintels over the windows. It was built with un-reinforced masonry, which was common at the time. Historic images show lawns surrounding the buildings towards the river banks. (Fig. 4.21) The structure was later turned into a restaurant and served in that function until recently.

The restaurant was well known in the area and was heavily frequented on weekends, when visitors came to enjoy the food, the cool river water, and the enchanting natural beauty of the site. Increasing popularity required several structural additions to the original building, which were constructed in a patchwork of steps over a longer period of time. (Fig. 4.22) In the center of today's structure the old un-reinforced masonry structure is still visible, seemingly entombed within the later additions.

Fig. 4.24
Residential apartment

Fig. 4.25
Two-unit structure with ranger residence

Today's restaurant structure is broken up into four major rooms plus service spaces. In the rear, a patio, shaded by verdant growth of trees, forms the transition to the steep hillside. (Fig. 4.23) Smaller block retaining walls keep water from the hillside from flowing on to the patio and into the building. The perimeter square footage of the first floor of the building is 7,636 square feet, and the second floor amounts to 844 square feet. The total square footage is estimated at 8,480 square feet.

Next to the restaurant building is a small single residential apartment built on top of a garage. (Fig. 4.24) The structure is connected to the restaurant building by a covered breezeway or carport that also provides access to the back patio and storage areas of the restaurant. The breezeway also acts as drainage for the steep hill slope behind the structure.

Next to the apartment is a two-unit duplex structure that was built last. One of these units is currently used as a ranger residence. The buildings have stucco exterior, fenced back yards, and slump block retaining walls and planters in the front. (Fig. 4.25)

Finally, to the east of the restaurant building, is an 11-unit mobile home park. (Fig. 4.26) Several units are in obvious disrepair and some are precariously perched above the small drainage channel to the east.

4.7 Existing Parking and Vehicle Access

The El Encanto Site is visually dominated by a two-acre asphalt parking lot with a 600 foot-long low wall. The three-foot high slump stone wall follows the edge of the parking lot at the top of the slope. The parking lot was constructed on top of a large mass of artificial fill, presumably originating from local landslide material. This material was graded to form a large fill terrace between the restaurant site, the western property boundary and the river channel. The northern edge of the fill now constitutes an overly steep graded river bank.

Fig. 4.26
Mobile home

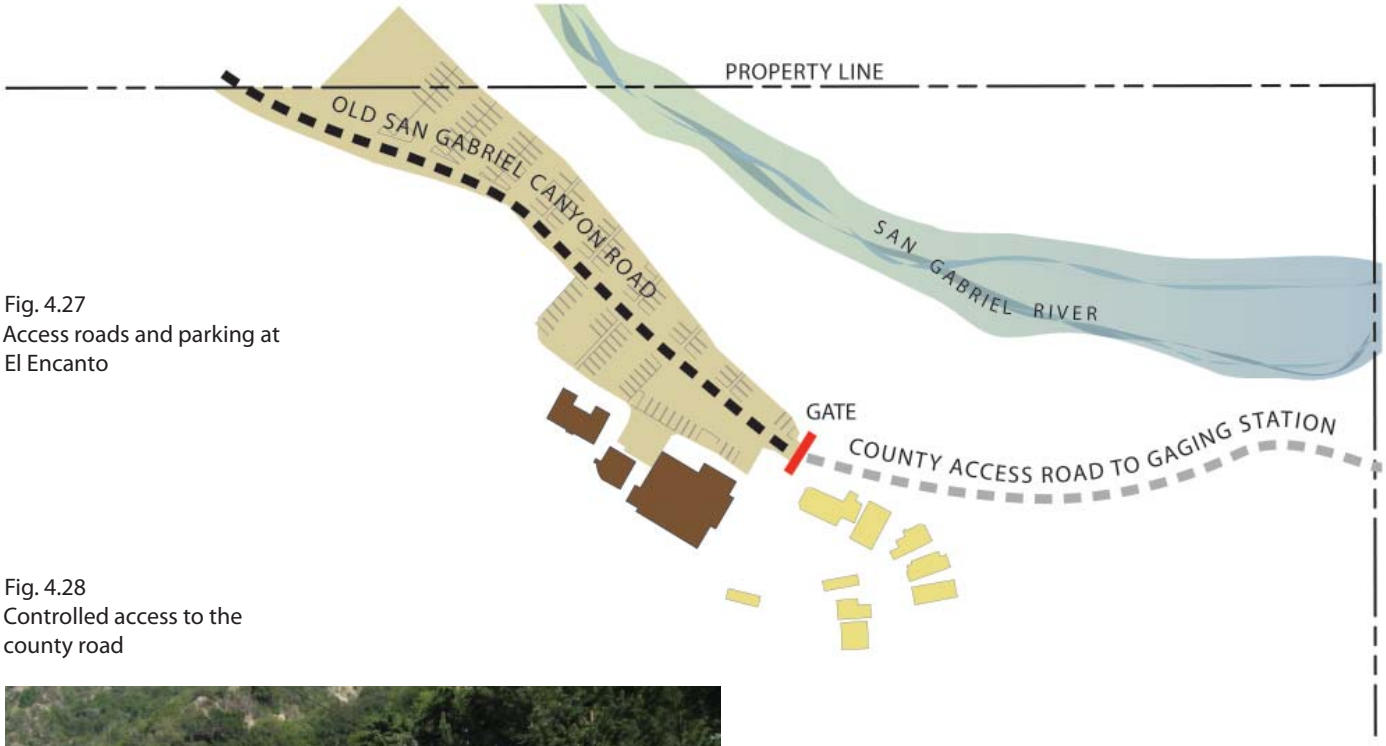


Fig. 4.27
Access roads and parking at El Encanto

Fig. 4.28
Controlled access to the county road

Striping for 170 parking spaces with additional space for three or four randomly parked vehicles was once used by restaurant patrons, and now is predominantly used by RMC staff, the residents of the trailer park, and the random recreational user. A triangular area at the western end of the parking lot, consisting of approximately 20 striped spaces, overlaps onto an abutting property outside the El Encanto site boundary. (Fig. 4.27)

Currently, no entry gates exist and the site is openly accessible. A two lane paved access road threads through the entire parking lot from the site entrance off the San Gabriel Canyon Road/Highway 39, hugging the hillside initially, then bisecting the parking lot as it rounds the point of the hill to a swing gate located at the east edge of the asphalt. This portion of the road is maintained by the City of Azusa and the WCA, as well as the County of Los Angeles. The road then continues as an unpaved access road to the Buddhist Temple and beyond to the river gaging station. This unpaved access road is maintained by the County of Los Angeles. While "No Trespassing" signs at the gate deter the majority of visitors from using this road, it is a public county road and pedestrian access beyond the swing gate is legal. (Fig. 4.28) Posted signage allows vehicles in the parking lot from dawn to dusk. Tickets are issued by the local ranger to vehicles after dusk, except for those belonging to on-site residents.

4.8 Pedestrian Walking and Cycling Routes

A limited number of hikers and pedestrians currently use the site. Trails and trail facilities to and from the site do not exist, with the exception of the scenic unpaved county road to the old gaging station. It follows the river north past the Buddhist Temple for approximately one mile until it dead-ends at a landslide site that destroyed the old road several years ago.

Cyclists avail themselves of the Class II bicycle path located along the west side of the San Gabriel Canyon Road/Highway 39. The bicycle path ends abruptly just below the former Canyon Inn property 260 yards below the entrance to the El Encanto on the east side of the highway. (Figs. 4.29 & 4.30) Crossing the highway just opposite the El Encanto entrance is hazardous due to speeding vehicles, a narrowing of the road approaching the bridge, steep grade from north to south, and road curvature that limits visibility.

Fig. 4.29
Existing access map

Fig. 4.30
End of Class II bicycle path

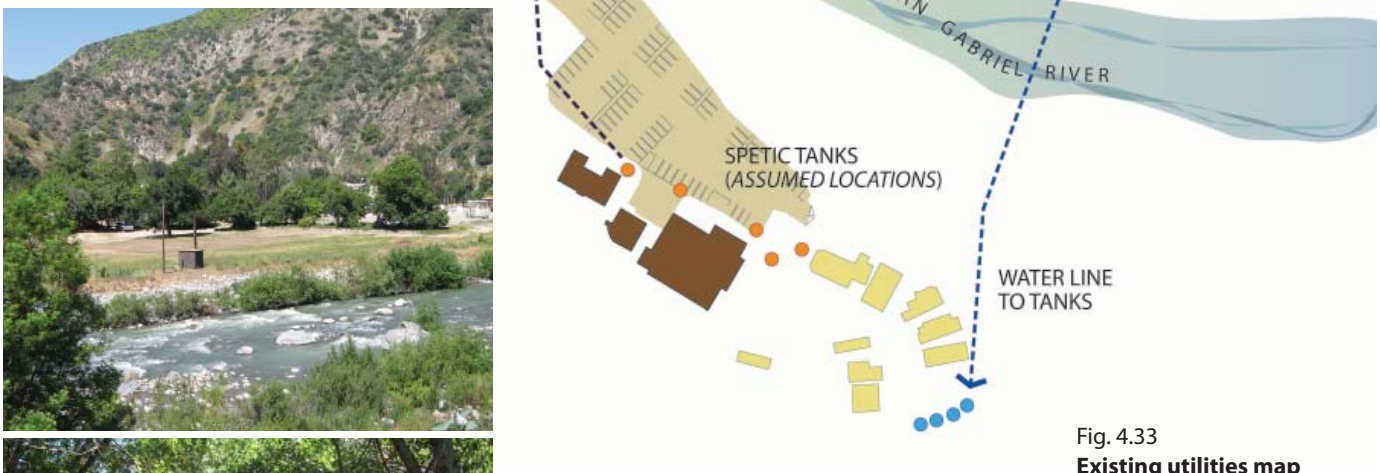


Fig. 4.33
Existing utilities map

Fig. 4.31
Water well on far side of river

Fig. 4.32
Water tanks above mobile home park

4.9 Utilities and Other Infrastructure

The Encanto property has its own water supply from a well on the northern parcel along the river bank. (Fig. 4.31) The water runs through a pipe under the river, and is pumped to a set of water tanks just above the mobile home area. In all, there are five water tanks, of which two are currently functioning. The water is chlorinated on-site and tested daily. The pipes that leave the tank to service the buildings are above ground and follow the steep slope and are vulnerable to damage from slides, rocks, and wildlife. (Fig. 4.32)

The structures on the site are not connected to the City of Azusa sewer system and rely on a set of septic tanks and leach fields. These are essentially undocumented facilities. Electrical service to the site is provided by Southern California Edison. A series of overhead utility lines extend electrical service from Highway 39 to the buildings. (Fig. 4.33) Currently, there are five street lights illuminating the parking lot, with remnants of older light fictures along the parking lot wall.

Phone service is provided by Verizon and a pay phone is located outside the former restaurant building. Cell phone reception is available only to Verizon subscribers. Trash service is provided by Athens Services. Two dumpsters are located in the western parking area and several metal trash canisters with domed metal lids have been placed in the parking lot and are serviced by the local park ranger.

Park regulation signage is mounted in several locations around the perimeter of the parking lot. A series of no trespassing signs located near the swing gate to the county road inaccurately deter the public, as pedestrian access is allowed. An old billboard sign for the former El Encanto restaurant still exists off-site on Highway 39 and a historic metal sign for the restaurant is mounted on posts in the parking lot and is designated for re-use under this plan. (Fig. 4.34)

Fig. 4.34
Restaurant signage
in parking lot

CHAPTER 5:
FINAL SITE DESIGN PLAN

5.1 Plan Alternative Selection

The stakeholder process leading up to the final plan included extensive conversations with the public, institutional stakeholders, and focus groups regarding potential or desired improvements and alternative program elements at the property site. An extensive list was created that included all suggested project elements. The list was further expanded by input from the steering committee and the technical advisory committee.

The list was finally completed by including input and comments from the first community event meeting and by including written comments that were received. The master list of desired program elements included a wide variety of interests including passive recreation opportunities like hiking, picnicking, bird watching, and more intensive visitor oriented activities such as day spa, restaurant and educational facilities.

Fig. 5.1
The San Gabriel River, looking west to El Encanto

Concurrently, the consultant teams performed an existing conditions review of all relevant planning areas of the site, producing a large set of known planning requirements, as well as factual constraints and conflicts. The master list of desired planning elements was then checked against existing planning documents including the San Gabriel River Corridor Master Plan and the City of Azusa Rio Vision Plan, and the set of known constraints to determine all potential conflicts. In this step, clearly infeasible project elements were eliminated.

In the next step, the consultant team broke the site into focus areas to organize and analyze opportunities and constraints with regard to the alternative placement of all desired project elements. These areas included the following:

- Main Building Area
- Mobile Home Park
- Parking Lot
- Southern River Bank
- Northern River Bank

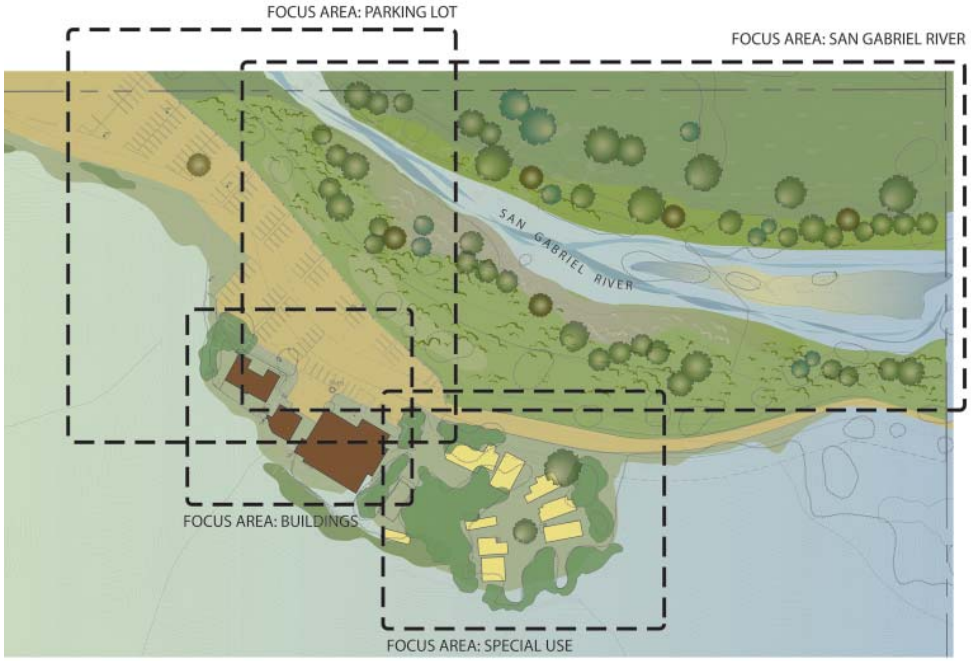


Fig. 5.2
Master Plan Focus Areas

This ultimately resulted in the tabulation of a large opportunities and constraints matrix to assist in determining how the desired project elements could be placed within the project focus areas. For instance, the matrix would list all potential locations for the placement of a picnic area, and would then indicate all factual constraints or conflicts arising out of that placement. In addition, the matrix would show all other desired planning elements that would compete with that exact placement.

The consultant team developed three programmatic alternatives and concept site plans that reflected the broader spectrum of potential future environmental impacts that site planning would have. Ordered from low-impact to high-impact, the following alternatives were presented to the public in the second community event meeting:

Habitat Restoration Alternative
The Ecological Restoration concept would focus on increasing the extent and quality of natural habitats to provide a very low impact nature experience.

Nature Experience Concept Alternative
The Nature Experience concept would maximize the outdoor visitor experience and provide only limited visitor services. This low-impact oriented approach would include a heavy emphasis on habitat restoration and maximize trail opportunities. Educational and interpretive displays would be located outdoors for self-guided tours.

Visitor Services Alternative
The Visitor Services concept would provide amenities for the greatest amount of visitors including groups and individual visitors arriving by trail, car and bus. The concept would include educational/interpretive components for visitors and school classes.

During the second community meeting, all three alternatives were presented individually. The presentation of each plan was followed by discussion and comment cards, with written comments gathered at that time. After all three had been presented, the community members were given the opportunity to verbally, or in writing select their preferred alternative. After all comments for each alternative were compiled and analyzed, it was clear that the community preferred the Nature Experience alternative. The three alternative concept plans are included in Appendix A.

5.2 Preferred Alternative

The preferred alternative for El Encanto in the Azusa River Wilderness Park is the Nature Experience alternative. The over-riding theme of the plan is to provide a place in nature close to the city. El Encanto is an "enchanted" place on the San Gabriel River that gives the impression of being further from civilization than is actually the case. The natural beauty and scenery gives the site a tranquil retreat-like quality. Nevertheless, it is located along a State highway and one of its more visible features is an expansive asphalt parking lot.

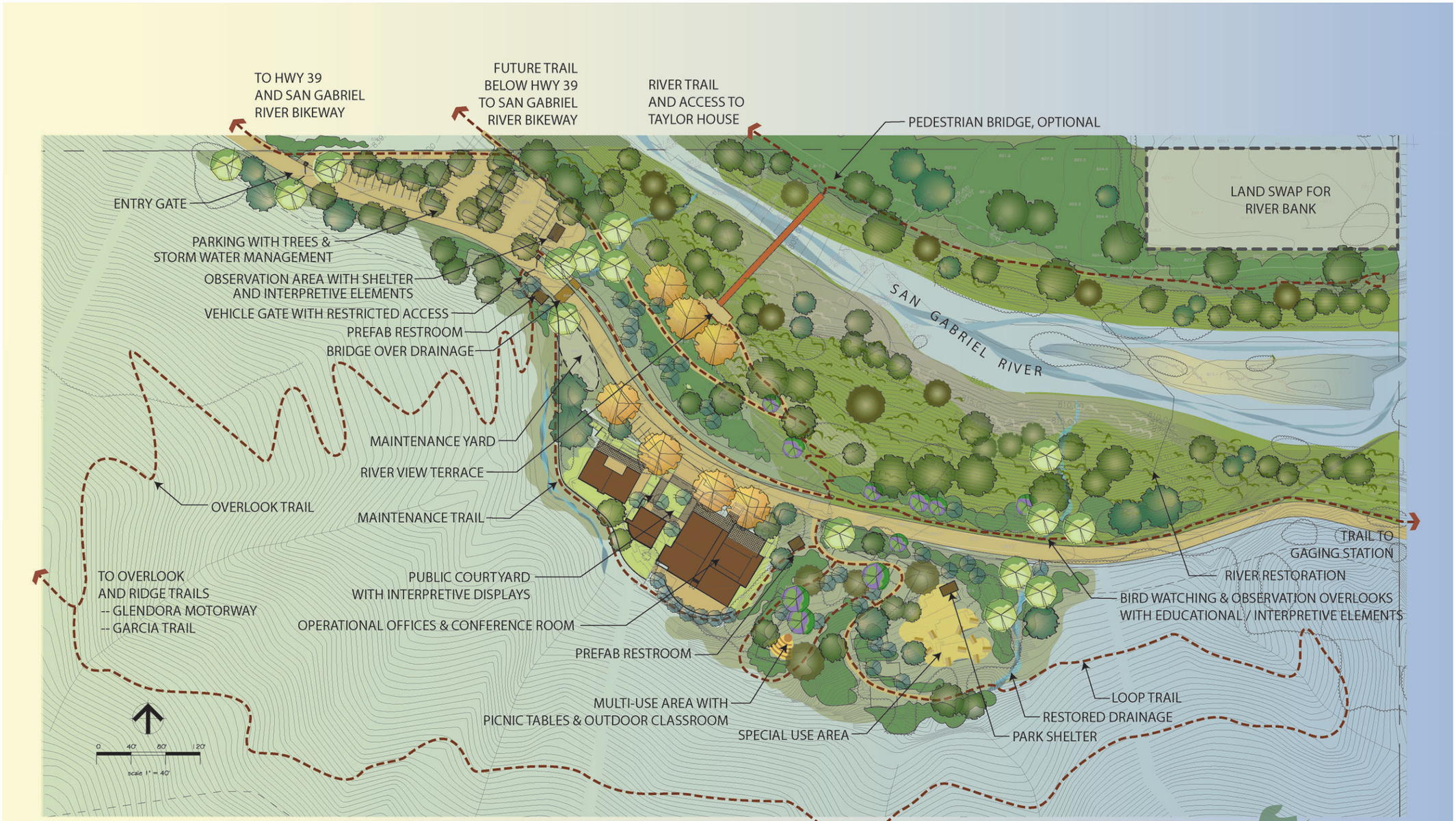
The goal of this plan is to amplify the tranquil qualities by "toning down" the developed site character associated with a large parking lot that conveys the image of a service-oriented facility. This preferred alternative will allow visitors more opportunities to engage in low impact experiences and the enjoyment of natural beauty. This is not to say that the character of the facility will be less inviting, but that it will project the image of a rustic California-style park that provides trail access, rather, than being a rest stop for vehicular traffic on the way to the Upper San Gabriel Canyon.

The distinct programmatic choice is to reduce services to a minimum, in exchange for access to natural open space in close proximity to the city. This will allow for some much needed relief for the heavily used trails of the Upper San Gabriel Canyon. Connecting the existing bikeway to the site, as well as, making a connection to the Glendora Ridge Motorway, is intended to create a recreational destination for users that arrive by means other than automobiles.

Fig. 5.3, *fold out*
The preferred alternative, Nature Experience Master Plan

Rich and diverse habitats of the surrounding terrain support an array of wildlife including deer, bear, fish and birds. Restoration of the river and natural environment is a local and regional planning priority. Hence, the Nature Experience theme includes a significant amount of local habitat restoration and will provide trail access that is carefully balanced within the sensitive natural areas. Educational and interpretive displays will be located along trails and outdoor areas for self-guided tours. Larger educational activities will be limited to special events within a designated special use area and a conference room within the old restaurant. Both will be made available to the public by special request.

The plan seeks to utilize existing facilities and structures for park operations featuring energy conservation and sustainable design. More extensive public use and services will not be anticipated as this would increase day-to-day traffic. With regard to the parking lot, this plan includes a dramatic reduction of parking to provide for stream bank restoration and the construction of a river bank trail with viewing terrace to provide a more intimate, non-contact experience of the riparian environment.



EL Encanto

Azusa River Wilderness Park

Nature Experience

PREFERRED CONCEPT

Presented May 2007

Watershed Conservation Authority

BlueGreen

Open Space Planning & Design

Exhibit E - 2007 RWP Site Programming, Planning & Concept Report

Fig. 5.4
The proposed enhancement of the old restaurant structure

5.3 Plan Components

Setting

The main restaurant building was originally built as a two-story residential unit with un-reinforced masonry in a Spanish/Mediterranean style with a large stone fireplace, clay roof tiles, and wood lintels over the windows. Later, the structure was turned into a restaurant that was well known in the area and was heavily frequented on weekends. Increasing popularity required multiple structural additions to the original building, which were constructed in several steps. In the center of today's structure, the old un-reinforced masonry structure is still visible, seemingly entombed within the structural additions. (Fig. 5.6) Two other buildings, an apartment over a garage, and a duplex exist on the site. Both were constructed as residential units as the restaurant operation expanded. Surface runoff from the slope above exits through the carport between the main building and the garage. All three existing buildings have unattractive stucco exteriors and lack character.

Suggested Exterior Renovations and Style

An upgraded façade for the structures is recommended in order to create a cohesive building complex with a unified building facade. (Fig 5.4) Integration of the three building structures will be accomplished by adding a new trellised courtyard to the area currently located in front of the garage. This will visually focus a visitor's approach to the center of the building complex, rather than to the existing restaurant entrance.

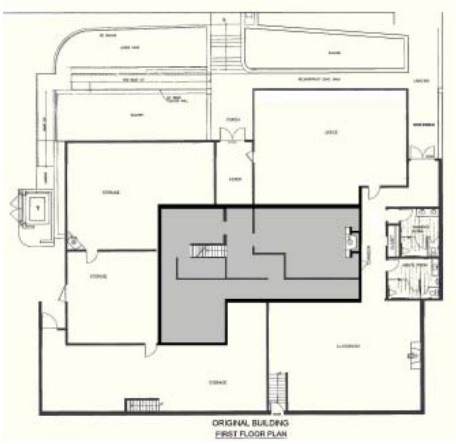


Fig. 5.5
Early watercolor of the original residence

Fig. 5.6
Existing floor plan highlighting the original residential sturcture

The suggested architectural style of the building façade would be that of a Columbian farm house, which relates back to the original house in the center of the existing structure, of which several historic photos and illustrations are still available. (Fig. 5.5) The influence of Spanish/Mediterranean design and architecture is found throughout South America and the southern portion of North America through the influence of European settlers. This style utilizes the Spanish roof tile, rough stucco texture, and porch and trellis structures. (Fig. 5.7)

The persistence of this style can be attributed to both the cultural and climatic environment. The sustainable architectural features of Spanish/Mediterranean buildings work remarkably well in Southern California's climate. Thick, light-colored stucco walls keep structures cool. Clay tiles can be made from local materials, are long-lasting, and are resistant to fires. Porches and trellis structures are particularly interesting, because they can produce a "semi-public" atmosphere in allowing exterior public access and shade.

Fig. 5.7
An example of a Columbian farm house, the recommended architectural precedent.

Fig. 5.8
The covered porch
and trellised courtyard

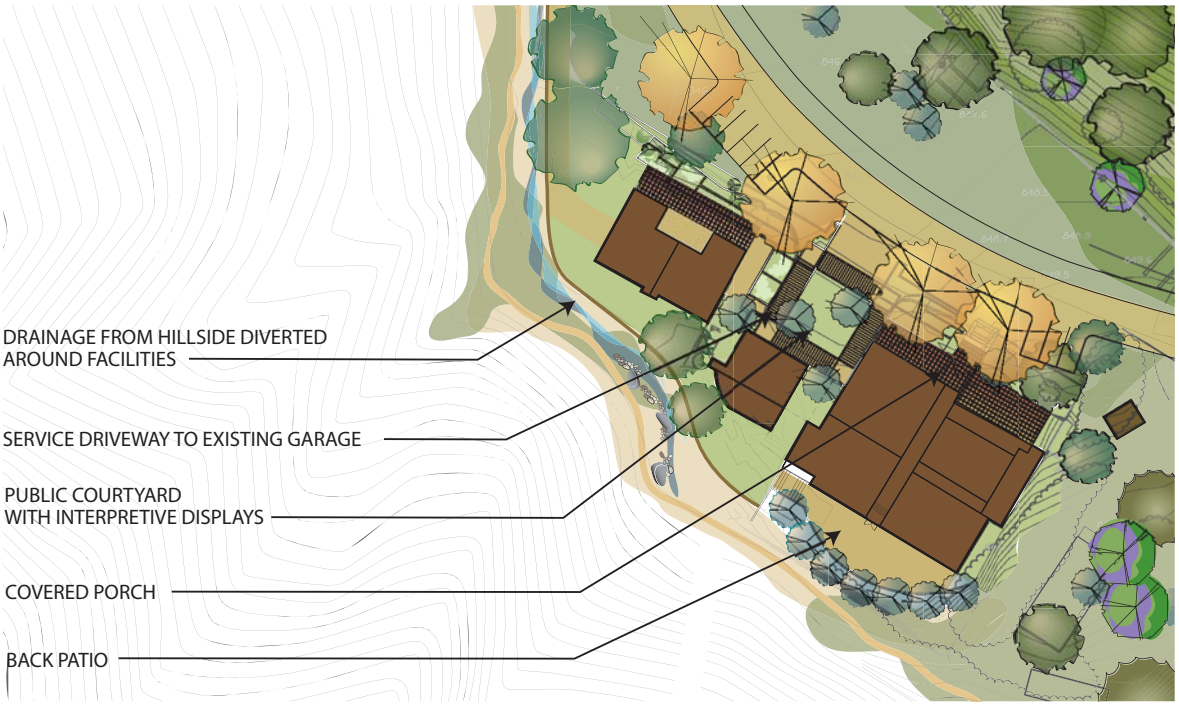
The new trellised courtyard in front of the buildings will create a new building approach, and new public space along the northern exterior of the buildings. The porches and trellis structures will give the public space to gather without entering the buildings. The courtyard will offer some relief from the sun and allow for covered interpretive displays at the same time. (Fig. 5.8)

Along with the changes to the windows and doors, the new design will become a beautiful backdrop to the park. Changing the color of the buildings to blend or compliment the trees behind them could also enhance the beauty of the site and move the developed visual component of the site into the background.

The landscape grade in front of the buildings will have to be elevated to create the space for the courtyard. The configuration of the exterior handicap ramps will change and allow for removal of a portion of the existing retaining walls. The walls will be waterproofed from the planter or backside and proper drainage will be added. The front side of the walls will receive a stucco finish to create continuity between buildings and other landscaping features.

New porch roof covers and trellis will be added in strategic locations to help change the character of the building, enabling the architect to reinterpret the existing architectural façade with the least changes to the existing structures. The result will be a

Fig. 5.9
Building Layout Plan



complex of connected structures with simple façade modifications. No consumer services will be provided at the site. Services will be limited to restrooms, water and trash disposal. Self-guided outdoor educational/interpretive elements will be added to the proximity of the buildings.

Sustainable and energy saving construction material and upgrades to energy systems will be integrated into building renovations. Visibility of the structures from the road will be enhanced by the façade upgrades, while new landscaping will screen portions of the building where public access is not allowed.

Building Uses

The main building will include space for operational offices for park staff, restrooms, storage, and conference/meeting room available for public use. The occupants will be the Rivers and Mountains Conservancy and the Watershed Conservation Authority. The building is broken into four major rooms plus service spaces. In the rear of the building is a patio that is shaded by the verdant growth of trees on the hillside. Slough or retaining walls will keep water from the hillside from flowing on to the patio and into the building. The unit above the garage is to be used for operational offices for park staff. The duplex unit will be used for operational offices and living quarters for the park ranger.

General Improvements

Fire Protection

A single fire hydrant connected to the existing water tanks is located near the buildings. It is critical to design and implement fire prevention systems and strategies as a part of each park improvement. Fire resistant materials include stucco, clay roof tiles and masonry. The chimney on the building must have proper screening. Fire extinguishers should be located both inside and outside of structures and readily available for use by park employees and visitors. Each employee should have direct instruction on evacuation, safe storage of materials and safe operation of potentially flammable equipment and materials. Vegetation near structures should be open, irrigated and maintained to prevent the fire ladder condition. No open fires or smoking will be allowed on site. Signage posting these regulations shall be visible in all public areas.

Trash Enclosure

A trash enclosure for dumpsters will be located in the maintenance area near the current duplex unit. The enclosure will be integrated into the park environment and screened by a combination of stone and stucco walls. The enclosure will be constructed in a fashion that prevents wildlife nuisance related incidents.

Parking Requirements

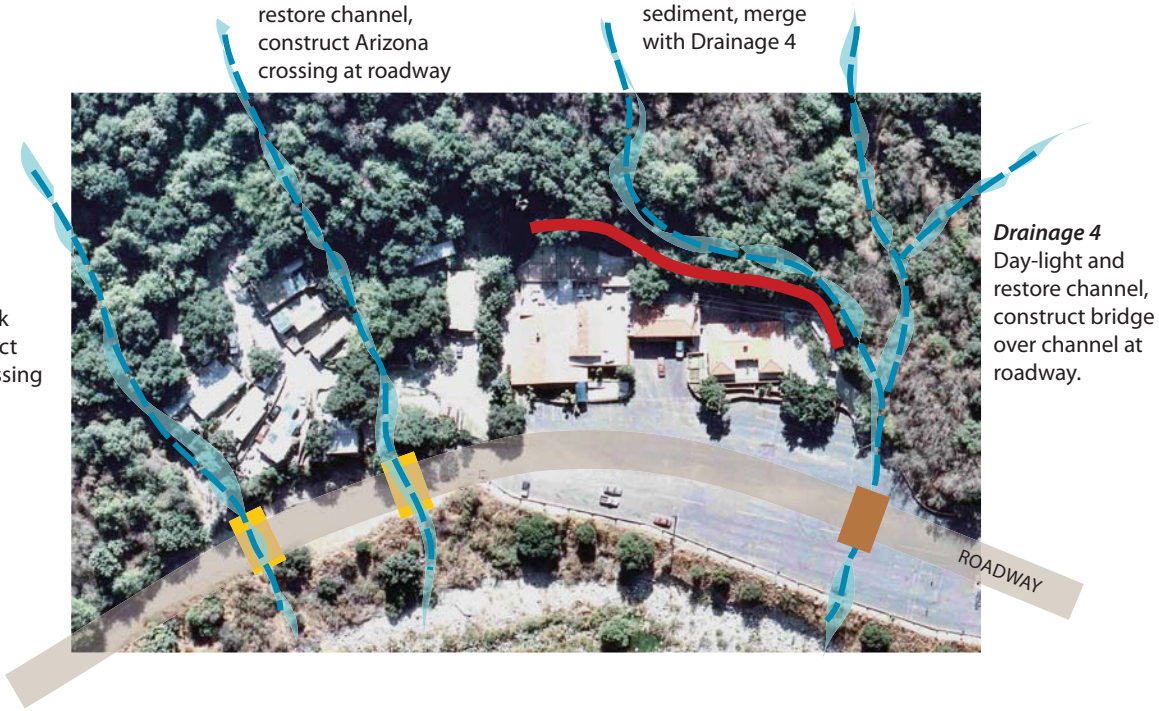
The general area is designated as Open Space which allows for a wide variety of activities, including the adjacent horse facility and the buddhist temple. There are no set parking requirements for the park portion of the project, but the project site should allow space for at least 2 school buses that may visit the site and for truck access to the special use area.

For the administrative offices, one parking space per 300 square feet is required. The total area of the building is 8480 square feet to the outside face of the walls. Approximately 33% of the building usage will be for office space. The remainder will be storage or conference facility. For storage space, one space per 2,500 square feet is required. For each residential one-bedroom apartment, one parking space with a garage is required. If all three apartments are used then 3 covered garage spaces will be required. If they are used for administrative purposes, the parking spaces can be calculated as office.

Park Area	10 parking spaces, 2 school buses
Office Space	20 spaces
Storage Space	1 space
Apartments	3 garage spaces (or modification from City)

This minimum required parking estimate would be 34 car spaces and 2 bus spaces. The final parking count will have to be determined with the City of Azusa.

Fig, 5.10
Schematic plan showing suggested drainage improvements.



Slope Stability and Drainage Improvements

Based on a preliminary investigation of slope stability and drainage (see Appendix B1) it is highly recommended that a more detailed study of the slope area behind the buildings is performed by geotechnical experts. With regard to minor slope wash and drainage, improvements to the local drainages will be implemented to "pass" runoff and slope materials through and around the building complex, and by making improvements that facilitate management and clean-up of debris. (Fig. 5.10)

Drainage 1

This drainage borders the mobile home area to the east. It is suggested to retain the drainage channel in the current position and to construct a road crossing that allows sediment to cross the road and enter the San Gabriel River channel. It is suggested to use what is commonly referred to as an "Arizona Crossing", essentially, a reinforced concrete dip in the road. It is not recommended to use a culvert, because this would lower the base level of the channel and cause more sediment mobilization and down-cutting in the upper drainage. It is suggested to lay back the western gully slope and restore, and plant part of the drainage to prevent future slope collapse. Absent re-grading of the bank slope, it is recommended to install a low barrier or fence at the top of the slope to prevent visitors to the special use area from falling into the gully.

Drainage 2

This drainage traverses the center of the mobile home park and enters into a large drain pipe under the access road within the mobile home park. It is recommended to completely re-grade and daylight this drainage. Underground culverts are likely to fill in with debris in the future. A concrete Arizona Crossing would be the most appropriate structure to allow flood waters to traverse the road.

Drainage 3

This drainage traverses the main buildings through the breezeway between the restaurant building and the apartment above the garage. It is the most problematic of the four drainages. One solution is to re-route flow and sediment into the fourth drainage and only retain the breezeway as an emergency overflow channel. This would require construction of a small retaining structure or slough wall with adjacent service road that would also function as the new debris channel. The downside of this solution is that a portion of the patio and a portion of the backyards of the apartment and duplex units would be lost. Nevertheless, this type of structure will reduce maintenance cost in the long-run as sediment behind the buildings could be seasonally removed using bobcat-type machinery.

Drainage 4

This drainage passes the building complex on the west side and currently exits onto the parking lot. Sediment spills onto the road and parking lot. It is recommended to combine drainages 3 and 4 into one naturalized channel traversing the existing road under a small bridge. The channel would be naturalized and designed to meet the re-graded slope of the San Gabriel River. The new channel and bridge would create the planned boundary between the public parking area and the "limited access" area surrounding the buildings.

Special Use Area

The current mobile home park will make room for the future special use area. The area will be regraded and reshaped to a more natural hillside morphology. Infrastructure from the mobile home park, including asphalt pads and roadways, will be removed. The area will be generously planted with native vegetation. (Fig. 5.11)

The special use area will have multiple uses and include picnic tables, outdoor classroom, restroom, trailhead, observation overlook with park shelter and interpretive displays. The area will be available for special group gatherings. The area will be available for these uses by special permit only. A trailhead will lead to an observational overlook either within the special use area or located along a loop-hiking trail that could traverse the slope above.

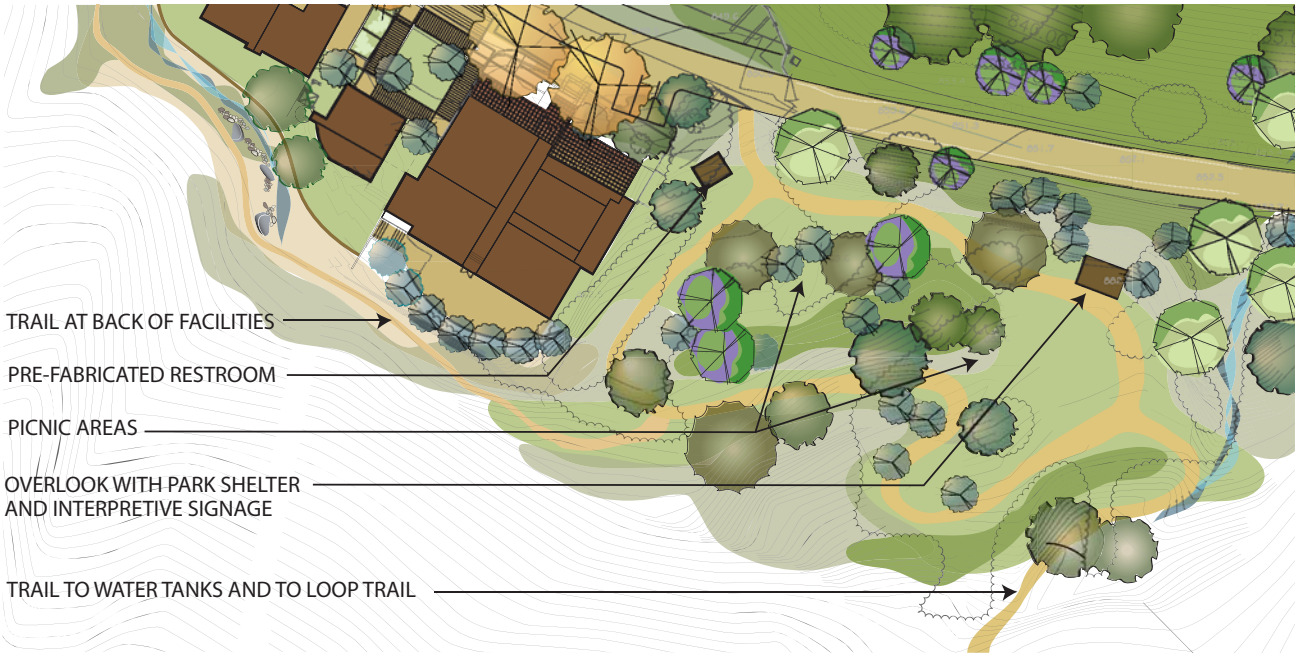


Fig. 5.11
Special Use Area

A vista park shelter will be located within the special use area. The shelter will be located near the trailhead and will provide a shaded rest stop and opportunities for orientation, way-finding, and interpretive displays. Constructed with local rock and metal beams finished to resemble heavy timbers, the shelter will have a rustic character and share style elements with the Columbian farmhouse styles of the main buildings. Clay tile roofs and rock walls will shelter visitors from sun, wind and rain.

A pre-fabricated waterless restroom facility will be brought to the site for public use. A sanitation company will maintain this unit. The pre-fabricated restroom will be screened with walled enclosures that integrate into the park environment. The enclosures will be built with a combination of stone and stucco walls with clay roof tiles that match the other buildings.

The drainage of the entire special use area will be upgraded and restored. Currently, two drainages traverse the area. A deep ravine passes the special use area near the eastern property boundary. Severe erosion has degraded the streambed and habitat, and created an unstable slope. The stream channel will be restored to a more natural form and heavily vegetated with sycamores and riparian plantings. A second drainage crosses the area through the center of the area. This drainage will be improved by grading of a new natural channel that is capable of conveying sediment through the site.

Finally, the steep access road will be removed and replaced by a new stabilized earthen road that will continue to provide access to the water tanks that store potable water for all buildings. Five water tanks exist, two are operable. The unused tanks will be removed.

Parking Lot

The new parking lot configuration will dramatically change the first appearance of the site. Native trees and plants throughout the parking area will blend parking in with the natural and scenic feel of the larger river wilderness site. The old 2-acre expanse of asphalt and the slump stone block wall will be removed in order to restore the river bank to a more natural shape.

A total of three gates will separate parking and roadway areas from the building complex and natural areas. The first entry gate is the representative main entry point designed to highlight the new style of the El Encanto site and the greater Azusa River Wilderness Park. The restoration of the river bank will practically eliminate the center-portion of today's parking lot, essentially separating the existing lot into a visitor parking area, a river trail access point, and a staff parking area adjacent to the building complex. (Fig. 5.12)

The role of the second, less prominent gate, is to control access to the building complex and to indicate to visitors that access to the remainder of the site is open to the public but limited to foot traffic. Once past the building complex, a third gate functions to close-off access to the unpaved county road to unauthorized vehicles.

After entering through the main entry gates, visitors will be directed to the "green" visitor parking area on the west end of the property. This area is designed with bio-swales, native plants, permeable paving, and other BMP's that manage stormwater and reduce pollutant loads. The new parking lot will be available to the public from dawn to dusk and will have 38 parking spots and two additional ADA spaces.

Fig. 5.12
Reduced parking area adjacent to the Visitor Intrepretive area.

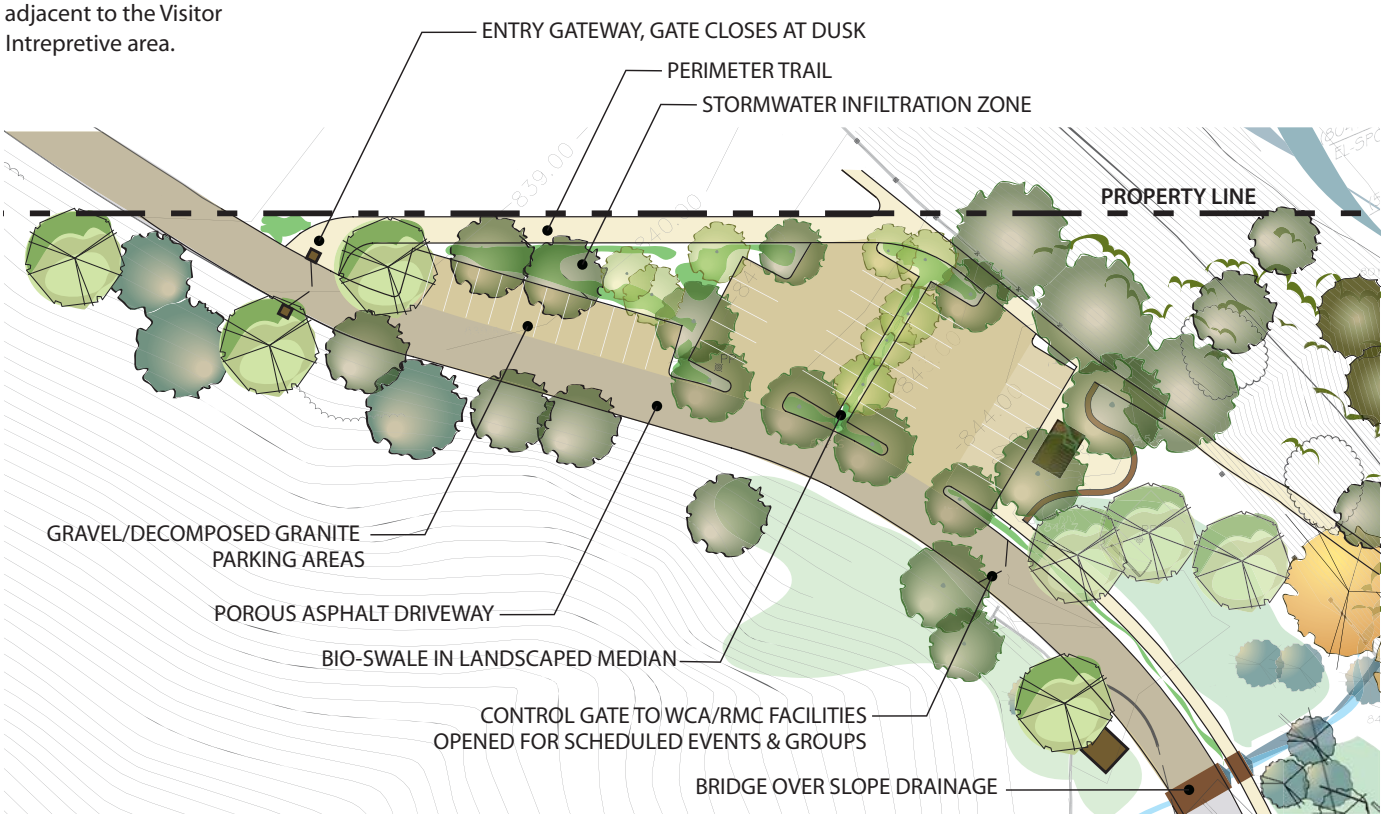


Fig. 5.13
Bird's eye view of the new visitors' parking lot, interpretive shelter, and observation area

Fig. 5.14
Sample of the preferred type of stonework to be used

Interpretive signage will be added to the parking lot to further enhance the unique wilderness experience. Public access to trails leading down the newly restored river terrace will begin at the east end of the parking lot. An observation and interpretive shelter strategically placed for scenic views to the river and mountains will be placed at the same location. The shelter will provide a shaded rest stop and opportunities for orientation, way-finding and interpretive displays. Constructed with local rock and metal beams finished to resemble heavy timbers, the shelter will have a rustic character and share style elements with the Columbian farmhouse styles of the main buildings. Clay tile roofs and rock walls will shelter visitors from sun, wind and rain. (Fig. 5.14)

A pre-fabricated waterless restroom facility will be integrated in the parking lot design. The pre-fabricated restroom will be screened with walled enclosures that integrate into the park environment. The enclosures will be built with a combination of stone and stucco walls with clay roof tiles that match the other buildings.

Signage will indicate that vehicular access past the second gate will be limited to park staff, buses, and visitors with special access needs. Surrounding the newly restored building complex will be a second parking area which will be used for RMC operations and special uses. The area will be designed to allow unloading of visitors arriving by bus and will have temporary parking for buses and vans along the access road. The area will also allow truck deliveries to the buildings and to the adjacent special use area.

San Gabriel River Banks

Southern Bank

El Encanto is an enchanted place with the dominant feature being the wonderful canyon meander. One of the goals of this plan is to bring people closer to the river to enjoy this natural environment, but to also protect the natural resources. Public sentiment favored a cautious approach to the river that would not allow human contact with the water, not only for safety and environmental protection, but also to protect the water resources that are diverted for drinking water not too far downstream of the project site.

However, the public also felt that stream bank restoration was appreciated and that the current parking lot was too large. The parking lot is positioned so far above the river that any closer experience of the river is currently not possible. The artificial fill constituting the base of the parking lot lies so far above the water surface, even during the largest floods, that the vegetation surrounding the parking area would have to be of an upland type. Hence, the goal of this plan is to remove a substantial amount of parking lot and artificial fill, and to re-contour a portion of the slope to a more natural profile. This will allow the planting of appropriate native vegetation that will reflect the appropriate transition from upland to riparian zones.

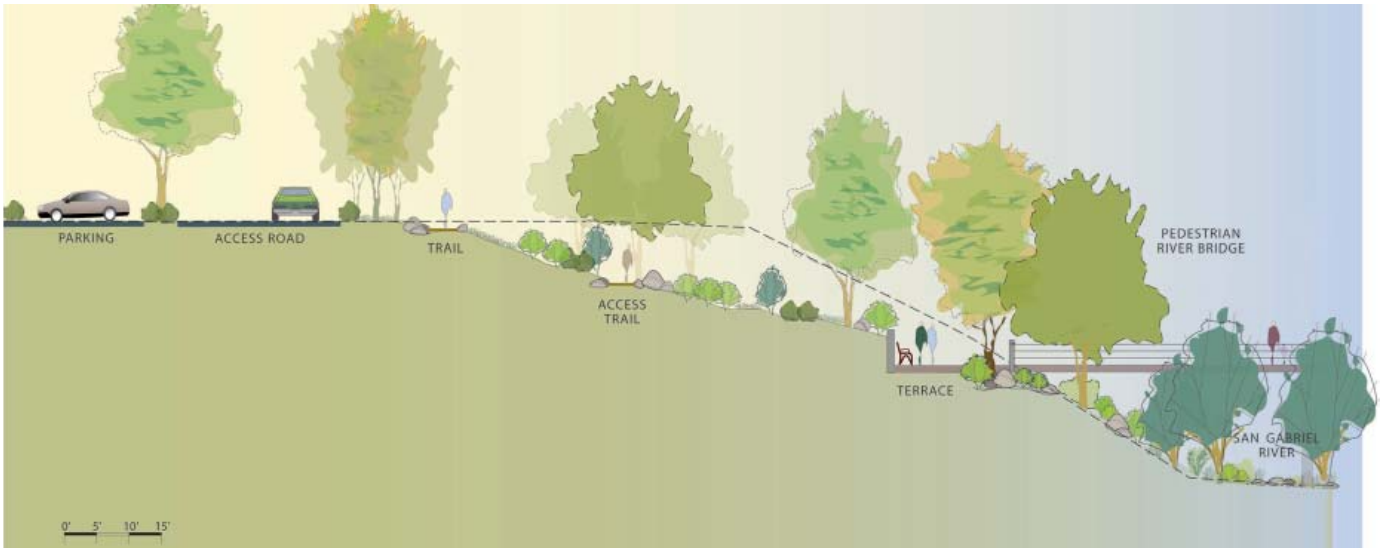
Fig. 5.15
Riverside Terrace and optional pedestrian bridge to the north river bank

The newly contoured slope will allow integration of a short river bank trail that will provide access to a small river terrace near the river's edge. This terrace will be at an elevation of 820 ft, about 25 ft below the existing parking surface. This elevation will be within riparian forest vegetation, but still far above common water levels (see Appendix B3 for more information on estimated flood elevations). The trail would be graded to allow for ADA access. (Fig 5.16)

Northern Bank

One of the more complex planning issues is the future use of the northern river bank parcel of the El Encanto Property. An optional component of this plan is a pedestrian bridge over the San Gabriel River. This element would be an important component to provide access to the northern park property and the Taylor House.

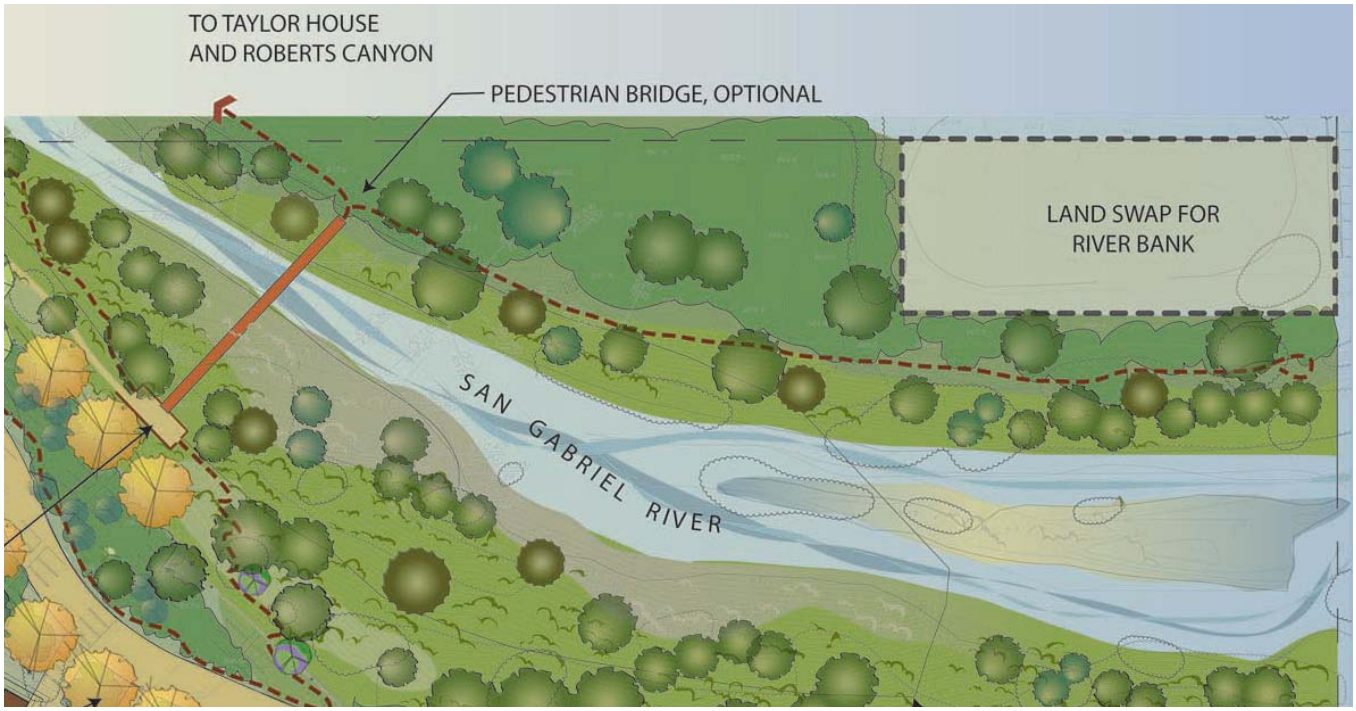
Fig. 5.16
Cross section of the south bank from the parking area to the riverside terrace



Currently, the only way to access the northern bank of the river is by crossing the Highway 39 bridge. With short sight lines and without formal sidewalks, crossing the bridge can be hazardous for pedestrians.

A pedestrian bridge would gain even more significance with the potential acquisition of additional lands on the northern side of the Azusa River Wilderness Park. The preferred location for a bridge would be at the western edge of the El Encanto property, at the downstream limit of the parking lot. Preliminary estimates (see Appendix B3) suggest that a bridge would be, at a minimum, 150 ft long, and 25 ft above the channel. The river terrace will be designed to function as a bridge approach.

Fig. 5.17
Riverside Trail to the old gaging station



Without a pedestrian bridge or improvements to the existing highway bridge, access to the northern river bank will remain difficult. Currently, the northern parcel is leased to the equestrian training center. If that lease were terminated, direct access would still be limited to the property and a set of other improvements, such as parking facilities and access road improvements would be required. While there is access to the Taylor House, the layout of the property is not amenable to improvements that would allow river access or additional parking for other facilities on the northern parcel. In addition, public sentiment during the stakeholder process favored low-impact and restoration as the primary candidates for the northern parcel.

A remaining alternative would be to attempt a land swap with the existing owners of the equestrian training facility who have continued interest in maintaining a horse arena on the northern parcel. The land swap could involve the equestrian facility gaining the property rights to the horse arena, while transferring property ownership of the entire river bank and a portion of land that would connect the river bank to the Taylor House and the WCA. (Fig. 5.17)

The advantage of this arrangement for the equestrian facility is that their continued operation is not negatively impacted by public access to the northern bank. From a restoration and conservation perspective, this plan would allow for a more substantive restoration of the northern river bank. Clearly, the riparian zone along the northern river bank is the most sensitive natural habitat in the area.

The land swap would create a desired linkage between the Taylor House and the river bank and allow creation of a northern river bank trail. In case of the construction of the optional pedestrian bridge, a direct trail connection between the southern El Encanto Property and the Taylor House could be established.

Habitat Restoration Activities

The proposed River Wilderness Park project will contribute to the sustainment of biological diversity of the Canyon through careful planning and consideration of key resources that promote and protect rare habitat types and plant and animals species. Although some riparian vegetation is present at the site, plant communities such as cottonwood-willow riparian woodland and alder riparian woodland will be enhanced and restored along the banks of the river.

Planning of restoration sites will focus on the fact that many special status wildlife species prefer riparian zones and would be attracted to restored riparian communities. The establishment of appropriate plant communities at desirable locations, adjacent to the river, contiguous with expansive wilderness along an important canyon corridor will promote wildlife usage and enhance the biological resource values of the region.

This plan proposes careful re-contouring and replanting of both river banks within the existing limits imposed by considerations of flood protection requirements. This will primarily include minor alterations to the bank slope angle. Laying back an overly steep bank slope typically widens the riparian bank zone outside the boulder-filled channel. This area tends to contain finer sedimentary materials that allow growth and establishment of riparian habitat. Especially on the northern bank, selective removal of fill along the bank edge will dramatically increase the width of this riparian zone.

Outside the riparian zone, oak woodlands and coastal sage scrub communities will be restored and it will be attempted to promote the expansion of the San Gabriel River dudleya.

Invasive non-native vegetation will be eliminated from the project site. Exotic trees and woody shrubs will be removed mechanically and their stumps treated with herbicide to prevent re-growth. An ongoing program to eradicate weeds and non-native grasses will be implemented. Areas will be restored to enhance habitat values and revegetated through planting and seeding with appropriate local native species.

Open Space Connections and Trails

The El Encanto Nature Experience plan promotes access and enhancement of the recreational trail system. A series of new and improved trails are proposed for the Azusa River Wilderness Park including a connection to the San Gabriel River Bike Trail, improving Old San Gabriel Canyon Road to the old river gaging station (Fig. 5.18), a new mountain trail to the Glendora Ridge Motorway, a loop trail to lookouts above the site, a fully accessible trail to a river terrace on the southern, bank and a river trail along the northern bank. (Fig. 5.19)

Bikeway Connection

The San Gabriel River Bike Trail is a significant recreational resource of regional importance. The bike trail extends along the east side of the river, from the Pacific Ocean at Seal Beach to the San Gabriel Mountains. It ends abruptly only a few hundred yards short of the entrance to the El Encanto property. The extension of the San Gabriel River Bike Trail to El Encanto property requires crossing Highway 39. High speeds and short sightlines make the crossing extremely harzardous. A cross-walk with button-activated flashing lights is proposed at this location.

Fig. 5.18
Riverside Trail to the old gaging station

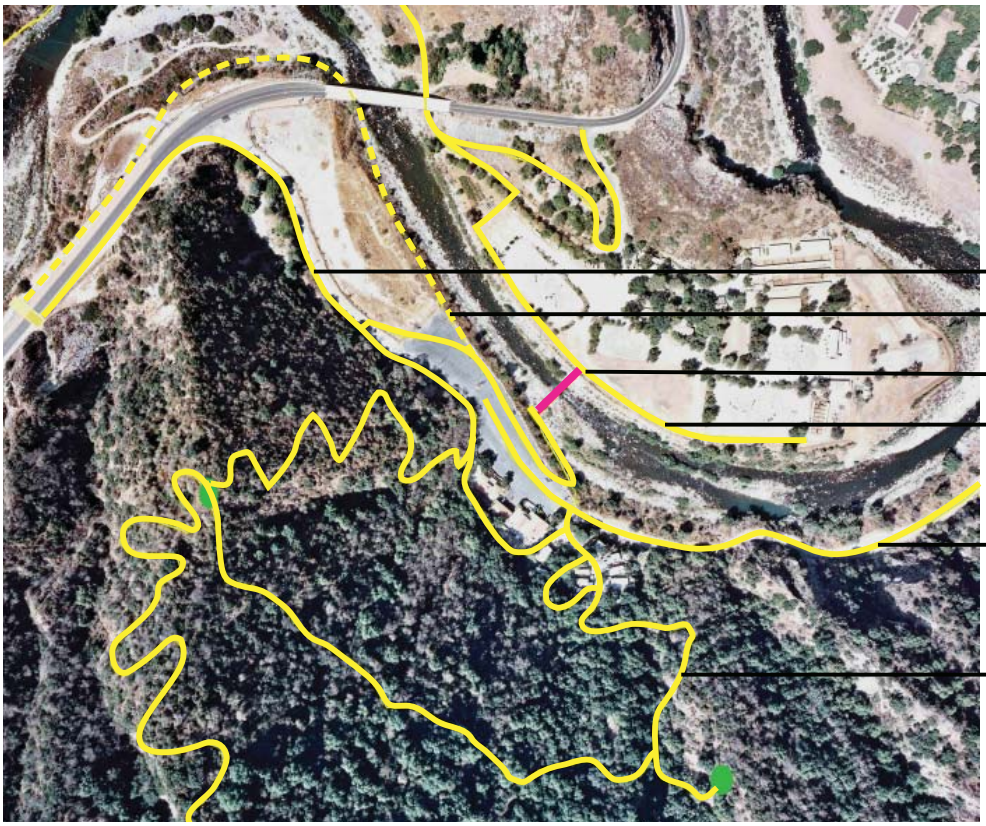


Fig. 5.19
Open Space Connections and Trails

In the eventuality of an acquisition of the former Canyon Inn property, a more desirable option would be to construct a crossing under the highway bridge, connecting to a river trail along the restored southern bank between the highway bridge and the future River Terrace.

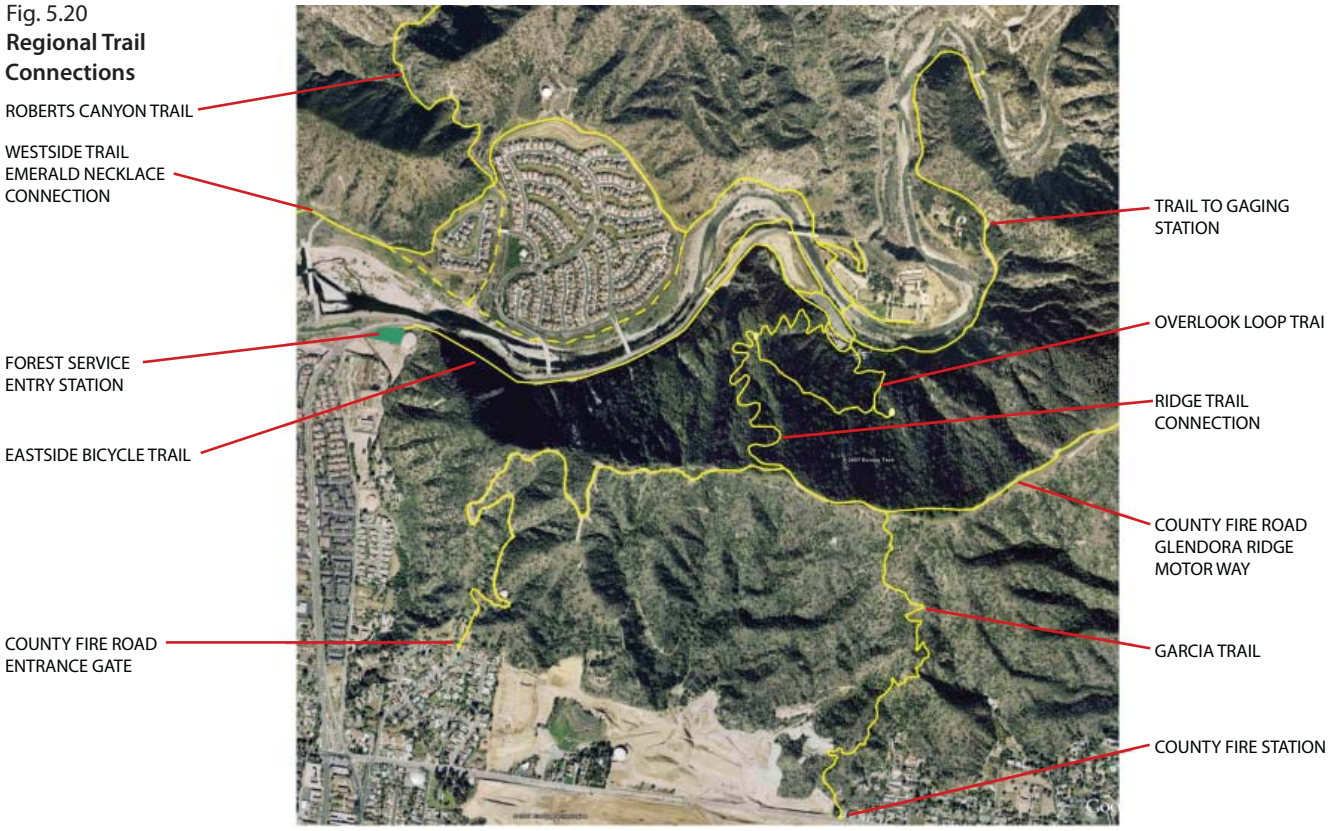
Trail to the Gaging Station

A priority element of this plan is the formal extension of the San Gabriel River Bike Trail along the Old San Gabriel Canyon Road to the site and beyond to the gaging station below Morris Dam. Although local residents use this trail, it is unmarked and gated and unlikely to be explored by the casual visitor.

Hillside Trails

Several hillside trail options are included in this plan. Of these trails, priority is given to a new trail to the ridgeline south of the El Encanto property to connect to the Glendora Ridge Motorway and the Garcia Trail. The Garcia Trail is an informal, steep trail that extends from the City of Azusa to the ridge. The new trail will start up the slope on the west side of the building complex and reach a lookout point at the southern property boundary. Crossing land currently owned by the City of Pasadena, it would then continue up to the ridge.

Fig. 5.20
Regional Trail Connections



An optimal trail under this plan would be a loop trail to a second lookout point above the future special use area. The loop trail would traverse the slope behind the building complex along the southern property boundary and provide sweeping vistas and interpretive signage.

The hillside trails will be a minimum of two feet wide, with clearance maintained on either side of the trail to a maximum of four feet, and a height clearance of eight feet. A series of steps, landings, and water bars will be necessary in the steep sections to prevent the trail bed from eroding. Priorities for these steep trails include regular maintenance, restricting bicycle & equestrian access, prevention of trail damage, and the immediate repair of unsafe conditions.

River Trails

A new trail will extend from the parking lot down to the river terrace and optional bridge, bringing visitors closer to the river. This trail will be ADA compliant, typically eight feet in width, with stabilized decomposed granite over a native gravel base. As this trail will be heavily used, a small maintenance vehicle may be used to collect trash, maintain vegetation on the slope, and perform general repairs to the trail and bridge. A trail along the northerly river bank will provide access to the northern parcel of the El Encanto property across the river. The trail will allow access to the river for educational and interpretative activities associated with the Taylor House.

Interpretive Signage and Way Finding

An interpretive trail will begin in the parking lot, and continue along the top of the terrace to the eastern edge of the property. Interpretive signage will provide information about the site, its location, history and natural resources. Variety in signage types will provide further diversity and contrast, and illustrate change, as the visitor moves through a site. (Fig. 5.21)

Interpretive signage about the environment will be placed along the upper parking lots to the entryway of the county road that leads to the gaging station. At the bend in the county road is an ideal place for a wildlife/bird observation point with a variety of interpretive elements.

Fig. 5.21
Interpretive elements will provide visual as well as tactile interest.

Way-finding signage informs the visitor where to go to discover the wide variety of experiences offered. At kiosks and trailheads, park rules and interpretive signage can be combined in an educational presentation. Kiosks and trailheads should be located in areas where people would naturally stop or pause with directional or observational questions. Each trailhead will have signage that provides information regarding trail distance, ranking of difficulty, and the locations of specific features and amenities to be found along the trail.

Benches/Rest Stops

Areas where visitors might wait for a group member are ideal locations for benches, including trailheads, in front of distinctive elements such as the buildings, and again, at the far edge of the site and the beginning of the county road. Seating will be designed to blend into the site by using split logs, large flat boulders, or durable metal. These waiting areas and rest stops should be located outside of the most scenic views.

CHAPTER 6:
DESIGN GUIDELINES

6.1 Site Design Objectives and Guidelines

The design objectives and guidelines provide an outline of styles and materials for the changes that are to occur at El Encanto. The emphasis of the project design is to restore the natural character of the site and to integrate sustainable features, watershed management and best management practices. This includes the integration of native trees and shrubs throughout the site including the parking area, restoration of the San Gabriel River, the use of indigenous material including logs and rocks, and using styles of architecture that are quintessential to the mountains of a less developed and more natural California. These design guidelines are intended to apply throughout the site, along trails and parking areas, and as part of the building design.

The focus of the project landscape design is to restore the character and function of various natural habitats that occur on the site including riparian zones, woodland, grassland, scrub areas, and forested slopes. Local and/or recycled materials, and native trees and shrubs will be integrated throughout the site including the parking area. Down at the river's edge, restoration includes removal of non-native plant species and the restoration of natural riparian habitat. Other disturbed areas will be restored with habitat plantings. Around the buildings, structures and special use area, larger-specimen native trees will be added to give visitors a sense of this lovely place in nature.

Watershed Management

The plan emphasizes watershed management and best management practices (BMPs). BMPs in parking areas include bio-swales, naturalized drainages, infiltration, and permeable paving. Native plants will be used throughout the site. Surface runoff and trash will be handled so that pollutants do not enter the San Gabriel River from any point of this park site. The effort of best management practices will be emphasized in park regulations and interpretive signage.

Walls

Walls in the landscape will reflect the natural environment with its steep, angular, granite canyon walls, and rounded river rock found along the riverbed. Round river boulders will be featured in walls supporting the river terrace and river trails. (Fig. 6.1) Elements located at higher elevation will integrate more angular granite rock. Adjacent to the buildings, Spanish/Mediterranean stucco will be used. The existing slump stone retaining walls will be waterproofed and refinished with stucco to match the new architectural facade.

Surfacing & Paving

Permeable surfaces will be used throughout the site. Paving near the buildings and from the parking areas to the structures will be ADA compliant.

Hardscape paving options include:

- Hardened decomposed granite as trail bed material
- Porous concrete for ADA parking bays
- Porous asphalt along Old San Gabriel Canyon Road
- Pavers on paths near buildings
- Flagstone paving at overlooks

Soft-scape surface options include:

- Mulch
- Gravel
- Decomposed granite
- Native soil trail bed
- Grasses, wild flowers & ground covers

Gates & Fencing

Gates and fencing will be minimal, low-profile, and have an open, rustic character reflecting the mountain environment and a park service aesthetic. The entry gate will consist of rock pilasters with metal swing gates. The gates will be a framed grid design, painted dark brown and finished to resemble wood. (Fig. 6.4) Pilasters will be asymmetrical, constructed of local stone, with a rustic lantern mounted atop one, and the park entry sign atop the other. (Fig. 6.5)

Two additional metal swing gates will be sited to control traffic. One will be located just beyond the main public parking area. The second will be located at the entrance to the Old San Gabriel Canyon Road trail to the gaging station.

In areas where access should be limited, simple wood lodge pole fencing that matches the fencing along Azusa's reach of the San Gabriel River Bikeway will be used. (Fig. 6.3)

Fig. 6.1, *top left*
Cobble stone wall

Fig. 6.2, *top right*
Cobble stone piers with heavy timber fencing

Fig. 6.3, *middle left*
Lodge pole fencing along San Gabriel River Bikeway

Fig. 6.4, *middle right*
Example of a heavy timber gate constructed in a simple grid pattern

Fig. 6.5, *bottom*
The entry gateway with asymetric cobble pilasters

Parking Areas

Parking areas will consist of gravel, permeable concrete and decomposed granite surfaces. ADA parking bays will be permeable concrete with integrated color compatible with native materials. The parking area will be heavily planted and include bio-swales to accept and infiltrate site drainage. (Figs. 6.6-6.9)

Interpretive Elements

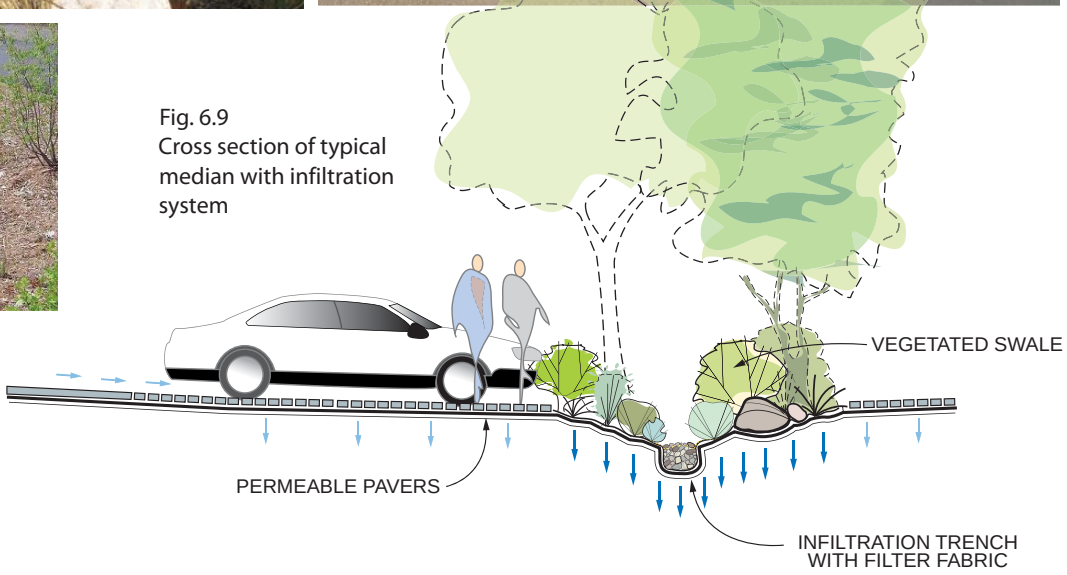
Interpretive elements will include text in one or more signage displays that emphasize the site restoration efforts. Additional interpretive elements can be more subtle and integrated into paving surfaces, walls, and site furnishings like trash receptacles. These could include metal inlays of images and tracks of animals whose habitats have been restored. (Fig. 5.21) Other inlays, wall impressions, or small illustrative signs could display the food and shelter that has been created through restoration.

Fig. 6.6, *top left*
Bio-swale at edge of parking lot

Fig. 6.7, *top right*
Decomposed granite parking stalls

Fig. 6.8, *bottom left*
Detention micro-basin allows stormwater to soak into the soil

Fig. 6.9
Cross section of typical median with infiltration system



Flg. 6.10, *left*
Animal-proof trash receptacles with custom graphics

Fig. 6.11, *middle*
Bear-proof dumpster

Fig. 6.12, *right*
Proposed style of metal picnic table

Benches and Rest Stops

Seating will include rustic split logs, large flat boulders along trails and informal areas. Rock benches will be incorporated into the River Terrace retaining wall and into the Vista Park Shelters. Metal benches with backs will have a brown color powder coat surface and will be used within the Trellised Courtyard and near buildings.

Trash Cans & Dumpsters

Trash containers and dumpsters will be ADA compliant and bear and animal resistant. (Figs. 6.10-6.11) The trash containers can incorporate interpretive graphics and will have forest brown color. Dumpsters will be located behind enclosures (see architectural guidelines). *Bearsaver Bear Resistant Trash Container Handicap Accessible Model HA-P HA, and Bear Resistant, 2 yard, Front Load Dumpster, heavy duty handicap accessible commercial container. BearSaver, 1390 S. Milliken Ave, Ontario, California 91761 Phone 1-909-605-1697*

Drinking Fountains & Water Spigots

Drinking fountains will be constructed with a river rock base, have backflow protection and will be ADA compliant. Water from drinking fountains and water spigots will drain into gravel basins.

Picnic Tables

Located in the special use area, the picnic tables shall be metal and powder coated brown. (Fig. 6.12) ADA picnic tables should be sited in appropriate locations. *Bearsaver Standard 6' and 8'long Picnic Tables and ADA Picnic Tables 8' long.*

Fig. 6.13
Wabash Valley Heritage Mission Straight Back 6' Bench Model HR 310.

6.2 Landscape & Restoration Design Objectives and Guidelines

Plantings on the El Encanto site will feature restoration of native plant associations. On the project site, scrub and chaparral vegetation types dominate the hillsides, and riparian habitats are present along the edges of the San Gabriel River. (Fig. 6.14) Oak woodlands are intermixed with chaparral on the hillsides throughout the southern portion of the site. Where disturbances have occurred within these vegetation communities, the addition of habitat restoration plantings is recommended.

Key Plant Associations

The following vegetation types were identified on the site (see Fig. 4.14 and Appendix B2):

- California Sagebrush Scrub
- Scalebroom Scrub
- Southern Mixed Chaparral
- California Annual Grassland
- Southern Willow Scrub
- Mule Fat Scrub
- Coast Live Oak Woodland
- Disturbed Areas, Slope Stabilization and Revegetation

Fig. 6.14
Woodland habitat

Ruderal, ornamental, disturbed and developed areas will be revegetated with key native plant associations most appropriate for the slope aspect, elevation and soil type.

Plantings for slope stabilization will occur in the area where the existing parking lot is graded and laid back to slope downward to the San Gabriel River, and will include southern mixed chaparral, coast live oak woodland and California annual grassland. Container planting and seeding with hydromulch will be employed.

A combination of rice straw wattles and bio-wattles with hydromulching will be used for erosion control on steep slopes where grading has occurred. Wattles will be placed every 6 feet on the slope. Installation of the wattles will proceed from the top of the slope to the bottom in areas without existing native shrub plants. Wattles shall be trenched (approximately 2″-4″) on the slope contour, with the ends butted tightly together and staked. Wood stakes 1″x1″x2′ shall be placed every two feet along the length of the wattle according to manufacturer's recommendations.

Wattles shall be placed on the slopes as soon after grading as possible. Hydromulching shall be applied to the slopes after wattle installation. Temporary irrigation shall be used and the system shall be installed after the wattles are placed taking care to not disturb the wattles.

Plantings in Developed Areas

The plantings which surround the buildings will reflect the coast live oak woodland plant community with an emphasis on the most ornamental plants. They will feature gooseberries and currents (*Ribes* species), sages (*Salvia* species), giant chain fern (*Woodwardia fimbriata*), monkey flower (*Mimulus aurantiacus*), toyon (*Heteromeles arbutifolia*), deergrass (*Muhlenbergia rigens*), maidenhair fern (*Adiantum jordanii*), California fuchsia (*Epilobium canum*) California wild rose (*Rosa californica*) and desert grape (*Vitis girdiana*). A limited number of cultivars may be introduced including California lilac (*Ceanothus species*), penstemon (*Penstemon* species), coyote brush (*Baccharis pilularis*), lupine (*Lupinus* species), yarrow (*Achillea & Eriophyllum* species) and manzanita (*Arctostaphylus* species)

Plantings in Parking Areas

In the proposed parking area where the existing grade is to be laid back to slope down to the San Gabriel River, the revegetation will include southern mixed chaparral, coast live oak woodland and California annual grassland. The parking lot bio-swales will include plants for phytoremediation that will cleanse and filter pollutants from storm water runoff.

Plants for Phytoremediation

White alder (*Alnus rhombifolia*)
Valley sedge (*Carex barbarae*)
Clustered field sedge (*Carex praegracilis*)
Common bog rush (*Juncus effuses*)
Common rush (*Juncus patens*)
Creeping wild rye (*Leymus triticoides*)
Deergrass (*Muhlenbergia rigens*)
Western sycamore (*Platanus racemosa*)
Black cottonwood (*Populus balsamifera ssp. trichcarpa*)
Sandbar willow (*Salix exigua*)
Arroyo willow (*Salix lasiolepis*)
California bulrush (*Scirpus californicus*)
Broadleaf cattail (*Typha latifoia*)
Narrowleaf cattail (*Typha domingensis*)

Riparian Restoration

Along the lower portion of the slope, below the river terrace trail, as the slope transitions to the riparian zone, the restoration plantings will consist of mule fat scrub, southern willow scrub, and scalebroom scrub. Stream side plant communities such as cottonwood-willow riparian woodland and alder riparian woodland should be enhanced and restored along the banks of the river.

Special Status Plants

Certain plant species which occur on or near the El Encanto site area have been designated for their special status as threatened, rare or sensitive due to their limited population as a result of habitat loss. A list of Special Status Plant Species occurring or potentially occurring within the San Gabriel Canyon is listed in Appendix B2. Existing populations of rare plants such as San Gabriel River dudleya should be protected and their expansion promoted through restoration efforts. Species available in seed or container stock should be included in restoration revegetation areas. Many of these plants are attractive and should be featured with interpretive information about their special status and the need to preserve and restore habitats.

Braunton's milk-vetch (*Astragalus brauntonii*)
Nevin's barberry (*Berberis nevinii*)
Thread-leaved brodiaea (*Brodiaea filifolia*)
Slender mariposa lily (*Calochortus clavatus var. gracilis*)
Plummer's mariposa lily (*Calochortus plummerae*)
San Gabriel River dudleya (*Dudleya cymosa ssp. crebrifolia*)
San Gabriel Mountains dudleya (*Dudleya densiflora*)—thought to occur on the site
Sonoran maiden fern (*Thelypteris puberula var. sonorensis*)

Exotic Plant Management

Invasive non-native exotic plants will be removed from the project site. Woody trees and shrubs shall be removed mechanically and the stumps shall be painted with Round-up® herbicide. Herbicide treatment is recommended to kill grasses and annual weeds on the slopes and areas adjacent to roads and trails. Only EPA approved, glyphosate base, systemic herbicides (Round-up®) shall be used for prescribed foliar application. Rodeo® or equivalent formulation must be used when applying herbicides within 100 feet of the stream. Herbicides shall be used according to manufacturer's recommendations. Care must be taken to avoid spraying of native plants. After grasses and weeds have died back completely, the sprayed areas shall be weed whipped, raked to remove dead weed thatch and disposed of off-site.

6.3 Architectural Objectives and Design Guidelines

Green Building and Sustainable Strategies

The goal of the overall project is to promote good stewardship of both the natural environment and the artifacts of the cultural landscape. Preserving the existing structures and adapting them for new uses saves many natural resources. The footprint of proposed additions to the buildings does not go outside of the already disturbed areas. Sustainable material and energy conservation guidelines focus on how to best reuse the existing structures, utilize recycled materials, use salvaged building materials and minimize waste. Building materials that contribute to energy conservation include high performance glazing, sunshades, insulation and low heat absorbing roofing.

Design Style

The design utilizes the Columbian farm house, Spanish/Mediterranean architectural style with clay roof tile, rough stucco texture, new porch and trellis. (Fig. 6.15) The new porch roof cover and trellis will help change the character of the building and enable the architect to reinterpret the existing architectural façade with the least changes to the existing structures.

Construction Materials

The objective of the construction material guidelines is the reuse of the existing structures and to have the lowest environmental impact through the specification of construction materials. The use of local building material reduces transportation costs and relates the design to the immediate surroundings. When renovating or demolishing existing structures, care should be taken to sort recycled and/or reused materials. Using the least amount of materials necessary and evaluating the durability and replacement cost of the materials is desirable.

Windows

New front windows will have fiberglass frames with high performance dual glazing and window sunshades or coverings. The fiberglass frames will look like wood but will have a long, maintenance-free life. Windows will be double-hung casement painted dark brown.

Doors

Exterior doors will be insulated fiberglass with an impregnated wood grain, then painted dark brown. The style will be a multi-panel door consisting of 5 panels high and 2 panels wide.

Roofs

The existing flat roofs offer excellent opportunity to provide solar panels for heating of water and photovoltaic use. Since this is a public project, the long payback period for solar panels can make economic sense. The roof material on the flat roof shall be light in color for higher reflectance and less heat gain. Reflective roof paint can also be used.

Mansard type Spanish clay tile roofs will be used on the front face of the buildings, park shelters and restroom enclosure structures. *Roof tiles shall be 100 percent natural Redland Clay Tiles Baja Mission Sandcast 4300 series. The mix of colors includes: Old Satillo, Café Antigua, Café Gold Flash, Pinto Gold Flash, Old Hacienda, Sandstone Flash, Adobe Brown, Moss Green Flash, Terra Antigua, Durazno and Terra cotta.*

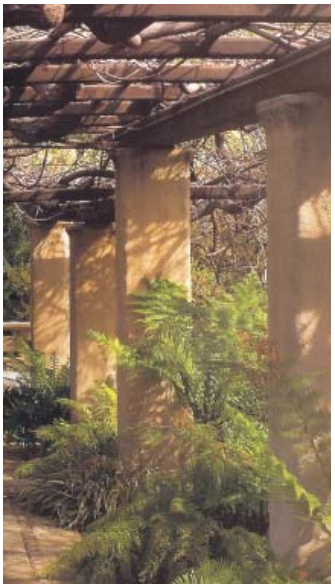


Fig. 6.15
Example of stucco columns with simple wood trellis

Exterior Finishes

The buildings and structures shall be painted with low-emitting materials or low VOC emissions paints and coatings. The building facades, restroom enclosures, and walls surrounding the dumpsters will have a rough stucco texture. *The stucco will be painted sage green and the trim dark rust brown. Stucco color to be Dunn-Edwards Turtle Trail – DE6256, LRV 43, trim to be Dunn-Edwards Sunken Ship – DEA148, LRV 7.* (Fig. 6.17)

Fig. 6.16
Color samples for exterior finishes

Trellis and Porch

The trellis and underside of the porch roof shall be wood from certified lumber by the Forest Stewardship Council. Spanish clay tiles will provide roofing above the porch. Roof tile to match the original reds and browns of the house roof tile (see roof material guideline above).

Paving Steps and Ramps

Paving, steps and ramps adjoining the buildings shall be poured in place concrete. The concrete shall be colored to reflect the native decomposed granite with exposed pea gravel finish.

Rock Work

The stone should be granite and may be both rounded river cobble or more angular in form depending on use. Material is available from the nearby Vulcan Material Company. Stone incorporated into the base of the stucco wall should be stacked from larger to smaller up to approximately 3 feet.

Drainage

The roof and parking lot water drainage is to filter through bio-swales and allowed to infiltrate into the ground.

Retaining Walls

The existing slump stone retaining walls will be waterproofed from the planter or backside and proper drainage added. The face of the wall shall be stucco and painted to match the structures.

Vista Overlook Shelter

Two park shelters will be constructed with local rock and heavy timbers and will have a rustic character with clay tile roofs and rock walls. Clay tile color and style will match that of other site structures.

Toilet and Trash Enclosures

Other small buildings, such as the park toilets and enclosures, shall integrate into the park environment. The restrooms can be screened by a combination of stone and stucco walls. The stone can come from the nearby Vulcan Material Company. The stone can be stacked from larger to smaller up to approximately 3 feet. The stucco texture and color will match the buildings. Spanish clay tiles will provide roofing detail. Roof tile to match the building roof tile (see roof material guideline above).

Energy & Resource Conservation Guidelines

Energy conservation guidelines include efficient natural ventilation for minimal use of air conditioning and heating systems, passive solar heating, water spray radiant cooling, solar panels for water heating, solar electric panels, high performance glazing, sunshades, insulation, low heat absorbing roofing and day lighting for interior spaces.

Air Conditioning and Ventilation

Air conditioning units on the roof shall be of high California State SEER ratings to provide the highest energy efficiency possible. The refrigerants in the units shall not rely on fluorocarbons to have less impact on the ozone layer. Good air filtering systems shall be provided to maintain excellent indoor air quality. The air handling system shall also be able to provide varying amounts of outside air up to 100%, depending on current climatic conditions. This could also be achieved through operable windows and a means of cross ventilation.

Insulation

As portions of the structure are remodeled and the walls are opened, the walls shall be insulated. Attic spaces shall be insulated as well. In areas where there is no attic, rigid insulation shall be used under the roofing. Increased insulation levels will make the structures more resistant to energy loss, reducing pollution from energy production and lowering energy costs.

Recycled Materials

Use of recycled materials to reduce the use of raw materials and divert material from landfills is encouraged. It is recommended to use at least 5%-10% salvaged or refurbished materials, and to specify that a minimum of 25%-50% of the build-

ing materials contain at least 20% post-consumer recycled content material, or a minimum of 40% post-industrial recycled content material.

Local Materials
Use local and regional materials as much as possible, in order to reduce natural resources necessary from transporting materials over long distances. Specify 20%-50% of building materials be manufactured within 500 miles of the building site.

Renewable Materials
Use rapidly renewable materials, in order to reduce the depletion of virgin materials and reduce use of petroleum-based materials. Specify 5% of total building materials be made from rapidly renewable building materials.

Certified Wood
For components of the building made of wood, such as flooring and framing, use a minimum of 50% wood-based materials certified in accordance with the Forest Stewardship Council Guidelines.

Volatile Organic Compounds
Select materials with low volatile organic compound (VOC) limits

Building Commissioning
As the building is occupied, there shall be a plan for Building Commissioning. This process ensures the building systems are designed, installed, tested and capable of being operated and maintained according to the owner's operational needs. Commissioning can certify that a new building begins at optimal productivity, and improve the likelihood that the building will maintain this level of performance. Commissioning can restore an existing building to its designed productivity levels and can ensure that building renovations and equipment upgrades function as designed. By ensuring that the equipment and controls are operating with energy efficiency, the money spent on these aspects will be recovered over time.

Daylighting
When properly designed and effectively integrated with the electric lighting system, daylighting can offer significant energy savings by offsetting a portion of the electric lighting load. A related benefit is the reduction in cooling capacity and use by lowering a significant component of internal gains. In addition to energy savings, daylighting generally improves occupant satisfaction and comfort. Recent studies are implying improvements in productivity and health in daylighted offices. Windows also provide visual contact with nature, time orientation, the possibility of ventilation, and emergency egress.

Solar tubes or high reflectance ducts channel the light from a skylight down to a diffuser lens in the room. These will be advantageous in lowering electric light costs. A building designed for daylighting but without an integrated electric lighting system will be a net energy loser because of the increased thermal loads.

When the electric lighting load is reduced, there will be more than an offsetting in electric and cooling loads. The benefits from daylighting are maximized when both occupancy and lighting sensors are used to control the electric lighting.

Wastewater

Wastewater ties into the existing septic system(s). New toilets inside the building shall be low flow toilets. New toilets for public use on site will be waterless chemical and serviced by contractors.

Construction Waste Management

Make sure the infrastructure for recycling of construction and demolition materials is in place and operating at the beginning of the project. Set up an on-site system to collect and sort waste for recycling, or for reuse, and monitor the system consistently throughout all phases of construction. Create a recycling plan that sets goals to recycle or salvage a minimum of 50% (by weight) of construction, demolition, and land clearing waste. Aim for a minimum of 75%

Product Packaging

Select products and materials with minimal or no packaging, if possible. Purchase materials in the sizes you will need them, rather than cutting them to size. Consistently track and monitor the amount of waste production during construction and measure it against pre-existing goals and guidelines.

6.4 Trails & Bridge Design Guidelines

Hiking trails, ADA paths and connections to the San Gabriel River Bikeway and other existing trails are key components to this Nature Experience plan for El Encanto.

Trail Materials

Trails are to be constructed from native materials. The native soils, which exist on site, can be described as decomposed granite and are suitable for trail base and surface. Most trails will be compacted native material cleared of rocks and graded for a smooth walking surface.

On trails designated as ADA, which include the route from the parking area to the main building and from the parking area to the river terrace, a stabilizer is to be added into the native, rock-free decomposed granite. Suitable hardening/stabilizer products for use with decomposed granite include: Road Oil, Rhino Snot, and Poly Pavement. All other aspects of designated ADA trails will meet the minimum guidelines extablished by the U.S. Access Board for Outdoor Development Areas.

The bike trail extension shall be permeable asphalt with integrated color. The color of the asphalt will match the color of the native soil.

Trail Widths

Trail widths vary due to the terrain and expected use patterns. Proposed steep hillside trails leading to overlooks, the Glendora Mountain Motorway, and Garcia trail will have a minimum two-foot tread width, minimal clearance of vegetation will not exceed four-foot overall width, height clearance will be eight feet. (Fig. 6.17) A series of steps, landings, and water bars will be necessary in the steepest sections to prevent the trail bed from eroding. The Old San Gabriel Canyon Road Trail to the gaging station shall be 10' wide; the extension to the San Gabriel River Bikeway Trail shall be 5' wide; the River Terrace Trail shall be 8'-10' wide. (Fig. 6.18)

Trailheads

A hierarchy of trailheads will be located at key locations. Two main trailheads will be located at both of the Vista Overlook Shelters near the parking area and within the Special Use Area. These trail heads will have signage orienting the public to the park site, local places of interest, and how to access off-site regional trails.

Fig. 6.17
Narrow trail along the steeper canyon walls

Fig. 6.18, *below*
Fire road trail

Secondary trailheads will be located at the restroom nearest the parking area, at the base of the Special Use Area, and the eastern most gates at the start of the Old San Gabriel Road trail to the gaging station. These secondary trailheads will mark with a trail signpost and have destination and mileage markers. (Figs. 6.20-6.22)

Trail Signage

Trail signage will include regional trail maps to be located at the two main trailheads, trail post markers identifying trail locations, and destination mileage markers located at secondary trailheads.

Trail Safety

Trails will not lead or encourage visitors to the rivers edge. An objective of the trail system is to provide views and access to the river environment without encouraging contact with the water itself. Along some reaches, simple wood handrails will be installed to discourage users from accessing steep unsafe slopes, the river and/or habitat conservation areas.

Fig. 6.19, *below*
Interpretive signage installed at vista point

Fig. 6.20, *right*
Mileage signs posted at trailheads and intersections

Fig. 6.21, *bottom right*
Interpretive signage along a trail

River Terrace

A low, cobble rock wall adjacent to the San Gabriel Riverbank will enclose the River Terrace. A rock-faced retaining wall will be constructed against the slope, in which seating benches will be integrated. The walking surfacing will be hardened/stabilized decomposed granite. Other site amenities located on the River Terrace will include interpretive signage; bear proof metal trash cans and metal benches.

River Trail Bridge *(Optional)*

A trail bridge over the San Gabriel River will be a beam or truss bridge, with a pair of girders supporting a deck spanning the gap between two piers. The beam may be a hollow box girder or an open frame or truss constructed of deck on caisson. The bridge will be constructed of cor-ten steel with a wood walking surface. The walking surface of the bridge shall be 5' wide and the metal handrails will be 42" high. The bridge will be ADA compliant, as will its approach on the river terrace. It is anticipated that the length of the bridge will be minimum of 150 ft long. Further analysis is needed to determine the best bridge location and the location of piers and footings.

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APPENDICES

Appendix A--Supporting Tables and Figures

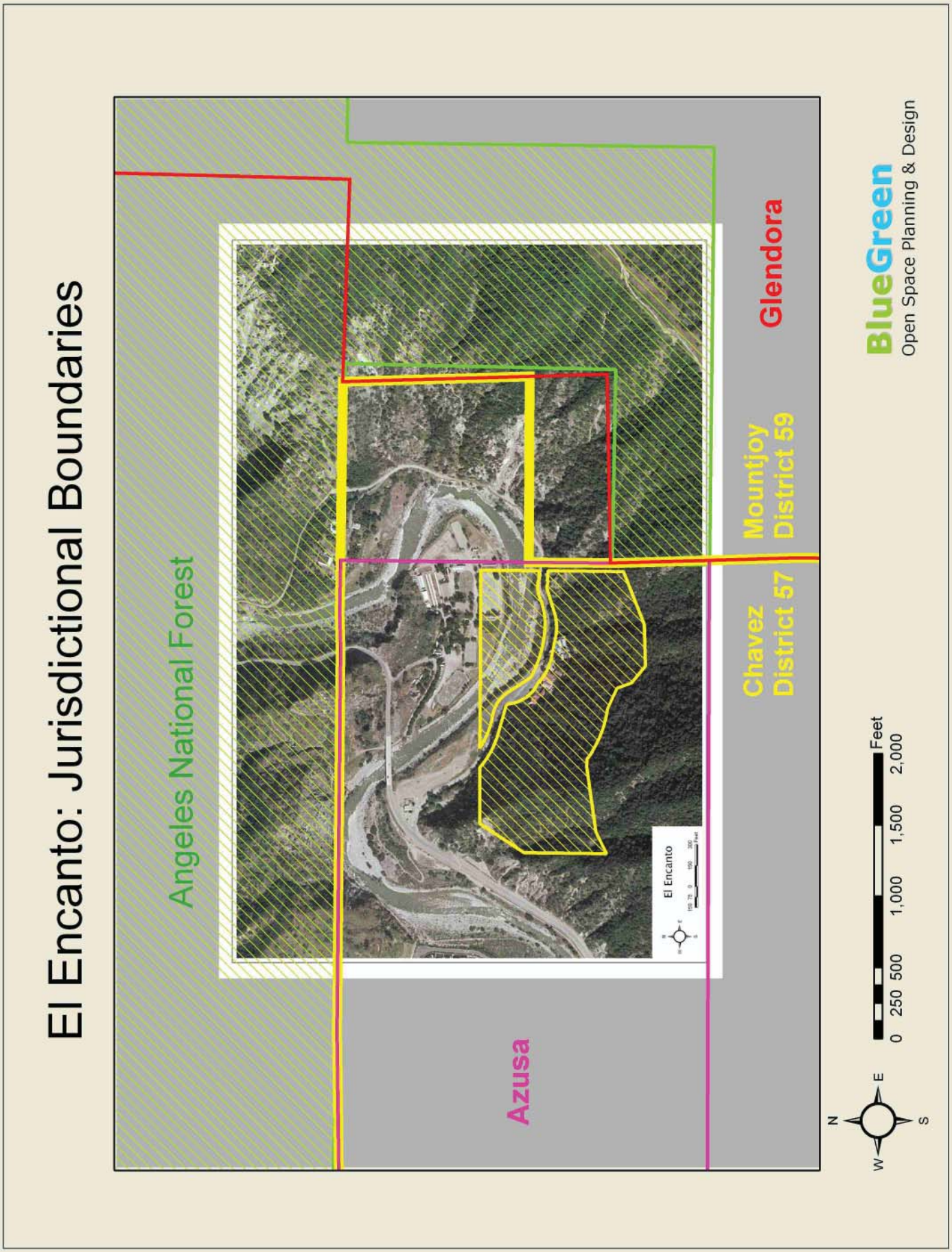
Appendix B--Project Reports

B1 Physical Conditions
B2 Biological Conditions
B3 Hydrological and Hydraulic Conditions
B4 Existing Architectural Conditions
B5 CEQA Recommendations
B6 Potential Future Funding Sources
B7 Preliminary Cost Estimates
B8 Credits and Contributors

Exhibit E - 2007 RWP Site Programming, Planning & Concept Report

APPENDIX A

SUPPORTING FIGURES AND TABLES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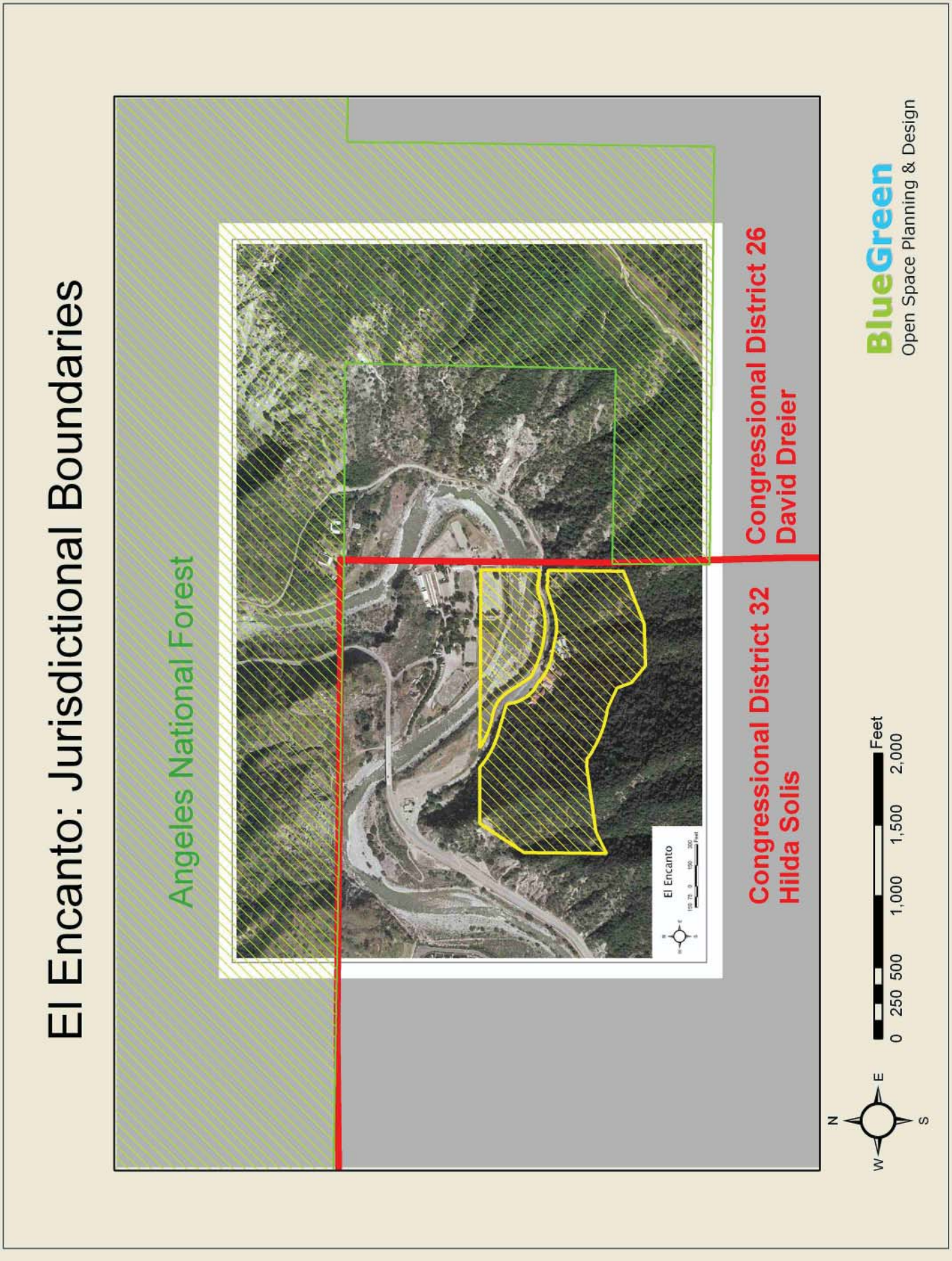
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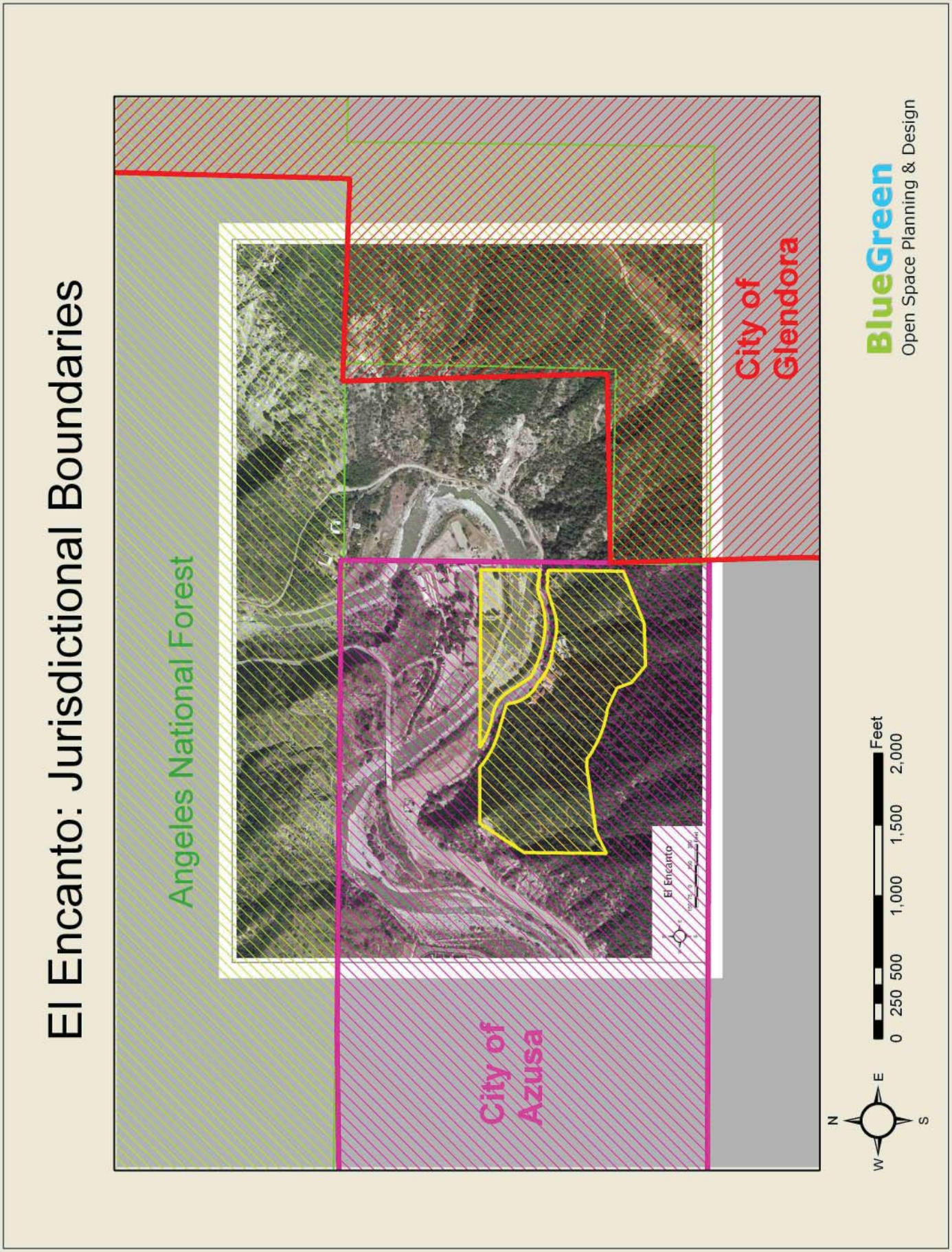
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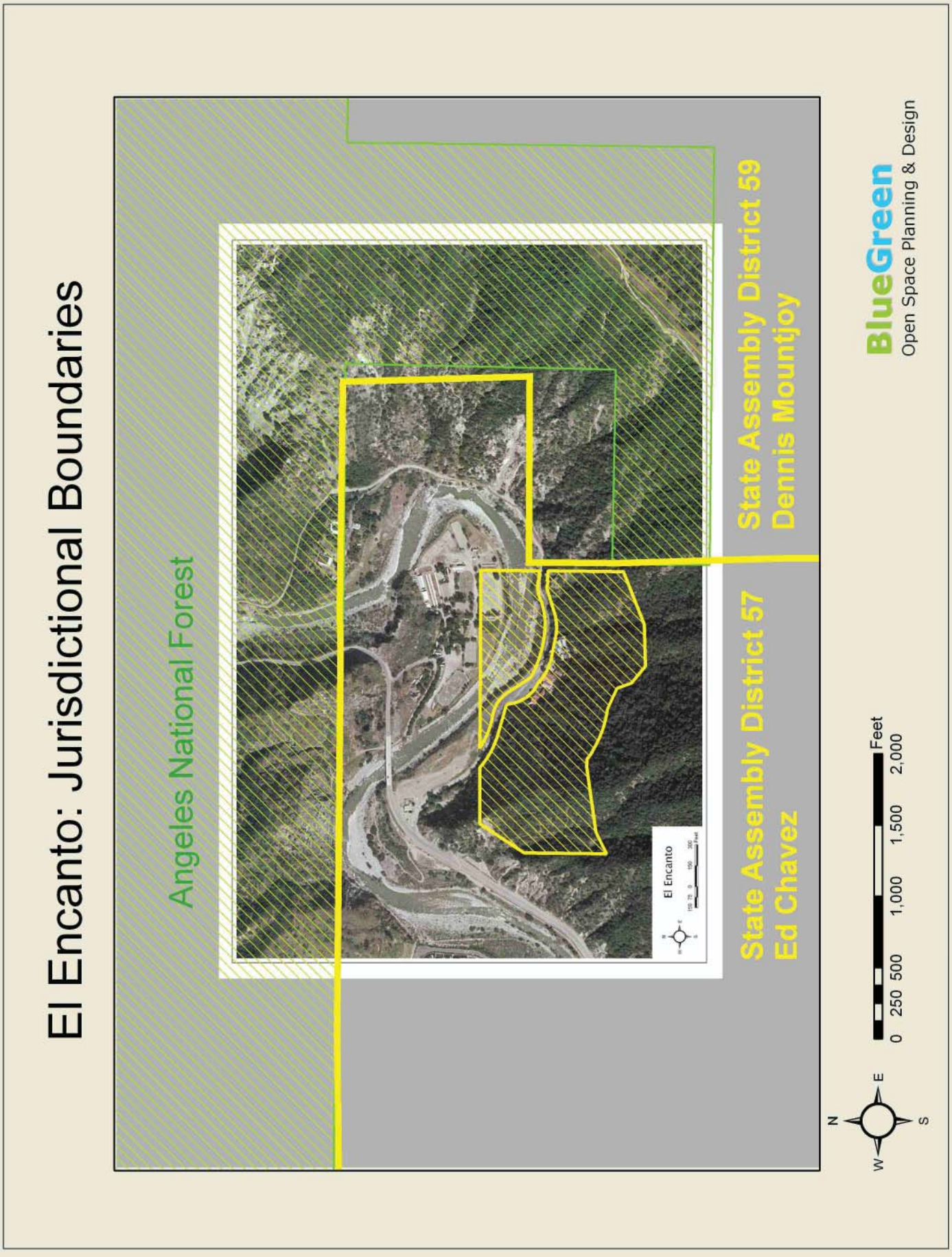
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Dennis Mountjoy
State Assembly District 57
Ed Chavez
El Encanto
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Open Space Planning & Design
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Visitor Services
Watershed Conservation Authority
BlueGreen
Open Space Planning & Design
EL Encanto
Azusa River Wilderness Park
RIVER VIEW TERRACE OVERLOOK
PEDESTRIAN BRIDGE
PICNIC AREAS
SAN GABRIEL RIVER
TRAIL TO GAGING STATION
RIVER RESTORATION
AMPHITHEATER
REMOVE MOBILE HOMES
NEW TRAIL TO OVERLOOK
CHILDREN'S ADVENTURE PLAY AREA
VISITOR SERVICES: INTERPRETIVE CENTER, BOOKSTORE, MUSEUM, TEA ROOM, RESTROOMS, CONFERENCE ROOM & DINING PATIO.
PARKING & HOOK-UP FOR MOBILE FOOD SERVICE
RESTORED DRAINAGE
OPERATIONAL OFFICES
ADA-ACCESSIBLE TRAIL WITH BIRD WATCHING & OBERVATION OVERLOOKS WITH EDUCATIONAL / INTERPRETIVE ELEMENTS
PARKING WITH TREES & STORM WATER MANAGEMENT
NEW TRAIL TO OVERLOOK
0
40
80
120
Scale 1" = 40'


Nature Experience
Watershed Conservation Authority
BlueGreen
Open Space Planning & Design
EL Encanto
Azusa River Wilderness Park
LAND SWAP FOR RIVER BANK
PEDESTRIAN BRIDGE, OPTIONAL
TO TAYLOR HOUSE AND ROBERTS CANYON
SAN GABRIEL RIVER
TRAIL TO GAGING STATION
RIVER RESTORATION
BIRD WATCHING & OBSERVATION OVERLOOKS WITH EDUCATIONAL / INTERPRETIVE ELEMENTS
LOOP TRAIL
REMOVE MOBILE HOMES & PROVIDE PADS FOR SUPERVISED CAMPING (SCOUTS)
OPERATIONAL OFFICES & CONFERENCE ROOM
TRAIL BELOW HWY 39 TO SAN GABRIEL RIVER BIKEWAY
PARKING WITH TREES & STORM WATER MANAGEMENT
ENTRY GATE RESTRICTED ACCESS
PREFAB RESTROOM
MAINTENANCE YARD
RIVER VIEW TERRACE
PLANTING TO OBSCURE BUILDING
OVERLOOK TRAIL
TO OVERLOOK AND RIDGE TRAILS
-- GLENDORA MOTORWAY
-- GARCIA TRAIL
scale 1" = 40'


Habitat Restoration
Watershed Conservation Authority
BlueGreen
Open Space Planning & Design
EL Encanto
Azusa River Wilderness Park
TO SAN GABRIEL RIVER BIKEWAY
ENTRY GATE AND TURN AROUND
SLOPE AND STREAM BANK RESTORATION
PARKING ALONG ENTRY DRIVE
RESTORE DRAINAGES
MAINTENANCE AREA
PLANTING TO OBSCURE BUILDING
OPERATIONAL OFFICES CONFERENCE ROOM & PUBLIC RESTROOMS
REMOVE MOBILE HOMES, GRADE AND RESTORE
BIRD WATCHING & OBSERVATION OVERLOOKS WITH EDUCATIONAL / INTERPRETIVE ELEMENTS ALONG TRAIL
RIVER RESTORATION
TRAIL TO GAGING STATION
FLOOD PLAIN RESTORATION
SAN GABRIEL RIVER
0 40' 80' 120'
SCALE 1" = 40'

APPENDIX B1

PHYSICAL CONDITIONS

Exhibit E - 2007 RWP Site Programming, Planning & Concept Report

BlueGreen
Open Space Planning & Design



Physical Conditions of the El Encanto Property Site

Climate
Geology
Soils
Geomorphology
Slopes
Drainage

Report prepared for:

Watershed Conservation Authority

by:
Martin Kammerer Ph.D.
Fluvial Geomorphologist
August 2007

Los Angeles River Center. 570 W Avenue 26, Suite 700, Los Angeles California 90065

Introduction

Purpose

The purpose of this report is to summarize the physical geography and geology of the El Encanto Property along the San Gabriel River. In particular, the goal is to compile planning-relevant data that allow evaluation of preliminary feasibility of site improvements and restoration work. This information is to be used for the current general planning process and should be available as a separate report for more detailed future design and planning work.

Site Location

The El Encanto property is located in the southern San Gabriel Mountains at the border to the Angeles National Forest. The site is located within the City of Azusa, adjacent to State Route 39, and adjacent to the San Gabriel River. Downstream of the site the river extends through the San Gabriel Valley before entering the Pacific Ocean between Long Beach and Seal Beach. The watershed area above the site is approximately 220 square miles of rugged mountainous terrain with steep drainage divides. The maximum elevation is at 10,064 feet at Mount San Antonio (Mt. Baldy) the highest peak in the area. Average slopes of the San Gabriel River in the mountains is about 5% and about 1% along the stream channel in the lower canyon area. The San Gabriel Mountains upstream of the site are a complex mix of igneous and metamorphic rocks units that are highly fractured, faulted, and tectonically active.

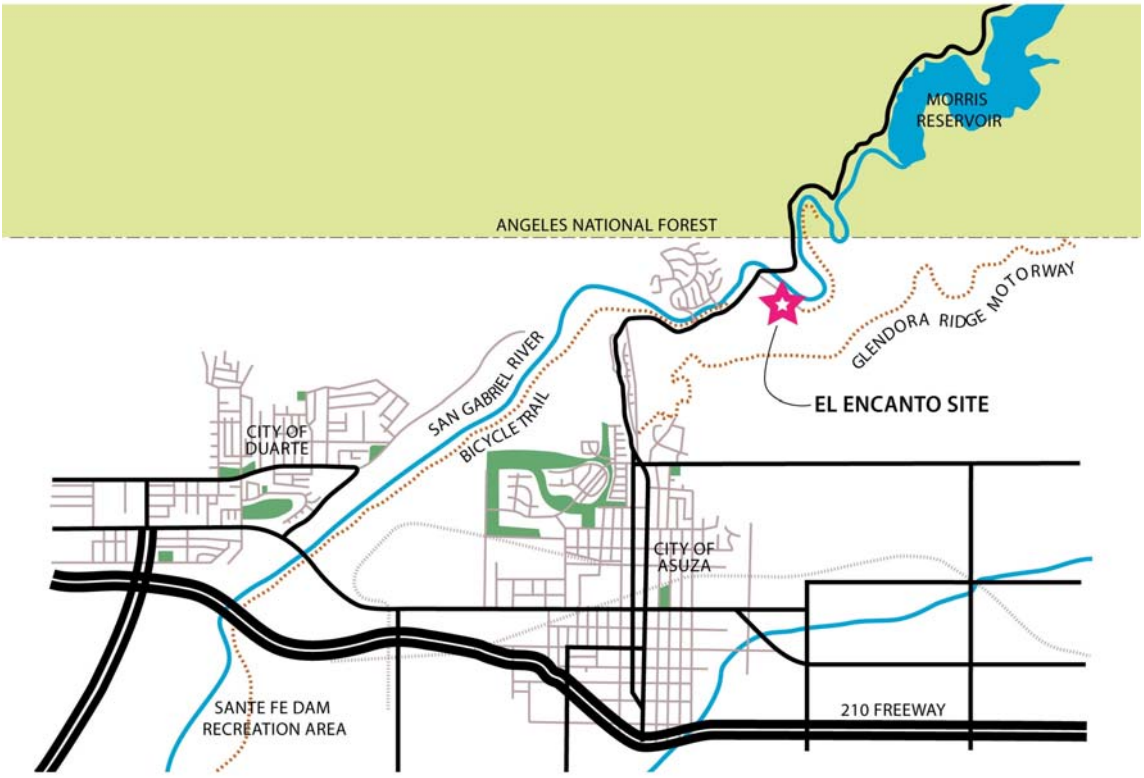


Figure 1: Regional Map showing of Site Location

Climate

The climate of the area is temperate and semi-arid with warm, dry summers and mild, moist winters. Higher elevations tend to have more moderate summers and colder winters with significant amounts of precipitation including snow in winter. The majority of rainfall occurs between the months of December and March. Extended rainless periods in the summer months are common.

Rainfall events in the area result from winter storms that are associated with extra-tropical cyclones originating in the North Pacific. They are characterized by hours of light-to moderate precipitation with occasional heavy showers. Snow is common above 6000 feet. Local thunderstorms may occur at any time of the year but often occur following general winter storms or in late summer when desert thunderstorms occasionally drift westward across the mountains, enhanced by moisture originating from tropical depressions to the south. These thunderstorms can result in very high rainfall intensities for periods of one to three hours and cause very heavy runoff.

According to the National Weather Service Climatography data (Pasadena), the average daily minimum and maximum temperatures in winter range from about 44 to 62 degrees. Summer average daily minima and maxima are around 68 and 91. The mean annual precipitation of the area is about 21 inches. All-time low and high extremes of temperature are 23 and 110 degree F, respectively (Department of Commerce, NOAA, 2002, 2004).

Temperature and precipitation vary greatly when moving from the foothill areas into the higher elevations. At elevations of 8000 to 10,000 feet temperatures range from about 10 and 22 degree F in winter to about 45 and 60 degree in summer. Extremes are about minus 30 and 75 degree F at the highest elevations. Generally, areas below 6ooo feet do not experience significant periods of freezing (U.S. Army Corps of Engineers, 1991).

Data for pan evaporation stations within the watershed indicate that mean monthly evaporation ranges from less than 1 inch in winter and about 8 inches in summer at forested upper elevations. They range from about 2-3 inches in winter to 9-10 inches in summer at the warmer lower elevations in the foothills. On days of strong Santa Ana winds, evaporation can be considerably greater than one inch in 24 hours (U.S. Army Corps of Engineers, 1991). See Appendix for more detailed Climate Data.

Geology

Geographic and Geologic Provinces

The El Encanto Property is situated in the southeastern portion of the San Gabriel Mountains within the central part of the Transverse Ranges at the northern margin of the Los Angeles Basin and the Pomona Valley (Figure 2). This topographically-steep range rises to an elevation of more than 10,000 feet around Mt. San Antonio (Mount Baldy). The San Gabriel Mountains are bounded to the north by the active right-lateral San Andreas fault separating the San Gabriel Mountains from the Mojave Desert and the San Bernardino Mountains to the east.

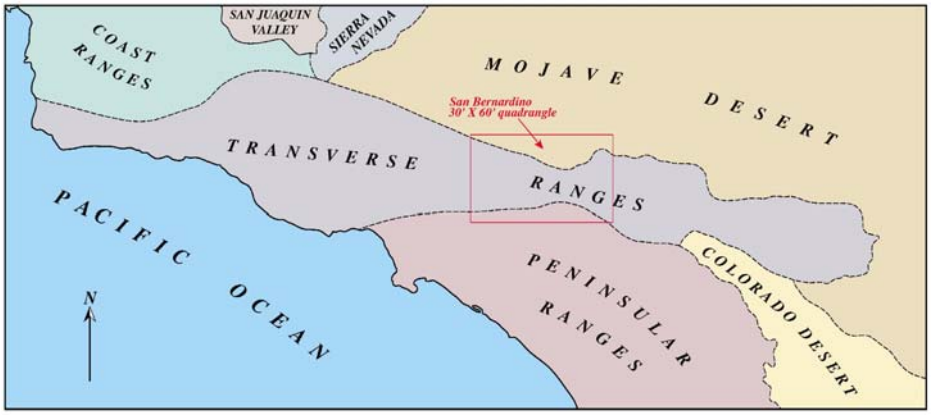


Figure 2: Geographic and Geologic Provinces

(Source: Morton and Miller, 2003, USGS Open-File Report 03-293, sheet 5)

Tectonics and Faults

In the south, the San Gabriel Mountains are bounded by a series of active left-lateral reverse faults. These faults include the Cucamonga, Sawpit Canyon, and Sierra Madre Faults. In the west they continue through the Raymond, and Verdugo, and San Fernando faults. Tectonic motion along these faults, has been responsible for the ongoing uplift of the mountain range. The Sierra Madre and Raymond faults continue linearly to the west and align with the Santa Monica-Malibu Coast fault system.

This group of faults, from Cucamonga to the Malibu Coast, form the boundary between the Peninsular Ranges in the south, and the Transverse Ranges to the north. All faults are considered to be active but not all show evidence of activity. The San Gabriel Mountains are further dissected by another east-west trending fault, the right-lateral San Gabriel Fault.

The block of the San Gabriel Mountains between the Sierra Madre and San Gabriel Fault zones consist of a set of Late Cretaceous plutons of medium-grained granitic rocks. The El Encanto property and the lower San Gabriel Canyon are located on this tectonic block (Figure 3).

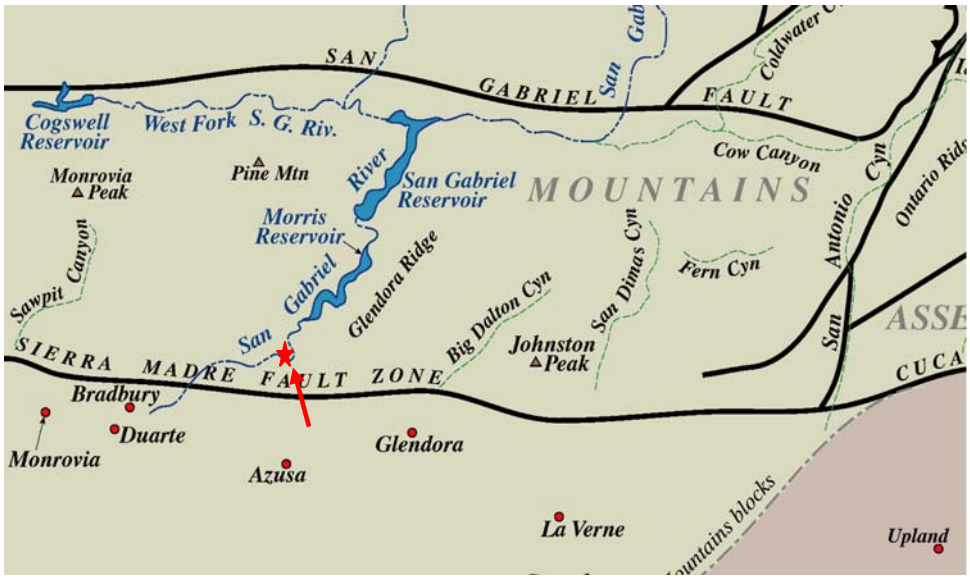


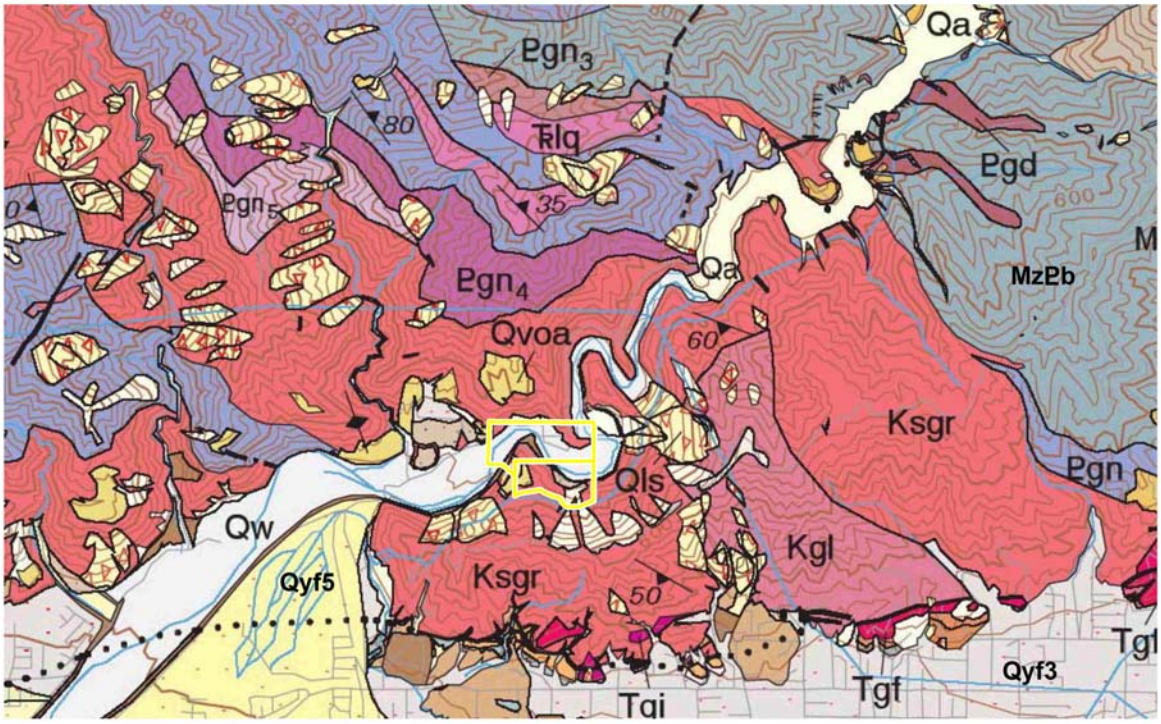
Figure 3: Geographic and Geologic Provinces (Source: Morton and Miller, 2003, USGS Open-File Report 03-293, sheet 5)

Major Rock Units

The granitic block of the lower San Gabriel Canyon is currently thrust upward along the Sierra Madre Fault Zone. The fault zone, only less than a mile south of the property is only poorly visible on the surface, as it is currently buried under the alluvial fan deposits at the mouth of the Lower San Gabriel Canyon. The Sierra Madre fault constitutes a reverse-thrusting fault where the larger granitic block is sliding upward and above the valley deposits, and over the margins of the Peninsular Range Province to the south.

During the formation or magmatic intrusion of the Mesozoic grantitic plutons, the former geologic base was displaced upward and towards the north. Remnants of these units are still present in the vicinity of the El Encanto area. They are visible as a patchwork or several generations of old Proterozoic metamorphic rocks, primarily to the north of the property. The geologic map (Figure 3) shows the general vicinity of the El Encanto property:

Geologic Map of the El Encanto Area



0 1 2 Miles

N

El Encanto Property and Extended Azusa River Wilderness Park

Source:
Morton, D. M., and Miller, F. K. (2003): Preliminary geologic map of the San Bernardino 30' x 60' quadrangle, California, Open-File Report 03-293, U.S. Department of the Interior, U.S. Geological Survey.

Geologic Units:

Qw
Very young wash deposits (late Holocene)

Qyf_5
Young alluvial-fan deposits, Unit 5 (late Holocene)

Qyf_3
Young alluvial-fan deposits, Unit 3 (middle Holocene)

Qvoa
Very old alluvial-valley deposits (middle to early Pleistocene)

Qls
Very young landslide deposits (late Holocene)

MzPb
Mixed metamorphic and granitic rocks of Big Dalton Canyon (Mesozoic and Proterozoic)

Ksgr
Tonalite of San Gabriel Reservoir (Cretaceous)
Biotite-hornblende tonalite, ranging to granodiorite and quartz-bearing diorite. Forms east-west elongate body at front of San Gabriel Mountains on both sides of San Gabriel Canyon.

Kgl
Mixed leucocratic and granitic rocks (Cretaceous)
Leucocratic dike rocks. Intrude Cretaceous quartz diorite and older rocks between San Gabriel and San Antonio Canyons

Trlq
Porphyritic quartz monzonite and quartz monzodiorite (Triassic)

Pgn
Layered gneiss, undifferentiated (Proterozoic)
Thinly layered, fine-grained gneiss probably derived from texturally diverse volcanic, fine grained intrusive, and immature sedimentary protoliths.

Figure 4: Geologic Map (Source: Morton and Miller, 2003, USGS Open-File Report 03-293)

The following unit descriptions were taken as excerpts from USGS Open-File Report 03-293 by Morton and Miller (2003):

Qw
Very young wash deposits (late Holocene)
Unconsolidated sand and gravel deposits in active washes, ephemeral river channels of axial-valley streams, and in channels on active surfaces of alluvial fans; has fresh flood scours and channel-and-bar morphology. Essentially no soil development. Subject to localized reworking and introduction of new sediment mainly during winter months.

Qyf_5
Young alluvial-fan deposits, Unit 5 (late Holocene)
Unconsolidated to slightly consolidated coarse-grained sand to bouldery alluvial fan deposits having slightly dissected to essentially undissected surfaces. On south side of San Gabriel Mountains, includes large, well formed fan emanating from Lytle Creek drainage; largely boulder alluvium in headward parts of fan, grading southward into dominantly sand and gravel.

Qyf_3
Young alluvial-fan deposits, Unit 3 (middle Holocene)
Slightly to moderately consolidated silt, sand, and coarse-grained sand to bouldery alluvial fan deposits having slightly to moderately dissected surfaces.

Qvoa
Very old alluvial-valley deposits (middle to early Pleistocene)
Alluvial deposits dominated by sand, but containing scattered gravel and pebble layers. Typically well consolidated and highly pigmented in upper parts. May not show generic relationship to modern drainages. Includes:

Qls
Very young landslide deposits (late Holocene)
Slope-failure deposits consisting of chaotically mixed soil and rubble and (or) displaced bedrock blocks; most are debris slides and rock slumps or earth slumps. Landslides may or may not be active. Landslide morphology well preserved. In San Bernardino Mountains in Holcomb Creek drainage northeast of Lake Arrowhead, consists of granitic rubble. On west side of Bear Canyon, near east edge of quadrangle, consists of granitic rubble and probably includes some talus In eastern San Gabriel Mountains between Deer Canyon and Sam Sevaine Flats, consists of granitic rubble and possibly includes some talus and slope wash.

MzPzb
Mixed metamorphic and granitic rocks of Big Dalton Canyon
(Mesozoic and Proterozoic)
Extremely heterogeneous mixture of rocks that includes biotite diorite, quartz diorite, tonalite, quartz monzonite, granodiorite, layered gneiss, augen gneiss, and rare leucocratic gneiss. Unit is cut by numerous basalt to basaltic andesite dikes, especially within 2 km of San Gabriel Fault. Mixed metamorphic and granitic rocks of Big Dalton Canyon contain abundant inclusions of Proterozoic layered gneiss (Pzgn), and sparse, irregularly shaped bodies of poorly foliated,

medium- to coarse-grained gabbro and pyroxenite. In West Fork San Gabriel Canyon, metamorphic and granitic rocks of Big Dalton Canyon are synformal, and are concordantly intruded on southeast by quartz diorite of Mount San Antonio (Ksa). East and west of lower San Gabriel Canyon, metamorphic and granitic rocks of Big Dalton Canyon are intermixed at all scales with larger amounts of Proterozoic gneiss than in other parts of unit. On Glendora Ridge, MzPb is intruded by rare sheets of Triassic quartz monzodiorite and quartz monzonite (unit Trlq) and abundant sill-like bodies of Jurassic(?) biotite granodiorite (unit Jgd).

Ksgr
Tonalite of San Gabriel Reservoir (Cretaceous)
Biotite-hornblende tonalite, ranging to granodiorite and quartz-bearing diorite. Forms east-west elongate body at front of San Gabriel Mountains on both sides of San Gabriel Canyon. Similar to tonalite of San Sevaine Lookout (Kss), but consistently more mafic. Medium to coarse grained, locally containing sparse plagioclase or potassium feldspar phenocrysts up to 2 cm long. Most rocks are weakly to moderately foliated, but at some places, foliation is either strongly developed or almost absent. Hornblende typically much more abundant than biotite; average color index is about 30, but varies widely from about 15 to 40. Contains abundant gneiss bodies ranging in size from tens of centimeters to hundreds of meters in length; bodies are larger and more abundant near contacts with large mapped gneiss units. Unit is moderately heterogeneous with respect to texture and composition, but much more homogeneous than bounding Mesozoic to Proterozoic units found northward to San Gaberial Fault. Considered Cretaceous based on similarity to tonalite of San Sevaine Lookout (Kss) and quartz diorite of Mount San Antonio (Ksa)

Kgl
Mixed leucocratic and granitic rocks (Cretaceous)
Leucocratic dike rocks. Includes pegmatite, aplite, alaskite, and biotite monzogranite. Weakly to moderately foliated; many exhibit buckling or boudinage structures. Most not large enough to show at map scale. Intrude Cretaceous quartz diorite and older rocks between San Gabriel and San Antonio Canyons

Trlq
Porphyritic quartz monzonite and quartz monzodiorite
Porphyritic biotite quartz monzonite predominates, but unit is interlayered with much hornblende quartz monzodiorite. Both varieties intrude quartz diorite and diorite parts of Mesozoic and Proterozoic metamorphic and granitic rocks of Big Dalton Canyon unit.

Pgn
Layered gneiss, undifferentiated (Proterozoic EON=P)
Thinly layered, fine-grained gneiss; layered on millimeter scale. Foliation has mylonitic appearance. Isoclinal folds are common; multiple generations of deformational fabrics preserved. Metamorphosed to upper amphibolite facies. Probably derived from texturally diverse volcanic, fine grained intrusive, and immature sedimentary protoliths. Intruded by foliated to gneissic granodiorite unit (**Pgd**) and gneissic quartz diorite of unknown age. U-Pb ages on zircons suggest sedimentary protolith accumulated between 1.68 and 1.75 Ga. Includes (no relative age relations implied by order listed):

Pgn$_5$

Layered gneiss, Unit 5 (Proterozoic)

Gneissic granodiorite to monzogranite. Although included in layered gneiss unit (**Pgn**), rocks of **Pgn$_5$** are not obviously layered. Medium grained, having weakly developed gneissic, and locally cataclastic, fabric. Generally more leucocratic than other **Pgn** units.

Pgn$_4$

Layered gneiss, Unit 4 (Proterozoic)

Heterogeneous mixture of highly deformed gneiss, layered gneiss, and gneissic granodiorite to monzogranite, all cut by locally abundant leucocratic granitic dikes. Layered gneiss is relatively undeformed, alternating layers of leucocratic and biotite-rich rocks; biotite-rich layers contain garnet. Other rocks are ductilely and brittlely deformed.

Pgn$_3$

Layered gneiss, Unit 3 (Proterozoic)

Mixed gneissic quartz diorite and gneiss; much is cataclastic. Granitic rock is highly deformed, and much of gneiss is highly chloritic. Unit is characterized by dark green color resulting from abundance of chlorite in rocks. Gneiss is fine grained and contains lenses of leucocratic augen gneiss. Gneiss also contains partially chloritized biotite, some white mica, and structurally elongated, strained quartz grains; augen in leucocratic parts are pink potassium feldspar.

Soils

General

The soils of the southern San Gabriel Mountains are commonly part of the larger CIENEBA-EXCHEQUER-SOBRANTE (CA672) soil unit. On the steep slopes of Mesozoic granitic rocks the soils generally fall into the Cieneba series. These are very shallow, somewhat excessively drained soils formed in weathered materials of the parent rock. Cieneba soils occur on uplands with slopes between 9 to 85 percent. Mean annual precipitation is commonly observed at about 25 inches with mean annual air temperature of around 60 degrees F. (see complete unit descriptions in Appendix)

Detailed Soil Units

The detailed Soil Survey Geographic (SSURGO) Database for the vicinity of the El Encanto property, shows two dominant soil units. On the densely vegetated north-facing slopes we find Mollisols of the Tollhouse-Stukel-Wrentham families (Map Unit # 92). On the south-facing exposed slopes of the area we find Entisols of the Vista-Trigo, granitic substratum-Modesto families (Map Unit #320). Since both soil units have developed within the weathering products of the underlying cretaceous tonalite (Ksgr) it appears that the primary genetic difference between the two are related to climatic exposure.

The current vegetation cover indicates that the development of Mollisols on north-facing slopes are related to a moister and cooler meso-climatic environment allowing for the development of dense chaparral, and formation of darker, organic-rich top horizons among the otherwise shallow soils of the surrounding area. Conversely, the Entisols of the south-facing slopes experience a dry and hot environment with less dense vegetation, resulting in higher erosion rates, less overall soil development, and the lack of organic top horizons on the otherwise identical parent material.

Mollisols of the Tollhouse Family

Order:	Mollisols
Suborder:	Xerolls
Greatgroup:	Haploxerolls
Subgroup:	Entic Haploxerolls
Family:	Loamy, mixed, mesic, shallow Entic Haploxerolls
Phase:	Tollhouse-Stukel-Wrentham families complex, 60 to 90 percent slopes
Soil Series:	Tollhouse family

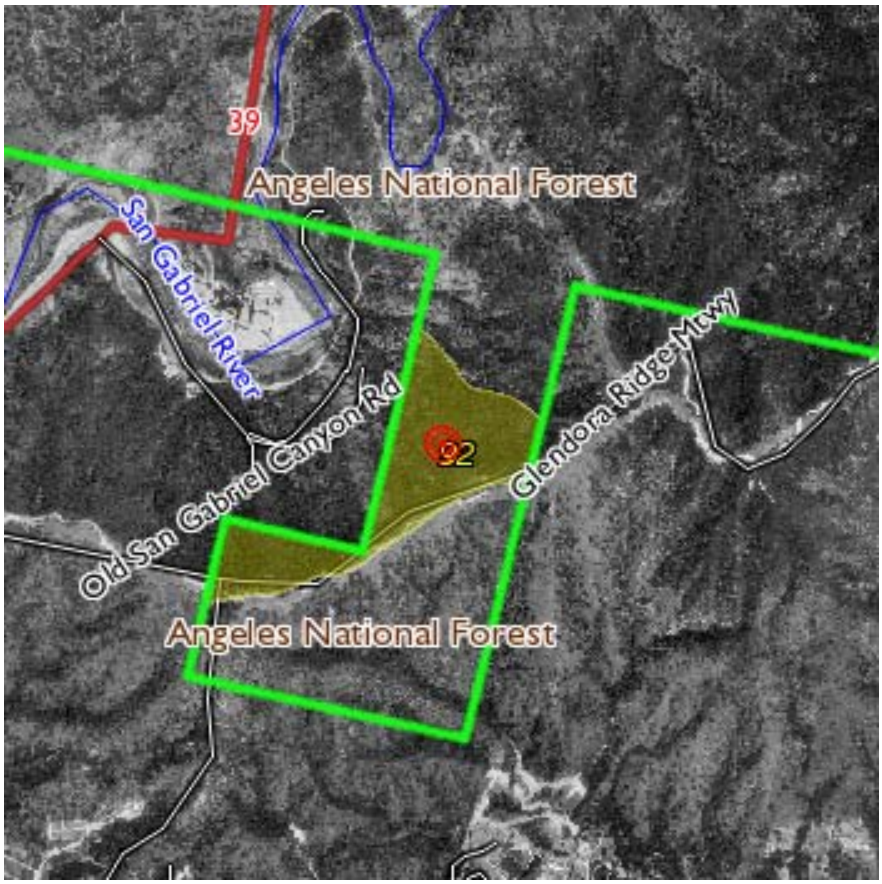


Figure 5: Soil Map showing extent of SSURGO map unit #92. Source: *University of California Davis, California Soil Resource Lab, Online Soil Survey,* http://casoilresource.lawr.ucdavis.edu/drupal/

Mollisols generally show a darkening of the top soil horizons through addition of organic matter often in prairie and grassland settings. Large amounts of organic matter accumulate and are microbially decomposed producing relatively stable, dark compounds (humification). Xerolls are the more or less freely drained Mollisols of regions that have dryer Mediterranean climates. They are dry for extended periods in summer, but moisture moves through most of the soils in winter and is stored above bedrock in normal years.

In Southern California, Xerolls are commonly associated with vegetation histories of annual grasses and oak species and can also be found associated with today's California Chapparal on steep slopes. More specifically, the Xerolls of the Tollhouse Family are part of the "Entic Haploxeroll" subgroup which are very shallow with thin horizons above weathered granitic bedrock. They tend to be excessively drained on strongly sloping to very steep mountain slopes. A typical soil profile has the following form:

Xerolls of the Tollhouse Family:

01--thin, scattered litter of dried grass parts and shrub leaves.

All--0 to 11 inches; dark grayish brown (10YR 4/2) coarse sandy loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable; common fine and few medium roots; about 15 percent of volume is fine rock fragments; slightly acid (pH 6.3); clear wavy boundary. (5 to 14 inches thick)

A12--11 to 18 inches; dark grayish brown (10YR 4/2) coarse sandy loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable; few fine and medium roots; about 15 percent of volume is fine rock fragments; medium acid (pH 6.0); abrupt irregular boundary. (0 to 10 inches thick)

Cr--18 to 24 inches; very pale brown and white with dark flecks, weathered quartz diorite; rock fabric clearly visible; crushes to very coarse sand; grades to unweathered rock.

Entisols of the Vista Family

Order: Entisols
Suborder: Orthents
Greatgroup: Xerorthents
Subgroup: Typic Xerorthents
Family: Coarse-loamy, mixed, thermic Typic Xerorthents
Phase: Vista-Trigo, granitic substratum-Modesto families complex, 40 to 70 percent slopes
Soil Series: Vista family

Figure 6: Map of the extent of SSURGO map unit #320. Source: *University of California Davis, California Soil Resource Lab, Online Soil Survey,* http://casoilresource.lawr.ucdavis.edu/drupal/

Entisols are generally young soils at an early stage of development including sandy weathering products. They may occur in unconsolidated parent material with no genetic horizons except an A horizon and are often transitions from a "non-soil" stage. Non-soils exist where erosion rates are very high or the parent material is impenetrable by roots restricting plant

growth. Weathering and soil materials are not in place long enough for pedogenic processes to form distinctive horizons.

The entisols around the El Encanto property belong into the subgroup of Typic Xerorthents. These are entisols of a xeric moisture regime associated with dry or semi-arid Mediterranean climates. Xerorthents are found in sandy-skeletal soils and recently exposed regolith over hard rocks. The soils on the south-facing dryer slopes surrounding the El Encanto properties belong to the Vista series. They are coarse-loamy, moderately deep, well drained soils that formed in material weathered from decomposed granitic rocks. Vista soils are found on slopes up to 75 percent. The mean annual precipitation is measured about 16 inches and the mean annual air temperature is about 62 degrees F.

Entisols of the Vista Family:

A1--0 to 3 inches; dark grayish brown (10YR 4/2) coarse sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium crumb structure; soft, very friable; common fine roots; many very fine and fine pores; neutral (pH 6.7); abrupt smooth boundary. (2 to 4 inches thick)

A2--3 to 9 inches; brown (10YR 4/3) coarse sandy loam, dark brown (10YR 3/3) moist; weak fine and medium granular structure; slightly hard, very friable; common fine roots; common very fine and fine pores; neutral (pH 6.7); diffuse irregular boundary. (4 to 7 inches thick)

A3--9 to 19 inches; brown (10YR 4/3) coarse sandy loam, dark brown (10YR 3/3) moist; weak fine and medium granular structure; slightly hard, very friable; few fine roots; common very fine and fine tubular pores; many krotovinas and animal burrows; slightly acid (pH 6.5); clear wavy boundary. (5 to 12 inches thick)

Bw1--19 to 28 inches; brown (10YR 4/3) coarse sandy loam, dark brown (10YR 3/3) moist; massive; hard, friable; few fine roots; common very fine and fine pores; many krotovinas and animal burrows; slightly acid (pH 6.3); clear wavy boundary. (6 to 14 inches thick)

Bw2--28 to 35 inches; yellowish brown (10YR 5/4) coarse sandy loam, dark yellowish brown (10YR 3/4) moist; massive; hard, friable; few fine roots; common fine and very fine pores; many krotovinas and animal burrows; slightly acid (pH 6.3); abrupt irregular boundary. (6 to 10 inches thick)

Cr1--35 to 44 inches; yellowish brown (10YR 5/4) and very pale brown (10YR 7/4) weathered quartz diorite grus composed mostly of plagioclase feldspar, biotite, hornblende, and some quartz; clear irregular boundary. (5 to 10 inches thick)

Cr2--44 to 61 inches; brown (10YR 5/3) and very pale brown (10YR 7/3) grus, similar to above, but lacking stains on mineral grains.

Geomorphology

General Site Character

The general geomorphology of the study area is that of an incised, bedrock-controlled canyon meander. The formation of this incised meander is due to massive tectonic uplift of the south eastern granitic block of the San Gabriel Mountains that is bound in the south by the Sierra Madre Fault and in the north by the San Gabriel Fault. The formation of the canyon topography is antecedent to tectonic uplift where the rate of down cutting of the canyon is approximately equal in magnitude to the tectonic uplift.

Approximately 1 mile downstream of the study site the stream transitions into a large alluvial fan complex forming the margin of the San Gabriel Mountains. This foothill region is a large deposition area for immense volumes of river gravels that have historically been weathered and eroded in the mountains, transported through the canyon, and deposited roughly over the Sierra Madre Fault Zone forming the fans.

Fluvial Geomorphology

While the channel base is very near bedrock there are substantive alluvial gravel deposits stored within the Canyon bottom. These are commonly reworked and redistributed throughout the Canyon floor by fluvial sediment transport during floods. The resulting channel morphology is a string of larger gravel bars flanking the main channel. In the wider and more curved portions of the Canyon, a meander topography has evolved that includes a set of large gravel-based point bars. The larger of these point bars is the dominant feature of the El Encanto property and the Azusa River Wilderness Park. Because the lower San Gabriel Canyon widens greatly, a sudden drop of stream power allows for natural deposition of sandy sediments and the formation of a sandy floodplain deposit in the upper portions of today's equestrian area.

This thick sandy deposit is the only significant accumulation of sands in the area, although it appears that most of the larger gravel bars may have originally been topped by sandy "river beach" deposits. Many of these deposits have been lost forever, as they have been slowly eroded during floods following closure of the upstream reservoirs. This is a common process in many western streams, where dam closures cut off the natural sediment supply for downstream channels. The result is that large flows may erode, but not rebuilt sandbars and is commonly referred to as "sediment starvation". This process ultimately leads to channel degradation, the disappearance of sand bars and vertical down-cutting of the main channels.

Hydraulic analyses (see separate report on hydraulic conditions) indicate that the thalweg of the San Gabriel River may have lowered by as much as 7-10 ft since closure of the upstream dams. The analysis also suggests that the formation of the sandy point bar surface across the El Encanto property predates dam closure.

The negative effect of this process is that flood waters do not reach the high floodplain elevations anymore. Sandy bank materials that historically where an important part of the riparian ecology become disconnected from the hydraulic process. As channel entrenchment continues, riparian habitat becomes "over aged", because a major element in their cyclical rejuvenation – regular flooding, was eliminated.

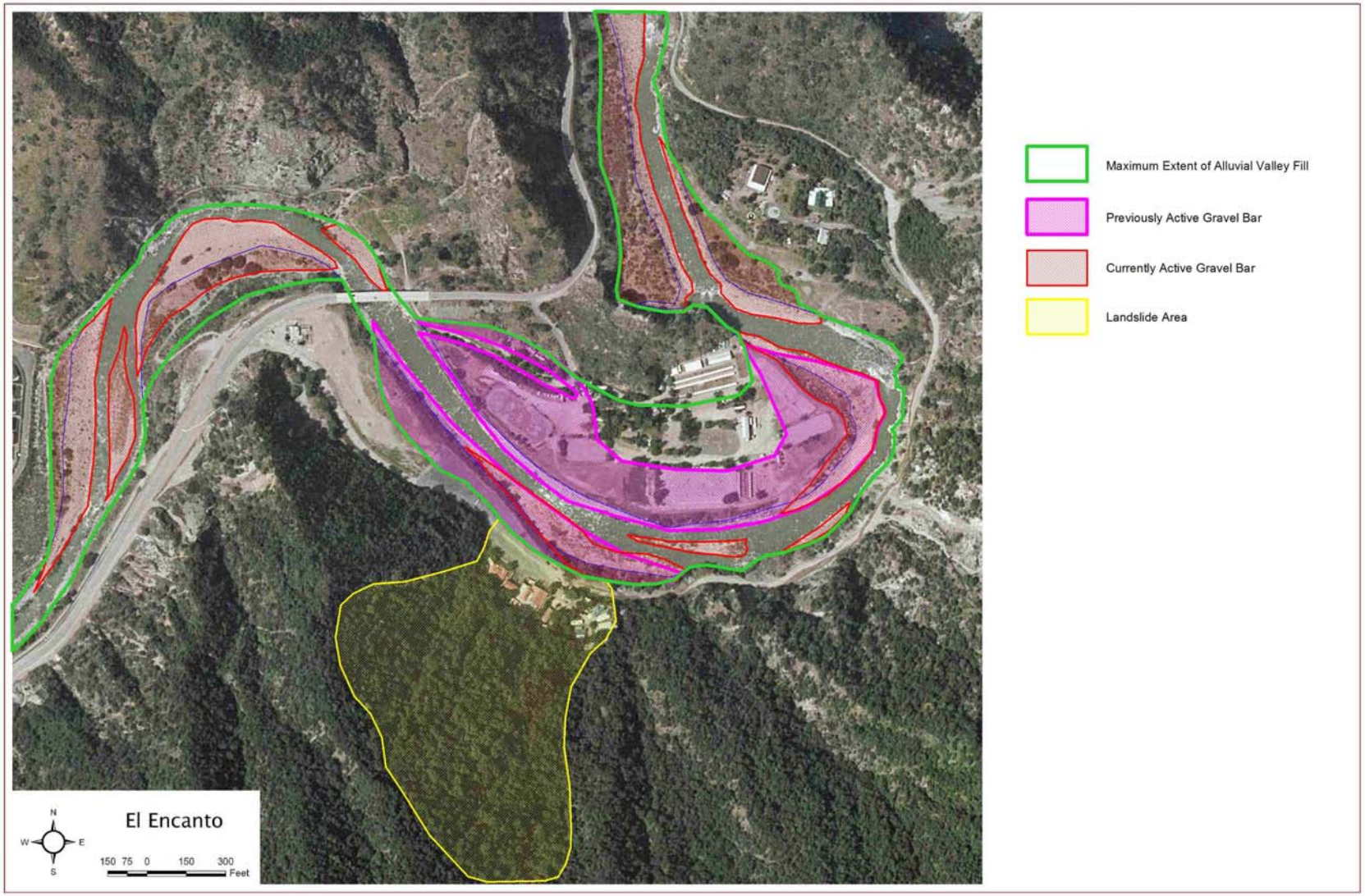


Figure 7: Geomorphologic Map of the El Encanto Area.

The southern portion of the El Encanto property constitutes a cutbank positioned opposite the sandy point bar. It appears that, historically, this has been the location of an elongated gravel bar that was later buried by a large landslide deposit originating from the southern slopes of the property. This is also characteristic of the lower canyon topography where several smaller landslides can be observed impinging on the river channel, often associated with the formation of boulder riffles, where some larger, poorly rounded clasts can be observed within the river channel

Slope Processes

The slide scar on the southern slope is not well visible to the untrained eye and is heavily vegetated indicating that this landslide may have occurred centuries ago. The materials underlying today's mobile home park area seem to constitute the unaltered toe materials of the original landslide. Within the area of the old restaurant these slide deposits where moved to make room for the buildings and the old San Gabriel Canyon Road. It appears that the majority of the material was bulldozed towards the stream where it is now incorporated into the base of the parking lot and the engineered southern river bank.

The pre-slide topography likely included a relatively large gravel bar that is now buried under the parking lot and the neighboring property. The alterations to the local topography led to a narrowing of the river channel. The southern stream bank is now significantly steeper than this would be the case under normal conditions.

Figure 8: Steep drainage channels behind buildings are cutting deeply into the local historic landslide sediments. Remobilization of these deposits is the primary origin of mud and debris flows surrounding the buildings.

There are indications of ongoing mudslides and debris flows emanating from the smaller drainages and historic slide scars behind the El Encanto Property. Visual field inspection suggests that the majority of these slide processes are slope wash related to erosion and down

cutting of drainage channels within the depositional toe materials of the ancient slide. Figure 9 shows one of these channels that are deeply incised into the slide material.

Visual inspection of the material indicates that the lower slopes, behind and immediately adjacent to the buildings, and underlying the trailer park, are an angular, matrix-supported conglomerate, characteristic of a slide deposit.

Figure 9: Angular matrix-supported landslide deposits underlying the mobile home park and lower slopes surrounding the buildings.

Generally, these landslide materials tend to be well drained without finer clay-bearing horizons making large-scale or “deep seated” mobilization of the landslide deposit relatively improbable. However, slopes in the area are very steep and this will always cause materials to mobilize and being washed off during larger rainfall events. This will be accompanied by vertical and lateral erosion of the channels of the four smaller drainages traversing the property. In essence, water from the well drained upper slopes of the watershed will continue to erode and mobilize the landslide materials below. There are no immediate solutions available to prevent this process other than to manage the movement of these materials through the property. In addition, the possibility of a larger slide originating from the upper slopes in this area cannot be ruled out simply because of the high steepness of the terrain and the fact that there is a history of slides in this area.

Positively weighs the fact that the underlying lithology of granitic rocks, covered by shallow soils, would suggest a period of slope stability following the original slide. This is so, because it requires significant amounts of time to reproduce sufficiently thick weathering profiles and weathering products to supply the material required for another slide. On the other hand, the slide scar topography is now concave and does contribute materials being transported towards the center of the scar where it does accumulate.

Other possible scenarios for slope instability of the upper slopes should be further investigated. There is a possibility that granitic materials of the upper slopes are heavily fractured and that a slide would originate as a rock slide along shallow slope-parallel fracture

planes, as a result of a combination of unloading and local tectonic stresses. There is also the possibility that some older slide materials have originated as ancient alluvial river deposits on the upper canyon slopes. These old river deposits would be the remnants of the ancient San Gabriel River that were uplifted with the general tectonic block. The existence of these types of deposits are documented in the geologic maps of the area and some larger rounded cobbles and boulders have been observed integrated into the slide deposits.

Based on this preliminary investigation it is highly recommended that a more detailed study of the area is performed by geotechnical experts. The bedrock of the old slide scar should be investigated to look for signs of heavy rock fracturing that could initiate a larger rockslide. In addition, the upper slope areas have to be investigated for the presence of old alluvial deposits and the degree of colluvium accumulation. Finally, the subsurface materials within the mobile home park have to be investigated to determine if there are any underlying layers within the old landslide deposits that may cause continued mobilization in the future.

Drainage

With regard to the more surficial processes of slope wash and drainage, it appears that general improvements to the local drainages can be designed in order to "pass" larger amounts of slope materials through the site, and by making smaller improvements that facilitate management and clean-up of debris. The following section will characterize the 4 sub-drainages and make suggestions with regard to future management.

Figure 10: Mapped Drainages that cross the El Encanto Property. Small images show the locations where sediment and water currently traverses the parking lot and road.

Drainage 1

This drainage passes the mobile home area to the east. The channel has cut down dramatically to the level of the old San Gabriel Canyon Road. The eastern set of mobile homes are precariously perched above the western bank of the gully. Currently, the gully outlet across the road is blocked by materials that were removed from the road.

It is suggested to retain the drainage channel in the current position but to design a road crossing that allows sediment to cross the road and enter the San Gabriel River Channel. It is suggested to use what is commonly referred to as an "Arizona Crossing", essentially, a

reinforced concrete dip in the road. It is not recommended to use a culvert, because this would lower the base level of the channel and cause more sediment mobilization and down-cutting in the upper drainage. It is suggested to lay back the western gully slope and restore and plant part of the drainage to prevent future slope collapse. Absent regarding of the bank slope it is recommended to install a low barrier or fence at the top of the gully slope to prevent visitors and residents from falling into the deep gully.

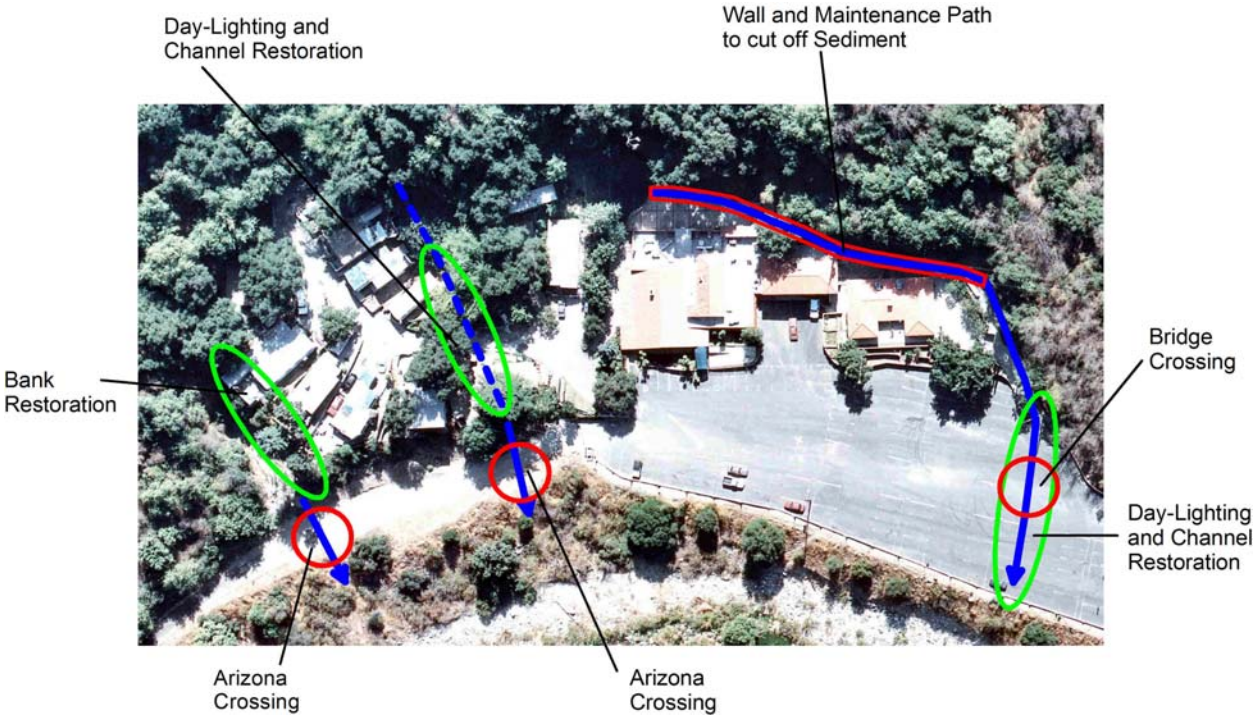


Figure 11: Schematic plan showing suggested drainage improvements.

Drainage 2

This drainage traverses the center of the mobile home park and enters into a large drain pipe under the access road to the mobile home park. This drain is filled-in with debris and does not function properly, and debris accumulates in the center of the trailer park and excess water runs down the driveway. The plugged drain pipe exits onto the access road similar to the first drainage.

It is recommended to completely re-grade and daylight this drainage. Underground culverts are likely to fill-in with debris in the future. A concrete Arizona Crossing would be the most appropriate structure to allow flood waters to traverse the road.

Drainage 3

This drainage traverses the main buildings through the breezeway between the Restaurant building and the Apartment above the Garage. It is the most problematic of the four drainages because a substantive improvement would require building alterations or removals. Channeling

flow into a culvert would be problematic simply, because sediment would fill and plug the culvert with sediment during each storm event.

One solution is to re-route flow and sediment into the fourth drainage and only retain the breezeway as an emergency overflow channel. This would require construction of a small retaining structure with adjacent service road that would also function as the new channel. The downside of this structure would be that a portion of the restaurant patio, and a portion of the backyards of the apartment and condos would be lost. Nevertheless, this type of structure would reduce maintenance cost in the long-run as sediment behind the buildings could be seasonally removed using bobcat-type machinery.

Drainage 4

This drainage passes the building structure on the west side and currently exits onto the parking lot. There are no structural improvements or channel to lead water and sediment into the San Gabriel River. Sediment currently spills onto the road and parking lot.

It is recommended to combine drainages 3 and 4 into one naturalized channel traversing the existing road under a small bridge. The channel would be naturalized and designed to meet the re-graded slope of the San Gabriel River. The new channel and bridge would create the planned boundary between the public parking area and the “limited access” area surrounding the buildings.

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Appendix

Pasadena Climate Tables
(Department of Commerce, NOAA, 2002)

Detailed Description of Soil Family Units
(National Cooperative Soil Survey U.S.A.)

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data,
and Information Service

Climatography of the United States No. 20 1971-2000

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801
www.ncdc.noaa.gov

Station: PASADENA, CA **COOP ID: 046719**

Climate Division: CA 6 **NWS Call Sign:** **Elevation: 864 Feet** **Lat: 34°09N** **Lon: 118°09W**

Temperature (°F)																					
Mean (1)				Extremes										Degree Days (1) Base Temp 65		Mean Number of Days (3)					
Month	Daily Max	Daily Min	Mean	Highest Daily(2)	Year	Day	Highest Month(1) Mean	Year	Lowest Daily(2)	Year	Day	Lowest Month(1) Mean	Year	Heating	Cooling	Max >= 100	Max >= 90	Max >= 50	Max <= 32	Min <= 32	Min <= 0
Jan	67.8	44.3	56.1	93	1971	18	61.1	1986	23+	1949	4	51.7	1979	281	3	.0	.1	30.8	.0	.2	.0
Feb	70.3	45.9	58.1	92	1995	20	63.7	1991	26	1929	9	54.3	1975	205	11	.0	.2	28.1	.0	.2	.0
Mar	71.3	47.2	59.3	96+	1997	19	64.3	1997	23	1978	2	54.9	1973	200	22	.0	.5	31.0	.0	.1	.0
Apr	76.0	50.0	63.0	105	1989	6	68.2	1992	34	1933	19	56.1	1975	129	69	.1	2.4	30.0	.0	.0	.0
May	78.2	53.5	65.9	102	1942	20	71.9	1984	37	1930	8	60.5	1977	80	106	.2	3.1	31.0	.0	.0	.0
Jun	84.0	57.4	70.7	110	1990	27	76.5	1981	41	1998	13	65.2	1982	20	191	.9	7.1	30.0	.0	.0	.0
Jul	89.4	61.1	75.3	110	1934	27	78.8	1985	45	1933	10	71.4	1987	0	318	1.5	15.3	31.0	.0	.0	.0
Aug	90.6	62.0	76.3	107+	1998	30	81.6	1998	48	1935	19	72.5	1976	2	352	2.4	17.2	31.0	.0	.0	.0
Sep	88.5	60.6	74.6	110	1988	4	80.8	1984	44+	1948	26	68.1	1986	8	294	2.9	13.8	30.0	.0	.0	.0
Oct	82.5	55.2	68.9	108	1991	11	74.4	1999	37	1971	30	65.5	1975	34	153	.8	6.3	31.0	.0	.0	.0
Nov	73.8	48.1	61.0	98	1997	2	65.5	1976	29	1931	23	55.8	1994	156	33	.0	.9	30.0	.0	@	.0
Dec	68.0	44.1	56.1	93+	1958	3	60.3	1980	26+	1990	23	51.4	1971	283	6	.0	.0	31.0	.0	.5	.0
Ann	78.4	52.5	65.4	110+	Jun 1990	27	81.6	Aug 1998	23+	Mar 1978	2	51.4	Dec 1971	1398	1558	8.8	66.9	364.9	.0	1.0	.0

+ Also occurred on an earlier date(s)

@ Denotes mean number of days greater than 0 but less than .05

Complete documentation available from: www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1927-2001

(3) Derived from 1971-2000 serially complete daily data

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data,
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Climatography of the United States No. 20 1971-2000

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801
www.ncdc.noaa.gov

Station: PASADENA, CA

COOP ID: 046719

Climate Division: CA 6 **NWS Call Sign:** **Elevation: 864 Feet** **Lat: 34° 09N** **Lon: 118° 09W**

Precipitation (inches)

Precipitation Totals

Month	Means/ Medians(1) Mean	Means/ Medians(1) Median	Extremes Highest Daily(2)	Year	Day	Highest Monthly(1)	Year	Lowest Monthly(1)	Year
Jan	4.48	3.02	7.08	1943	22	18.46	1995	.00	1976
Feb	5.00	3.44	4.50	1991	28	19.70	1980	.00	1984
Mar	4.38	3.74	7.70	1938	2	12.86	1978	.00+	1997
Apr	1.22	.63	3.30	1929	4	7.77	1983	.00+	1997
May	.45	.13	1.82	1977	9	4.41	1998	.00+	1997
Jun	.21	.05	1.58	1995	16	1.93	1995	.00+	2000
Jul	.05	.00	.45	1992	12	.82	1992	.00+	2000
Aug	.21	.00	2.16	1977	17	2.27	1977	.00+	1999
Sep	.48	.06	4.90	1939	25	3.93	1976	.00+	1999
Oct	.65	.42	3.26	1934	17	3.34	1987	.00+	1999
Nov	1.50	1.00	5.55	1970	29	6.80	1982	.00+	2000
Dec	2.46	1.47	6.17	1933	31	7.74	1984	.00	1989
Ann	21.09	18.84	7.70	Mar 1938	2	19.70	Feb 1980	.00+	Nov 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	7.2	5.3	2.9	1.6
Feb	6.7	5.0	3.0	1.8
Mar	7.7	5.1	3.0	1.4
Apr	4.1	2.1	.7	.3
May	2.8	1.0	.2	.2
Jun	1.6	.4	.1	.1
Jul	.5	.1	.0	.0
Aug	.7	.4	.1	.1
Sep	1.7	.8	.3	.2
Oct	2.6	1.2	.4	.2
Nov	3.4	2.2	1.2	.5
Dec	4.8	3.2	1.8	.7
Ann	43.8	26.8	13.7	7.1

Precipitation Probabilities (1)

Probability that the monthly/annual precipitation will be equal to or less than the indicated amount

Monthly/Annual Precipitation vs Probability Levels
These values were determined from the incomplete gamma distribution

Month	.05	.10	.20	.30	.40	.50	.60	.70	.80	.90	.95
Jan	.03	.18	.59	1.14	1.83	2.70	3.80	5.27	7.41	11.17	15.01
Feb	.03	.20	.67	1.28	2.05	3.02	4.24	5.88	8.25	12.43	16.69
Mar	.00	.34	1.06	1.74	2.47	3.28	4.25	5.42	7.06	9.77	12.43
Apr	.00	.00	.04	.17	.36	.60	.93	1.39	2.06	3.27	4.53
May	.00	.00	.01	.04	.09	.18	.30	.47	.75	1.28	1.84
Jun	.00	.00	.00	.00	.01	.05	.11	.20	.35	.65	.98
Jul	.00	.00	.00	.00	.00	.00	.00	.00	.03	.14	.29
Aug	.00	.00	.00	.00	.00	.00	.00	.06	.26	.71	1.24
Sep	.00	.00	.00	.00	.00	.05	.16	.37	.75	1.48	2.33
Oct	.00	.00	.02	.10	.21	.36	.54	.77	1.12	1.72	2.35
Nov	.00	.00	.11	.30	.54	.84	1.23	1.76	2.52	3.88	5.27
Dec	.04	.17	.46	.79	1.18	1.65	2.22	2.96	4.01	5.81	7.61
Ann	6.80	8.80	11.76	14.28	16.71	19.22	21.98	25.20	29.36	35.82	41.79

+ Also occurred on an earlier date(s)
# Denotes amounts of a trace
@ Denotes mean number of days greater than 0 but less than .05
** Statistics not computed because less than six years out of thirty had measurable precipitation

(1) From the 1971-2000 Monthly Normals
(2) Derived from station's available digital record: 1927-2001
(3) Derived from 1971-2000 serially complete daily data

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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Station: PASADENA, CA **COOP ID: 046719**

Climate Division: CA 6 **NWS Call Sign:** **Elevation: 864 Feet** **Lat: 34°09N** **Lon: 118°09W**

Snow (inches)																						
Snow Totals														Mean Number of Days (1)								
Means/Medians (1)					Extremes (2)									Snow Fall >= Thresholds					Snow Depth >= Thresholds			
Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median	Highest Daily Snow Fall	Year	Day	Highest Monthly Snow Fall	Year	Highest Daily Snow Depth	Year	Day	Highest Monthly Mean Snow Depth	Year	0.1	1.0	3.0	5.0	10.0	1	3	5	10
Jan	#	.0	0	0	#	1979	28	#+	1979	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Feb	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Mar	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Apr	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
May	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jun	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jul	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Aug	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Sep	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Nov	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Dec	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Ann	#	.0	N/A	N/A	#	Jan 1979	28	#+	Jan 1979	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0

+ Also occurred on an earlier date(s) #Denotes trace amounts

@ Denotes mean number of days greater than 0 but less than .05

-9/-9.9 represents missing values
Annual statistics for Mean/Median snow depths are not appropriate

(1) Derived from Snow Climatology and 1971-2000 daily data

(2) Derived from 1971-2000 daily data

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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Freeze Data

Spring Freeze Dates (Month/Day)

Temp (F)	Probability of later date in spring (thru Jul 31) than indicated(*)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	3/19	3/04	2/20	2/10	2/01	1/21	1/09	12/21	0/00
32	2/08	1/19	12/31	12/02	0/00	0/00	0/00	0/00	0/00
28	1/06	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00
24	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00
20	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00
16	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00

Fall Freeze Dates (Month/Day)

Temp (F)	Probability of earlier date in fall (beginning Aug 1) than indicated(*)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	11/17	12/01	12/11	12/20	12/29	1/08	1/20	2/11	0/00
32	12/12	1/01	1/21	0/00	0/00	0/00	0/00	0/00	0/00
28	1/24	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00
24	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00
20	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00
16	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00	0/00

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	>365	>365	>365	>365	328	310	296	282	264
32	>365	>365	>365	>365	>365	>365	>365	>365	>365
28	>365	>365	>365	>365	>365	>365	>365	>365	>365
24	>365	>365	>365	>365	>365	>365	>365	>365	>365
20	>365	>365	>365	>365	>365	>365	>365	>365	>365
16	>365	>365	>365	>365	>365	>365	>365	>365	>365

* Probability of observing a temperature as cold, or colder, later in the spring or earlier in the fall than the indicated date.

0/00 Indicates that the probability of occurrence of threshold temperature is less than the indicated probability.

Derived from 1971-2000 serially complete daily data

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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Degree Days to Selected Base Temperatures (°F)

Heating Degree Days (1)

Base Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	281	205	200	129	80	20	0	2	8	34	156	283	1398
60	146	102	99	56	25	4	0	0	0	7	69	152	660
57	87	59	54	28	11	1	0	0	0	2	35	94	371
55	56	35	32	17	6	0	0	0	0	0	20	63	229
50	11	8	7	3	0	0	0	0	0	0	4	15	48
32	0	0	0	0	0	0	0	0	0	0	0	0	0

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	745	731	845	930	1049	1161	1341	1373	1276	1142	868	745	12206
55	89	122	164	257	342	471	628	660	586	429	198	96	4042
57	58	89	124	208	285	411	566	598	526	368	153	64	3450
60	24	48	75	146	207	324	473	505	436	280	97	29	2644
65	3	11	22	69	106	191	318	352	294	153	33	6	1558
70	0	0	4	22	39	90	173	211	168	65	7	0	779

Growing Degree Units (2)

Base	Growing Degree Units (Monthly)												Growing Degree Units (Accumulated Monthly)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
40	505	532	605	699	810	932	1108	1132	1044	905	635	507	505	1037	1642	2341	3151	4083	5191	6323	7367	8272	8907	9414
45	350	387	450	549	655	782	953	977	894	750	485	355	350	737	1187	1736	2391	3173	4126	5103	5997	6747	7232	7587
50	205	251	297	401	500	632	798	822	744	595	337	207	205	456	753	1154	1654	2286	3084	3906	4650	5245	5582	5789
55	87	121	159	255	346	482	643	667	594	440	196	88	87	208	367	622	968	1450	2093	2760	3354	3794	3990	4078
60	27	45	64	133	198	333	488	512	444	287	83	26	27	72	136	269	467	800	1288	1800	2244	2531	2614	2640
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	289	314	349	417	493	597	726	740	674	569	380	293	289	603	952	1369	1862	2459	3185	3925	4599	5168	5548	5841

(1) Derived from the 1971-2000 Monthly Normals
(2) Derived from 1971-2000 serially complete daily data
Note: For corn, temperatures below 50 are set to 50, and temperatures above 86 are set to 86

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

Notes

a. The monthly means are simple arithmetic averages computed by summing the monthly values for the period 1971-2000 and dividing by thirty. Prior to averaging, the data are adjusted if necessary to compensate for data quality issues, station moves or changes in station reporting practices. Missing months are replaced by estimates based on neighboring stations.

b. The median is defined as the middle value in an ordered set of values. The median is being provided for the snow and precipitation elements because the mean can be a misleading value for precipitation normals.

c. Only observed validated values were used to select the extreme daily values.

d. Extreme monthly temperature/precipitation means were selected from the monthly normals data.
Monthly snow extremes were calculated from daily values quality controlled to be consistent with the Snow Climatology.

e. Degree Days were derived using the same techniques as the 1971-2000 normals.
Compete documentation for the 1971-2000 Normals is available on the internet from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

f. Mean "number of days statistics" for temperature and precipitation were calculated from a serially complete daily data set .
Documentation of the serially complete data set is available from the link below:

g. Snowfall and snow depth statistics were derived from the Snow Climatology.
Documentation for the Snow Climatology project is available from the link under references.

Data Sources for Tables

Several different data sources were used to create the Clim20 climate summaries. In some cases the daily extremes appear inconsistent with the monthly extremes and or the mean number of days statistics. For example, a high daily extreme value may not be reflected in the highest monthly value or the mean number of days threshold that is less than and equal to the extreme value. Some of these difference are caused by different periods of record. Daily extremes are derived from the station's entire period of record while the serial data and normals data were are for the 1971-2000 period. Therefore extremes observed before 1971 would not be included in the 1971-2000 normals or the 1971-2000 serial daily data set. Inconsistencies can also occur when monthly values are adjusted to reflect the current observing conditions or were replaced during the 1971-2000 Monthly Normals processing and are not reconciled with the Summary of the Day data.

a. Temperature/ Precipitation Tables
   1. 1971-2000 Monthly Normals
   2. Cooperative Summary of the Day
   3. National Weather Service station records
   4. 1971-2000 serially complete daily data

b. Degree Day Table
   1. Monthly and Annual Heating and Cooling Degree Days Normals to Selected Bases derived from 1971-2000 Monthly Normals
   2. Daily Normal Growing Degree Units to Selected Base Temperatures derived from 1971-2000 serially complete daily data

c. Snow Tables
   1. Snow Climatology
   2. Cooperative Summary of the Day

d. Freeze Data Table
   1971-2000 serially complete daily data

References

U.S. Climate Normals 1971-2000, www.ncdc.noaa.gov/normals.html
U.S. Climate Normals 1971-2000-Products Clim20, www.ncdc.noaa.gov/oa/climate/normals/usnormalsprods.html
Snow Climatology Project Description, www.ncdc.noaa.gov/oa/climate/monitoring/snowclim/mainpage.html
Eischeid, J. K., P. Pasteris, H. F. Diaz, M. Plantico, and N. Lott, 2000: Creating a serially complete, national daily time series of temperature and precipitation for the Western United States. J. Appl. Meteorol., 39, 1580-1591,
www1.ncdc.noaa.gov/pub/data/special/ serialcomplete_jam_0900.pdf

LOCATION CIENEBA CA

Established Series
Rev. GWH/RCH/RWK/SBS/KP
05/1999

CIENEBA SERIES

The Cieneba series consists of very shallow and shallow, somewhat excessively drained soils that formed in material weathered from granitic rock. Cieneba soils are on uplands and have slopes of 9 to 85 percent. The mean annual precipitation is about 25 inches and the mean annual air temperature is about 60 degrees F.

TAXONOMIC CLASS: Loamy, mixed, superactive, nonacid, thermic, shallow Typic Xerorthents

TYPICAL PEDON: Cieneba gravelly loam, chaparral cover. (Colors are for dry soil unless otherwise noted.)

O1 --1/2 inch to 0; intermittent, partially decomposed leaf and twig litter; grayish brown; loose and fluffy; abrupt smooth boundary

A --0 to 10 inches; pale brown (10YR 6/3) fine gravelly loam, brown (10YR 4/3) moist; moderate fine granular structure; slightly hard, very friable, nonsticky and nonplastic; many fine and medium roots; many very fine and fine interstitial pores; medium acid; gradual smooth boundary. (4 to 20 inches thick)

Cr --10 to 30 inches; reddish yellow and brown, strongly weathered, acid granitic material with relic rock structure; some loam material formed in place in cracks and cleavage planes; larger roots penetrate along joints.

TYPE LOCATION: San Benito County, California; on the south side of Fremont Peak Road, 9 miles south of San Joan Bautista; SE side of section 25, T.13 S., R.4 E.

RANGE IN CHARACTERISTICS: Depth to a paralithic contact is 4 to 20 inches. Soil below a depth of about 4 to 6 inches usually is moist all of the time after November until sometime in May. It is dry all the rest ofthe time. The mean annual soil temperature just above the weathered rock is 59 degrees to 65 degrees F. Fragments larger than 2 mm make up 0 to 35 percent of the soil. The soil is neutral to strongly acid, though moist pedons are slightly or medium acid. It is coarse sandy loam, gravelly sandy loam, light loam or gravelly lightloam and has less than 18 percent clay throughout the profile. The amount of coarse and very coarse sand is 15 to 25 percent. Organic matter content is less than 1 percent below a depth of about 1 inch to about 4 inches.

The A horizon is dark grayish brown to light brown (10YR 4/2, 4/3, 5/2, 5/3, 6/2, 6/3; 7.5YR 5/2, 6/4). Dry values of 4 or 5 extend to a de pth of 1 to 5 inches in protected pedons that have not been burned and eroded.

COMPETING SERIES: These are theGillender and Trigo series in this family and theLa Posta, Maymen, Pentz, Tollhouse and Vista series. Gillender soils have less than 15 percent very coarse plus coarse sand and have distinct mottles in the A horizon. La Posta and Tollhouse soils have mollic epipedons and have a mean annual temperature of less than 59 degrees F. Maymen soils have a lithic contact at depths less than 20 inches and a soil temperature of less than 59 degrees F. Pentz soils have an exchange complex dominated by amorphous material and more than 60 percent vitreous material in the sand and silt fraction. Trigo soils have about 3 to 10 percent coarse and very coarse sand. Vista soils are more than 20 inches deep to a paralithic contact.

GEOGRAPHIC SETTING: Cieneba soils formed from material weathered from granite and other rocks of similar texture and composition. Gradients are 9 to 85 percent. The soils are at elevations of 500 to 4,000 feet. The climate is dry subhumid mesothermal with warm dry summers and cold moist winters. There is little or no snow. Mean annual precipitation is 12 to 35 inches. Mean annual temperature is 57 degrees to 65 degrees F.; average January temperature is 45 degrees to 50 degrees F.; average July temperature is 68 degrees to 80 degrees F. The freeze-free season is 175 to 300 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Ahwahnee, Auberry, Chualar, and Sheridan soils and the competing Vista soils. Ahwahnee and Auberry soils are more than 20 inches deep to a paralithic contact and have argillic horizons. Chualar and Sheridan soils have mollic epipedons and lack a paralithic contact at depths of less than 20 inches.

DRAINAGE AND PERMEABILITY: Somewhat excessively drained; low to medium runoff; moderately rapid permeability in the soil, but much slower in the weathered granite.

USE AND VEGETATION: Used for wildlife, recreation, watershed, and incidental grazing. Vegetation is mainly chaparral and chamise with widely spread Digger pine or oak tree. There are small area of thin annual grasses and weeds.

DISTRIBUTION AND EXTENT: Coast Range in central and south-central California and foothills of the Sierra Nevada, MLRAs 15,10 and 22. The soil is extensive.

MLRA OFFICE RESPONSIBLE: Davis, California

SERIES ESTABLISHED: Monterey County, California, 1972.

National Cooperative Soil Survey
U.S.A.

LOCATION TOLLHOUSE CA

Established Series
Rev. GLH/RWX
05/2001

TOLLHOUSE SERIES

The Tollhouse series consists of shallow, somewhat excessively or excessively drained soils that formed in material weathered from granitic rocks. Tollhouse soils are on strongly sloping to very steep mountain slopes. The mean annual precipitation is about 22 inches and the mean annual air temperature is about 54 degrees.

TAXONOMIC CLASS: Loamy, mixed, superactive, mesic, shallow Entic Haploxerolls

TYPICAL PEDON: Tollhouse coarse sandy loam - native shrubs and naturalized grass. (Colors are for dry soil unless otherwise noted.)

01--thin, scattered litter of dried grass parts and shrub leaves

All --0 to 11 inches; dark grayish brown (10YR 4/2) coarse sandy loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable; common fine and few medium roots; about 15 percent of volume is fine rock fragments; slightly acid (pH 6.3); clear wavy boundary. (5 to 14 inches thick)

A12--11 to 18 inches; dark grayish brown (10YR 4/2) coarse sandy loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable; few fine and medium roots; about 15 percent of volume is fine rock fragments; medium acid (pH 6.0); abrupt irregular boundary. (0 to 10 inches thick)

Cr --18 to 24 inches; very pale brown and white with dark flecks, weathered quartz diorite; rock fabric clearly visible; crushes to very coarse sand; grades to unweathered rock.

TYPE LOCATION: Fresno County, California; 2-1/4 miles (airline) NE of town of Auberry; near the center of SW 1/4 of sec. 34, T.9S., R.23E.

RANGE IN CHARACTERISTICS: Depth to a paralithic contact of weathered rock is 5 to 20 inches. The mean annual soil temperature just above the rock is 54 degrees to 59 degrees. The soil temperature is not below 47 degrees at any time or is not below 47 degrees after the middle of February. Soil below a depth of about 8 inches usually is continuously dry from late May or in June until about November and is moist all the rest of the year. The soil profile is coarse sandy loam or sandy loam. Coarse and very coarse sand make up 20 to 50 percent of the soil material finer than 2mm. Clay content is less than 18 percent. Rock fragments, mostly as 2 tx 5mm. mineral grains, make up 5 to 35 percent of the soil volume. The soil is neutral to medium acid.

The A horizon is grayish brown to very dark grayish brown (10YR 5/2, 5/3, 4/1, 4/2, 3/2, 2.5Y 5/2) when dry and very dark gray to very dark brown (10YR 3/1, 3/2, 3/3, 2/2) when moist. It has 1.5 to 5 percent organic matter and 75 to 100 percent base saturation. This horizon has weak to moderate granular or weak subangular blocky structure.

In most pedons the A horizon rests directly on the weathered rock. In other pedons there is a C or AC horizon. Such horizons are grayish brown to very pale brown (10YR 5/2, 6/3, 6/4, 7/3, 2.5Y 5/2).

COMPETING SERIES: This is the Chehulpum series. Chehulpum soils have more than 18 percent clay in the particle size control section.

GEOGRAPHIC SETTING: Tollhouse soils are strongly sloping to very steep and are in mountainous areas at elevations of 2,000 to about 8,000 feet. They formed in residuum weathered from granite and closely related coarse crystalline rocks. Rock outcrops are common to many. The climate is subhumid mesothermal with warm dry summers and wet cold winters. Mean annual precipitation is 10 to 35 inches. Snow is infrequent and soon melted. Average January temperature is about 40 degrees to 50 degrees., average July temperature is 70 degrees to 78 degrees., and the mean annual temperature is 52 degrees to 57 degrees. The freeze-free season is about 140 to 225 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Auberry, Ahwahnee, Crafton, Crouch, Kitchen Creek, La Posta, Mottsville and Sheephead soils. Auberry and Ahwahnee soils lack some of the properties of a mollic epipedon and the mean soil temperature is above 59 degrees. Crafton and La Posta soils have a paralithic contact at a depth of 20 to 40 inches. Crouch soils have 50 to 75 percent base saturation and lack a paralithic contact at depths of 40 inches or less. Kitchen Creek soils have an argillic horizon. Mottsville soils are sandy and lack a paralithic contact. Sheephead soils have a base saturation of 50 to 75 percent.

DRAINAGE AND PERMEABILITY: Somewhat excessively or excessively drained; rapid to very rapid runoff; moderately rapid or rapid permeability.

USE AND VEGETATION: Used for wildlife, watershed, and limited grazing. Principal native plants are a chaparral of whitethorn, manztnita, California laurel, interior live oak, and California buckeye. Some naturalized grasses and forbs in some locations.

DISTRIBUTION AND EXTENT: Intermediate elevations of the Sierra Nevada and mountains of the southwestern part of California. The soils are extensive.

MLRA OFFICE RESPONSIBLE: Davis, California

SERIES ESTABLISHED: Fresno County (Eastern Fresno Area) California, 1959.

OSED scanned by SSQA. Last revised by state on 12/76.

National Cooperative Soil Survey
U.S.A.

LOCATION VISTA CA

Established Series
Rev. GB/RCH/LCL/SBS
9/98

VISTA SERIES

The Vista series consists of moderately deep, well drained soils that formed in material weathered from decomposed granitic rocks. Vista soils are on hills and mountainous uplands and have slopes of 2 to 75 percent. The mean annual precipitation is about 16 inches and the mean annual air temperature is about 62 degrees F.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, thermic Typic Haploxerepts

TYPICAL PEDON: Vista coarse sandy loam, annual pasture. (Colors are for dry soil unless otherwise noted.)

A1--0 to 3 inches; dark grayish brown (10YR 4/2) coarse sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium crumb structure; soft, very friable; common fine roots; many very fine and fine pores; neutral (pH 6.7); abrupt smooth boundary. (2 to 4 inches thick)

A2--3 to 9 inches; brown (10YR 4/3) coarse sandy loam, dark brown (10YR 3/3) moist; weak fine and medium granular structure; slightly hard, very friable; common fine roots; common very fine and fine pores; neutral (pH 6.7); diffuse irregular boundary. (4 to 7 inches thick)

A3--9 to 19 inches; brown (10YR 4/3) coarse sandy loam, dark brown (10YR 3/3) moist; weak fine and medium granular structure; slightly hard, very friable; few fine roots; common very fine and fine tubular pores; many krotovinas and animal burrows; slightly acid (pH 6.5); clear wavy boundary. (5 to 12 inches thick)

Bw1--19 to 28 inches; brown (10YR 4/3) coarse sandy loam, dark brown (10YR 3/3) moist; massive; hard, friable; few fine roots; common very fine and fine pores; many krotovinas and animal burrows; slightly acid (pH 6.3); clear wavy boundary. (6 to 14 inches thick)

Bw2--28 to 35 inches; yellowish brown (10YR 5/4) coarse sandy loam, dark yellowish brown (10YR 3/4) moist; massive; hard, friable; few fine roots; common fine and very fine pores; many krotovinas and animal burrows; slightly acid (pH 6.3); abrupt irregular boundary. (6 to 10 inches thick)

Cr1 --35 to 44 inches; yellowish brown (10YR 5/4) and very pale brown (10YR 7/4) weathered quartz diorite grus composed mostly of plagioclase feldspar, biotite, hornblende, and some quartz; clear irregular boundary. (5 to 10 inches thick)

Cr2 --44 to 61 inches; brown (10YR 5/3) and very pale brown (10YR 7/3) grus, similar to above, but lacking stains on mineral grains.

TYPE LOCATION: San Diego County, California; about 2 1/2 miles southeast of Fallbrook, California, about 440 feet North northwest of the southeast corner of the Fallbrook High School campus; NE1/4 SW1/4 section 31, T.9 S., R. 3 W. (projected). 33 degrees North latitude, 20 minutes, 57 seconds;117 West longitude, 14 minutes, 16 seconds.

RANGE IN CHARACTERISTICS: Depth to paralithic contact is 20 to 40 inches. The mean annual so il temperature is 6 to 65 degrees F. Usually the soil between depths of 8 and 24 inches is moist in some or all parts from December until about May 1 and is dry the rest of the year.

The A horizon is grayish brown to dark brown (10YR 5/2, 5/3, 4/2 and 4/3). It averages less than 1 percent organic matter. It is coarse sandy loam or sandy loam and is medium acid to neutral. In many pedons krotovinas filled with material like that of the A12 horizon extend downward through the remainder of the solum and into the C1 horizon.

The Bw horizon is very pale brown (10YR 7/3, 6/3, 5/3, 4/3, 5/4, 4/4 and 7.5YR 6/4, 5/4). In some pedons the B horizon has 1 unit higher chroma or redder hue than an underlyimg C horizon that is not grus. This horizon is coarse sandy loam or sandy loam and is slightly acid or neutral. In most pedons the B horizon has a few thin clay films and has slightly more clay than the A horizon.

A sandy loam C horizon that lacks rock structure is present above the grus in some pedons.

COMPETING SERIES: These are the Ahwahnee, Cienba, Crouch, Escondido, Fallbrook, Garey, Greenfield, and Saugus series. Ahwahnee, Fallbrook, and Greemfield soils have argillic horizons. Cienba soils have a paralithic contact at depths of less than 40 inches. Garey soils have argillic horizons made up of lamellae. Saugus soils lack cambic horizons and they have paralithic contacts at depths below 40 inches.

GEOGRAPHIC SETTING: Vista soils are on hilly slopes at elevations of 400 to 3,900 feet in southern California and at less than 3,500 feet elevation in central California. Slopes range from 2 to 75 percent. The soils formed in material weathered from decomposed granite and other closely related rocks. The climate is subhumid mesothermal. The average annual precipitation is 10 to 22 inches. The average January temperature is 47 to 58 degrees F.; the average July temperature is 67 to 80 degrees F.; and the mean annual temperature is 59 to 65 degrees F. The average frost free season is 210 to 320 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Bonsall, Las Posas, and Ramona soils and the competing Fallbrook and Greenfield soils. Bonsall soils have fine textured argillic horizons that are high in exchangeable sodium. La Posas soils have dark red, fine textured argillic horizons, formed in deeply weathered gabbro. Ramona soils have reddish brown argillic horizons formed in granitic alluvium.

DRAINAGE AND PERMEABILITY: Well drained; slow to rapid runoff; moderately rapid permeability

USE AND VEGETATION: Under irrigation avocados and citrus are grown in areas of favorable temperature. A few small areas are used for growing winter truck crops. On areas of moderate relief, grain and hay are grown without irrigation. Range is a common use in areas that are not cultivated. The natural vegetation is annual grasses and forbs and such shrubs as California sagebrush, scrub oak, lilac, chamise, sumac, and flattop buckwheat.

DISTRIBUTION AND EXTENT: Southern California and Sierra Nevada foothills. The soil is extensive.

MLRA OFFICE RESPONSIBLE: Davis, California

SERIES ESTABLISHED: San Diego County (Oceanside Area), California, 1929.

ADDITIONAL DATA: NSSL pedons S64CA-073-001 (type location), S65CA-053-029, S65CA-053-030, S55CA-065-006, S64CA-073-004 and S55CA-065-007.

REMARKS: Minor edits to horizon designations made in 1996. Entire official series description needs to be updated, included competing section.

Yearly Summary Statistics
Los Angeles County Department of Public Works
Gaging Station: U8-R San Gabriel River below Morris Dam

Season	Daily CFS			Total Runoff	Peak Inflow	
	Maximum	Minimum	Mean	(Acre-feet)	Date	CFS
1895-96	134	0	N.D.	N.D.		
1896-97	1,760.00	0	95.6	69,200		N.D.
1897-98	1,600.00	0	9.6	6,920		N.D.
1898-99	16	0	0.1	74		N.D.
1899-00	49	0	0.4	272		N.D.
1900-01	5,170.00	0	94.1	68,100	5-Feb	N.D.
1901-02	318	0	4.3	3,100		6,250
1902-03	2,940.00	0	104	74,900		N.D.
1903-04	1,070.00	0	9.3	6,720		N.D.
1904-05	2,940.00	0	172	124,000		N.D.
1905-06	7,950.00	0	262	190,000		N.D.
1906-07	6,730.00	0	406	293,000		N.D.
1907-08	1,160.00	0	46.4	33,700		N.D.
1908-09	7,030.00	0	197	143,000		N.D.
1909-10	12,400.00	0	137	99,100	1-Jan	13,900
1910-11	9,100.00	0	321	231,000	10-Mar	13,500
1911-12	2,950.00	0	55.5	40,300		N.D.
1912-13	1,880.00	0	25.6	18,600		N.D.
1913-14	11,800.00	0	359	260,000	20-Feb	18,100
1914-15	1,110.00	0	108	77,900	29-Jan	2,770
1915-16	22,300.00	0	315	228,000	18-Jan	40,000
1916-17	3,900.00	0	49.3	35,700		N.D.
1917-18	4,940.00	0	123	88,600	17-Mar	8,680
1918-19	76	0	3.2	2,290	11-Feb	230
1919-20	2,400.00	0	94.6	68,700	2-Mar	5,000
1920-21	2,050.00	0	40.1	29,000	14-Mar	4,000
1921-22	16,000.00	0	505	365,000	19-Dec	22,300
1922-23	2,250.00	0	44	31,800	13-Dec	3,670
1923-24	253	0	3.5	2,540	26-Mar	510
1924-25	588	0	4.2	3,030	4-Mar	3,000
1925-26	5,530.00	0	113	81,700	7-Apr	14,900
1926-27	11,400.00	0	123	88,900	16-Feb	18,200
1927-28	672	0	4.1	2,940	4-Feb	1,810
1928-29	411	0	10	7,210	10-Mar	895
1929-30	396	0	21.5	15,600	15-Mar	586
1930-31	601	0	9.5	6,900	26-Apr	1,450
1931-32	5,830.00	0	120	87,200	9-Feb	7,500
1932-33	1,630.00	0	21.9	15,900	19-Jan	5,820
1933-34	2,380.00	0	30.4	22,080	1-Jan	6,120
1934-35	460	0	102	74,080	9-Feb	507
1935-36	224	0	31.6	22,980	10-Apr	455
1936-37	1,770.00	0	195	141,100	20-Feb	1,950
1937-38	21,660.00	0.1	415	300,200	2-Mar	65,700
1938-39	316	6.5	53.5	38,680		N.D.
1939-40	506	0	50.5	36,640	24-Jun	506
1940-41	3,870.00	0	317	229,300	4-Mar	4,460
1941-42	370	2.5	13.1	9,480	20-Apr	422
1942-43	10,370.00	2	334	242,000	23-Jan	12,100
1943-44	2,710.00	3.6	184	133,700	22-Feb	5,170
1944-45	980	6.1	62.8	45,490	6-Feb	988
1945-46	937	0.3	75.9	54,930	23-Dec	980
1946-47	2,930.00	0	74.9	54,220	31-Dec	2,980
1947-48	1,170.00	0	18.1	13,170	2-Jun	1,320
1948-49	61	0	5.7	4,140	27-Oct	79
1949-50	7.9	0	0.7	51	31-Jul	8

Yearly Summary Statistics
Los Angeles County Department of Public Works
Gaging Station: U8-R San Gabriel River below Morris Dam

Season	Daily CFS			Total Runoff	Peak Inflow	
	Maximum	Minimum	Mean	(Acre-feet)	Date	CFS
1950-51	47	0	8.6	6,220	27-Apr	168
1951-52	3,530.00	0	91.1	66,120		N.D.
1952-53	1,190.00	0	69.4	50,240		N.D.
1953-54	960	0	34.6	25,030	16-Apr	9,420
1954-55	9.9	0	0.1	86	26-Sep	10
1955-56	43	0	0.2	176	30-Sep	45
1956-57	650	0	12.4	9,010	14-Apr	656
1957-58	2,470.00	0	241	174,100	5-Apr	2,780
1958-59	348	0	11.3	8,200	24-Feb	364
1959-60	0	0	0	0		0
1960-61	7.5	0	1.7	1,250	6-May	9
1961-62	1,520.00	0	102	73,590	12-Feb	1,650
1962-63	27	0	1	712	4-Sep	45
1963-64	22	0	0.2	160	26-Aug	50
1964-65	276	0	10.7	981	12-Jun	291
1965-66	7,260.00	0	225	162,900	23-Nov	8,640
1966-67	3,750.00	0	232	167,900	6-Dec	5,680
1967-68	236	0	31.7	23,030	25-Nov	326
1968-69	19,300.00	0	750	543,000	25-Feb	29,850
1969-70	1,060.00	0	52.4	37,970	28-Feb	1,102
1970-71	434	0	31.4	22,760	4-Jan	439
1971-72	299	0	15.3	11,090	8-Dec	299
1972-73	849	0	131	94,790	19-Mar	918
1973-74	310	0	60.8	44,010	7-Nov	364
1974-75	248	0	29.7	21,500		248
1975-76	191	0	28.8	20,870	25-Mar	178
1976-77	267	0	21.8	15,760	13-Oct	273
1977-78	10,800.00	0	630.1	456,170	4-Mar	14,100
1978-79	504	0	149.2	108,000	22-Apr	519
1979-80	8,310.00	0	473.3	337,410	19-Feb	8,720
1980-81	415	0	37.8	27,335	11-Dec	514
1981-82	586	0	90.2	65,284	24-Mar	5,490
1982-83	11,600.00	0	15.9	352,733	2-Mar	11,900
1983-84	485	0	2.2	48,419	13-Oct	552
1984-85	464	0	48.5	35,100	1-Jan	469
1985-86	831	0	131	94,778	25-Feb	856
1986-87	186	0	60.8	43,995	23-Feb	212
1987-88	253	0	94.1	67,673	8-Jun	793
1988-89	434	0.4	68	49,058	5-Jan	434
1989-90	166	0.1	64	46,101	28-Apr	162
1990-91	785	0	113	80,999	28-Jul	793
1991-92	1,740.00	0.8	206	149,508	15-Feb	3,460
1992-93	9,500.00	0	655	474,300	14-Jan	9,500
1993-94	480	0	57.8	41,860	2-Aug	1,490
1994-95	*	*	*	*		*
1995-96	552	0.4	124	89,820	25-Sep	1,220
1996-97	696	0.3	90.3	65,340	2-Feb	1,620
1997-98	7,200.00	0	365	264,000	24-Feb	10,300
1998-99	250	0	33.1	23,970	1-Mar	3,140
1999-00	316	1.2	59.1	42,940	1-May	834
2000-01	490	2	65.3	47,240	9-May	1,240
2001-02	242.1	2.3	65.5	47,415.90	31-Oct	1,183
2002-03	746.8	1.9	118	85,273.40	14-Nov	1,070
2003-04	676.8	1.1	89	64,272.90	6-Oct	683
2004-05	15,900.00	21	748	541,000.00	11-Jan	20,700

M	Data Missing
*	Record incomplete
E	Estimate
N.D.	Not determined
**	Record not Computed
+	Less than 0.05 Acre Feet or less than 0.05

APPENDIX B2

BIOLOGICAL CONDITIONS

Exhibit E - 2007 RWP Site Programming, Planning & Concept Report

BonTerra CONSULTING
An Environmental Planning/Resource Management Corporation

August 23, 2007

Ms. Lynne Dwyer
BlueGreen
570 W. Avenue 26, Suite 700
Los Angeles, CA 90065

VIA EMAIL AND MAIL
lynnedwyer@earthlink.net
mkammerer@starnetdial.net

Subject: Results of Biological Reconnaissance Survey and Constraints Analysis for the El Encanto/Azusa River Wilderness Park Project Site in the City of Glendora, California

Dear Ms. Dwyer:

A biological reconnaissance survey of the El Encanto/Azusa River Wilderness Park Project Site in the City of Azusa, California (hereafter referred to as the project site), was conducted by BonTerra Consulting on October 19, 2006. The purpose of the survey was to document existing biological resources on the site and evaluate potential biological constraints to development of the proposed wilderness park. The results of the field study, as well as a description of the biological resources within the San Gabriel Canyon region in general, are provided. In addition, site specific recommendations for potential enhancement, restoration, and/or creation of biological resources are provided.

LOCATION/DESCRIPTION

Regional

Land uses within the San Gabriel Canyon region are predominantly low intensity recreation and open space within public lands. The overwhelming majority of the open space surrounding the site is within the Angeles National Forest which is oriented toward recreational use. For the most part, unimproved roads, trails, campgrounds, and scattered cabins represent the most intense uses of the forest. Private land-holdings comprise a very small portion of the National Forest lands. South of this mountainous region lies the sprawling urban communities of the San Gabriel Valley. In general, the topography of the San Gabriel Canyon region is severe, consisting of steep-walled canyons and narrow ridgelines.

Project Site

The project site is located near the mouth of San Gabriel Canyon in the northern portion of the City of Azusa. The project site is surrounded by open space with a few scattered developments on adjacent parcels. The Angeles National Forest is situated immediately north of the site. The San Gabriel River flows through the project area and is crossed over by a vehicular bridge as a segment of State Highway 39 (San Gabriel Canyon Road). Land uses on the site include residential properties, the former El Encanto Restaurant and parking lot, equestrian facilities, and natural open spaces. Topography on the site ranges from flat mesas near the

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river and the parking area to steep hillsides on the southern portion of the site with elevations ranging from approximately 820 to 1,400 feet above mean sea level (msl). The project site is located within the United States Geological Survey (USGS) Azusa, California 7.5-minute quadrangle map.

SURVEY METHODS

Prior to the field survey, BonTerra Consulting conducted a search of available literature to identify special status plants, wildlife, and habitats known to occur in the vicinity of the site. The California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (CNPS 2005) and the California Department of Fish and Game (CDFG) California Natural Diversity Database (CDFG 2004) were reviewed.

The biological reconnaissance field survey was conducted on October 19, 2006. During the survey, the vegetation types on the site were described and evaluated for their potential to support special status plant and wildlife species. All plant species observed were recorded in field notes. Plant species were identified in the field or collected for subsequent identification. Plants were identified using keys in Hickman (1993) and Munz (1974). Taxonomy follows Hickman (1993) and current scientific data (e.g., scientific journals) for scientific and common names. Nomenclature for vegetation types generally follows that of *The Vegetation Classification and Mapping Program: List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database* (CDFG 2003).

VEGETATION

Regional

The variety of topography, soil types, slope aspects and water availability within the San Gabriel Canyon region create a range of physical habitats which support numerous plant species. Sensitive plant species occurring or potentially occurring within the San Gabriel Canyon area are discussed in the Special Status Resources section below. Many of these species, although often different in their growth form, prefer similar habitat characteristics and are often found in recurring assemblages to form plant communities. Ten major plant communities are found within the San Gabriel Canyon area. Plant communities within the region were classified using standard methodology and terminology. Most of the communities discussed below correspond directly with those listed in Holland's Preliminary Descriptions of the Terrestrial Natural Communities of California (1986 and 1992 update). Other communities are named based on dominant species within them and/or commonly used terminology. Brief descriptions and general locations of each major plant community present within the San Gabriel Canyon area are provided below, including bigcone spruce-canyon oak forest, white alder riparian forest, alluvial fan scrub, oak woodland, oak riparian forest, walnut woodland, southern willow scrub, chaparral, coastal sage scrub, and non-native grassland.

Big-cone spruce–canyon oak forest is an open to dense forest dominated by big-cone spruce (*Pseudotsuga macrocarpa*) 50 to 80 feet tall over a dense canopy of canyon oak (*Quercus chrysolepis*). It is found scattered throughout the canyon sides at elevations generally above 2,500 feet where it occupies rocky substrates. It commonly occurs in fairly small enclaves within chaparral.

White alder riparian forest is found along the upper reaches of many drainages in the San Gabriel Canyon area. This community is dominated by white alder (*Alnus rhombifolia*) which grow 30 to 40 feet high over a shrub understory. It typically grows along streams in bedrock-constrained, steep-sided canyons, resulting in a fairly narrow riparian corridor.

Alluvial fan scrub is a shrub community characterized by harsh substrates subject to episodic flooding and scouring. It is generally restricted to broad canyon outwashes, or alluvial washes. It is found at the San Gabriel Canyon mouth where it forms an open shrub vegetation within areas of bare, scoured ground in between.

Oak woodland is a plant community dominated by species of the genus *Quercus*. Within the San Gabriel Canyon area, this community includes coast live oak (*Quercus agrifolia*) which typically grows to heights of 20 to 40 feet and the somewhat smaller interior live oak and canyon oak, and forms either closed or open tree canopies. Understory vegetation varies from grassland in level areas to shrubs where topography is steeper. It may also intergrade with shrub communities. Within San Gabriel Canyon area, oak woodland is scattered throughout and most prevalent on north-facing slopes and in drainage bottoms.

Oak riparian forest is a highly related community found in the San Gabriel Canyon area as well. This community is also dominated by coast live oak (canyon oak at higher elevations). The primary difference between oak woodland and oak riparian forest is the greater availability of water in riparian situations which is expressed in a denser tree canopy and higher density of trees. There are also a greater number of hydrophytic (moisture favoring) plant species in the understory. Typical riparian trees such as western sycamore (*Platanus racemosa*) and willow (*Salix* spp.) occasionally occur as well. Oak riparian forest is best developed within broader, more level gradient drainages of the area.

Walnut woodland often intergrades with oak dominated woodlands or develops as a distinct community. This community is dominated by the southern California black walnut (*Juglans californica*) which grows 10 to 30 feet high. More often than not, walnut woodland in this area is highly intermixed with oak woodland and chaparral and large monotypic stands are uncommon.

Southern willow scrubs are found along widely scattered reaches of several drainages throughout the area. This community is dominated by species of willow (*Salix* spp.) which form nearly monotypic stands due to their dense growth with an occasional cottonwood. These stands generally reach 10 to 20 feet in height with little understory vegetation.

Chaparral is a shrub community composed of robust species. Within the area, a number of chaparral sub-communities are found according to their dominant plant species. These include chamise (*Adenostoma fasciculatum*), buck brush (*Ceanothus cuneatus* var. *cuneatus)*, ceanothus (*Ceanothus* spp.), scrub oak (*Quercus berberidifolia*), interior live oak (*Quercus wislizenii*) and even mosaics of these depending on mixes of species and elevation. These and other shrub species form dense vegetation covers growing five to ten feet in height. The development of chaparral is pronounced over large hillside areas throughout the San Gabriel Canyon area.

Coastal sage scrub is a shrubland community exhibiting less robust structure than chaparral. This plant community is dominated by California sagebrush (*Artemisia californica*), bush sunflower, (*Encelia californica*), white sage (*Salvia apiana*), black sage (*Salvia mellifera*), and California buckwheat (*Eriogonum fasciculatum*). It also forms dense stands which grow three to four feet in height. Within the area it is generally found in scattered patches which are highly

integrated with mixed chaparral. These are primarily located in the lower elevation hillsides of the San Gabriel Canyon area.

Non-native grassland is dominated by non-native annual grasses and forbs. These opportunistically growing species include brome grasses (*Bromus* spp.), wild oats (*Avena fatua*) and mustards (*Brassica* spp.). Characteristic of other parts of Southern California, this community became established as a result of livestock grazing and agriculture, as native vegetation is removed, sometimes by mechanical means, and replaced by more adventitious species. Non-native grassland is found throughout the area.

Project Site

The following vegetation types were identified specifically on the project site (see Exhibit 1):

- California Sagebrush Scrub
- Scalebroom Scrub
- Southern Mixed Chaparral
- California Annual Grassland
- Southern Willow Scrub
- Mule Fat Scrub
- Coast Live Oak Woodland

On the project site, scrub and chaparral vegetation types dominate the hillsides, and also occur in the alluvial areas west of San Gabriel Canyon Road. One annual grassland patch is located in the north-central portion of the site, and riparian habitats are present along the edges of the San Gabriel River, east of San Gabriel Canyon Road. Oak woodlands are intermixed with chaparral on the hillsides throughout the southern portion of the site.

Other areas identified on the site included:

- Open Water
- Ruderal
- Ornamental
- Disturbed
- Developed

WILDLIFE

Regional

Wildlife populations within the San Gabriel Canyon area are diverse and abundant due to the region's physiographic diversity, its relative isolation, and its location within and adjacent to the Angeles National Forest. The San Gabriel Canyon area is likely to support healthy populations of a diverse assortment of invertebrate species based on the undisturbed nature and variety of habitats. Fair numbers of amphibians are expected to be present primarily due to the aquatic and semi-aquatic habitats provided within the numerous drainages and several reservoirs.

Reptile abundance and diversity are expected to be characteristic for the habitats present, although areas closer to urban development along the southern boundaries of the area likely to be suppressed due to edge effect.

Bird use, diversity, and abundance within the San Gabriel Canyon area is expected to be high for several reasons. In general, this area provides habitat for a wide range of shrubland, woodland, forest, and riparian species that occur at varying elevations. In particular, the riparian habitats found in drainages throughout this area provide essential habitat for riparian-obligate and riparian-favoring species. In addition, a number of migratory birds no doubt use this area to move across the northern portion of the Los Angeles Basin. These include a wide spectrum of birds including songbird, waterfowl, and raptorial species.

Similarly, the mammalian fauna is expected to be very diverse and abundant. Perhaps, more influential on this taxa than the diversity of habitats is the inclusion of this area within and adjacent to the vast open space of the Angeles National Forest. Virtually all mammalian species found in the forest (with the exception of bighorn sheep) are expected to be found in this area. Frequent observations of black bear and mountain lion in foothill communities attest to the range of species expected.

Wildlife movement within the San Gabriel Canyon area takes on two major forms. First, due to the extreme intervening topography it is logical to expect considerable movement of wildlife up and down the many sizeable drainages which course through this area to connect the forest interior with foothill areas. In large part, the larger the watershed of the drainages, the greater the volume of movement. Consequently, this type of movement occurs on a seasonal and more frequent basis, particularly for large mobile mammals whose full range of habitat needs are typically met over broad areas.

The second major type of movement occurs across the flanks of the foothills and lower mountains, in an east-west direction. Particularly for riparian-favoring migratory birds, a corridor linking lower elevational riparian habitats in the San Gabriel Canyon area is of high use and importance. In addition to providing essential habitat for resident riparian birds, this area contains some of the best developed riparian habitat for birds which are seasonal visitors to cismontane Los Angeles County.

Project Site

Wildlife populations on the site are expected to be representative of the habitat types on site as described above for the larger Canyon area. Due to the diversity of plant communities and valuable river resources, underdeveloped portions of the site are expected to be particularly abundant in wildlife diversity.

SPECIAL STATUS RESOURCES

Sensitive biological resources are habitats or individual species that have been given special recognition by federal, state, or local conservation agencies and organizations as endangered, threatened, rare, or otherwise sensitive; this is principally due to the species' declining or limited population sizes, usually resulting from habitat loss. Watch lists of such resources are maintained by the California Department of Fish and Game (CDFG), the United States Fish and Wildlife Service (USFWS), and special groups such as the California Native Plant Society (CNPS). The following sections indicate the habitats as well as plant and animal species present, or potentially present within the San Gabriel Canyon area or the project site, that have

been afforded special recognition. Database searches included the Azusa, Glendora, Baldwin Park, and San Dimas U.S. Geological Survey quadrangles.

Regional

The San Gabriel Canyon area supports several habitat types considered sensitive by resource agencies, namely the CDFG [California Natural Diversity Database (CNDDB), 2006], because of their scarcity and their being habitat for a number of state and federally listed endangered, threatened, and rare vascular plants, as well as several sensitive bird and reptile species. These communities include: oak riparian woodland, walnut woodland, southern willow scrub, coastal sage scrub and alluvial fan scrub. These communities, or closely related designations, are considered highest-inventory priority communities by the CDFG, indicating that they are experiencing a decline throughout their range. The array and composition of these communities has been discussed earlier in this report (see Vegetation, above).

Sensitive species include those listed, or candidates for listing by the USFWS, CDFG, and CNPS (particularly List 1A, 1B, and 2). The Special Status Species Tables below lists those species which have been recorded within the San Gabriel Canyon area as well as those reasonably expected to occur. The tables include locations of special status species observed, recorded in the CNDDB, or reported in previous documentation as observed within or in the immediate vicinity of the area. Additional species, such as native oak, walnut, or sycamore trees may be protected under local ordinances but are not included in these tables.

SPECIAL STATUS PLANT SPECIES OCCURRING OR POTENTIALLY OCCURRING WITHIN THE SAN GABRIEL CANYON AREA

Vascular Plants					
Scientific Name	**Common Name**	**Agency Listing Status**	**CNPS Listing Status**	**Preferred Habitat**	**Location/Records**
Ferns and Fern Allies					
Ophioglossaceae (Adder's-tongue Family)					
Botrychium crenulatum	scalloped moonwort		1B	Bogs and fens, lower montane coniferous forest, meadows, freshwater marshes and swamps.	Potential where habitat occurs
Selaginellaceae (Spike-Moss Family)					
Selaginella cinerascens	ashy spike-moss		4	Dry slopes on mesas in coastal sage scrub and chaparral.	Potential where habitat occurs
Thelypteridaceae (Thelypteris Family)					
Thelypteris puberula var. *sonorensis*	Sonoran maiden fern		2	Meadows and seeps.	Monrovia Canyon (1967); Roberts Cyn. (1931); Santa Anita Cyn.
Angiosperms (Dicotyledons)					
Apiaceae (Carrot Family)					
Perideridia pringlei	adobe yampah		4	Chaparral, cismontane woodland, coastal scrub.	Potential where habitat occurs

SPECIAL STATUS PLANT SPECIES (Continued) OCCURRING OR POTENTIALLY OCCURRING WITHIN THE SAN GABRIEL CANYON AREA

Vascular Plants					
Scientific Name	**Common Name**	**Agency Listing Status**	**CNPS Listing Status**	**Preferred Habitat**	**Location/Records**
Asteraceae (Sunflower Family)					
Baccharis plummerae ssp. *plummerae*	Plummer's baccharis		4	Chaparral, broad-leaved upland forest, cismontane woodland, sage scrub. Associated with rocky areas.	Potential where habitat occurs
Erigeron breweri var. *bisanctus*	pious daisy		1B	Chaparral, lower montane coniferous forest, open dry slopes and washes.	San Antonio Cyn. (1933); near Glendora Wilderness Park, Big Dalton Dam (1989)
Helianthus nuttallii ssp. *parishii*	Los Angeles sunflower		1A	Marshes and swamps (coastal salt and freshwater)	Oak Knoll (1903)
Hemizonia parryi ssp. *australis*	southern tarweed		1B	Coastal salt marsh (estuaries), valley and foot-hill grassland vernally mesic), vernal pools.	Altadena, near Los Angeles (1951)
Senecio aphanactis	rayless ragwort		2	Cismontane woodland, coastal scrub, drying alkaline flats	Potential where habitat occurs
Senecio ganderi	Gander's ragwort	SR	1B	Chaparral (burned areas, gabbroic outcrops).	Potential where habitat occurs
Berberidaeeae (Barberry Family)					
Berberis nevinii	Nevin's barberry	FE, SE	1B	Sage scrub, chaparral, cismontane woodland, riparian scrub; sandy or gravelly substrate.	In vicinity of San Antonio Wash (198X)
Brassicaceae (Mustard Family)					
Caulanthus simulans	Payson's jewelflower		4	Burned areas, streambeds, rocky, steep slopes and other disturbed sites, below 6,500 feet.	Potential where habitat occurs
Caulanthus stenocarpus	slender-pod jewelflower	SR		Generally found after burns on dry, open slopes in chaparral between 1,000 and 3,000 feet.	Potential where habitat occurs
Lepidium virginicum var. *robinsonii*	Robinson's pepper grass		1B	Chaparral, coastal scrub.	Between Santa Anita Cyn. and Sierra Madre (1928); Tanbark Flats (1936)
Rorippa gambelli	Gambel's water cress	FE, ST	1B	Freshwater/brackish marsh.	Potential where habitat occurs
Crassulaceae (Stonecrop Family)					
Dudleya cymosa ssp. *crebrifolia*	San Gabriel River dudleya		1B	Chaparral.	Fish Cyn., from Gaging Station upstream to Large Falls (1986); San Gabriel Cyn.

SPECIAL STATUS PLANT SPECIES (Continued) OCCURRING OR POTENTIALLY OCCURRING WITHIN THE SAN GABRIEL CANYON AREA

Vascular Plants					
Scientific Name	**Common Name**	**Agency Listing Status**	**CNPS Listing Status**	**Preferred Habitat**	**Location/Records**
Dudleya densiflora	San Gabriel Mountains dudleya		1B	Cliffs, cyn. walls in association with chaparral, coastal sage scrub. Succulent perennial.	Mouth of Fish Cyn. at the San Gabriel River (1986); Fish Cyn, 1 mi. downstream of Large Falls (1989); Roberts Cyn. (1989); San Gabriel Cyn. (1989); near San Gabriel Dam (1985)
Dudleya multicaulis	many-stemmed dudleya		1B	Sage scrub, valley and foothill grassland; heavy clay soils or rock outcrops; below 2,000 feet.	Many records throughout area (CNDDB)
Ericaceae (Heath Family)					
Arctostaphylos peninsularis ssp. *peninsularis*	peninsula manzanita		2	Chaparral; 650 to 3,000 ft.	Potential where habitat occurs
Fabaceae (Legume Family)					
Astragalus brauntonii	Braunton's milk-vetch	FE	1B	Sage scrub, chaparral, valley and foothill grassland, closed cone coniferous forest; limestone endemic, carbonate soils, recent burns and disturbed areas.	Monrovia, 0.5 mi. N of Hillcrest Blvd. at Myrtle Ave (1986); S of Clamshell Cyn., N of Monrovia (1998), E of debris basin (1996)
Astragalus pachypus var. *jaegeri*	Jaeger's milk-vetch		1B	Chaparral, coastal scrub, valley and foothill grasslands/sandy or rocky, and cismontane woodland.	Potential where habitat occurs
Juglandaceae (Walnut Family)					
Juglans californica var. *californica*	Southern California black walnut		4	Sage scrub, chaparral, cismontane woodland; often in association with oaks/oak woodland; steep hillsides with northern exposures; deep alluvial soils.	Base of San Gabriel foothills, Los Pinetos Springs (1999)
Hydrophyllaceae (Waterleaf Family)					
Phacelia suaveolens ssp. *keckii*	Santiago peak phacelia		1B	Chaparral, closed-cone coniferous forests.	Potential where habitat occurs
Lamiaceae (Mint Family)					
Lepechinia fragrans	fragrant pitcher sage		4	Chaparral below 3,000 ft., perennial herb.	Potential where habitat occurs
Monardella hypoleuca ssp. *lanata*	felt-leaved monardella		1B	Chaparral between 980 and 3,280 feet.	Potential where habitat occurs

SPECIAL STATUS PLANT SPECIES (Continued) OCCURRING OR POTENTIALLY OCCURRING WITHIN THE SAN GABRIEL CANYON AREA

Vascular Plants					
Scientific Name	**Common Name**	**Agency Listing Status**	**CNPS Listing Status**	**Preferred Habitat**	**Location/Records**
Monardella macrantha ssp. *hallii*	Hall's monardella		1B	Broadleaved upland forest, chaparral, lower montane coniferous forest, cismontane woodland, valley and foothill grass-land, dry slopes and ridges with openings.	Sunset Ridge Road, NW of Spruce Cyn. and ~1.5 mi. S of Sunset Peak (1991)
Monardella virdis ssp. *saxicola*	rock monardella		4	Dry rock places in chaparral, yellow pine forest, 1,700-6,000 ft. perennial herb.	San Dimas Canyon; Upper Big Dalton Canyon
Scutellaria bolanderi ssp. *austromontana*	southern skullcap		1B	Chaparral, cismontane woodland, lower montane coniferous forest; elevation approximately 300 feet.	Potential where habitat occurs
Malvaceae (Mallow Family)					
Malacothamnus davidsonii	Davidson's bush mallow		1B	Sage scrub, chaparral, riparian woodland.	Potential where habitat occurs
Sidalcea neomexicana	Salt spring checkerbloom		2	Alkali playas, brackish marshes, chaparral, coastal scrub, lower montane coniferous forest, desert scrub.	Claremont (1909)
Orobanchaceae (Broomrape Family)					
Orobanche valida ssp. *valida*	rock creek broomrape		1B	Chaparral, pinyon juniper woodland, on slopes of loose decomposed granite, parasitic on various chaparral shrubs.	W ridge of Lookout Mt., NE of Mt. Baldy station (1979)
Polemoniaceae (Phlox Family)					
Linanthus concinnus	San Gabriel linanthus		1B	Lower and upper montane coniferous forest, dry rock slopes often in Jeffrey pine/cyn. oak forest.	Icehouse Cyn., San Antonio Hills (1917); Mt. Markham (1921); Mt. Lowe summit (191X)
Polygonaceae (Buckwheat Family)					
Chorizanthe parryi var. *parryi*	Parry's spineflower		3	Openings/clearings in coastal or desert sage scrub, chaparral or interface; dry slopes or flat ground; sandy soils.	Thompson Creek Dam (1932); Mt. Lowe (1902); Arroyo Seco (1920)
Dodecahema leptoceras	slender-horned spineflower	FE, SE	1B	Alluvial sage scrub vegetation on sandy flood-deposited rivers and washes.	Rubio Wash, Altadena (1920); Santa Anita Wash, S base of San Gabriel Mts. (1920); W fork San Gabriel River (1921)
Primulaceae (Primrose Family)					
Adrosace elongata ssp. *acuta*	California androsace		4	Chaparral, cismontane woodland, coastal scrub.	Potential where habitat occurs

SPECIAL STATUS PLANT SPECIES (Continued) OCCURRING OR POTENTIALLY OCCURRING WITHIN THE SAN GABRIEL CANYON AREA

Vascular Plants					
Scientific Name	**Common Name**	**Agency Listing Status**	**CNPS Listing Status**	**Preferred Habitat**	**Location/Records**
Rubiaceae (Madder Family)					
Galium grande	San Gabriel bedstraw		1B	Cismontane woodland, chaparral, broadleafed upland forest, lower montane coniferous forest, open chaparral and low open oak forest, on rocky slopes.	Neat Chantry Flat and also near upper Winter Creek trailhead (1979); Sawpit Cyn. (1910); between Monrovia Cyn. and Fish Cyn. (1919); Chantry Flat (1985)
Saxifragaceae (Saxifrage Family)					
Boykinia rotundifolia	round-leaved boykinia		4	Chaparral, riparian woodland, streambanks.	Potential where habitat occurs
Scrophulariaceae (Figwort Family)					
Castilleja gleasonii	Mount Gleason Indian paintbrush	SR	1B	Lower montane coniferous forest, open flats or slopes with granitic soil, restricted to San Gabriel Mts.	Potential where habitat occurs
Fremontodendron mexicanum	Mexican flannelbrush	FE, SR	1B	Closed-cone coniferous forest, chaparral, cismontane woodland, creeks or dry cyns., gabbro soils.	Potential where habitat occurs
Angiosperms (Monocotyledons)					
Liliaceae (Lily Family)					
Brodiaea filifolia	thread-leaved brodiaea	FT, SE	1B	Sage scrub, valley/foothill grassland, cismontane woodland; vernal pools (clay soils).	Glendora, 1 mi. N of Goddard Jr. High School (1991); San Dimas, between Wildwood and Morgan Cyns. (1990)
Calochortus clavatus var. *gracilis*	slender mariposa lily		1B	Chaparral, especially in foothill cyns.; generally found in shade.	Evey Cyn., just W of jct w/ San Antonio Cyn. (1959); W fork of San Gabriel River
Calochortus palmeri var. *palmeri*	Palmer's mariposa lily		1B	Meadows, vernally moist places in chaparral and yellow pine forest at elevation from 3,500 to 6,500 feet.	Potential where habitat occurs
Calochortus plummerae	Plummer's mariposa lily		1B	Variety of Southern California plant communities, including sage scrub, valley and foothill grassland, yellow pine forest; dry, rocky or sandy sites, granitic or alluvial soil; to 4,800 feet.	Near Evey Cyn. (1935); Claremont, Live Oak Cyn. (1928); Johnston Peak (1949); many other records on CNDDB
Calochortus weedii var. *intermedius*	intermediate flowered mariposa lily		1B	Chaparral, coastal scrub, valley and foothill grasslands.	On summit of hills near Rancho Santa Ana Botanic Garden (1927); Elephant Hill (1991)

SPECIAL STATUS PLANT SPECIES (Continued) OCCURRING OR POTENTIALLY OCCURRING WITHIN THE SAN GABRIEL CANYON AREA

Vascular Plants					
Scientific Name	**Common Name**	**Agency Listing Status**	**CNPS Listing Status**	**Preferred Habitat**	**Location/Records**
Lilium humboldtii ssp. *ocellatum*	ocellated Humboldt lily		4	Openings in chaparral, cismontane woodland, lower montane coniferous forest; below 5,500 feet.	Potential where habitat occurs
Lilium parryi	lemon lily		1B	Lower and upper montane coniferous forest, meadows and seeps, riparian forest, shady edges of streams.	USGS 7.5' Mt. Baldy quadrangle, location info suppressed by CNDDB (1993)
Poaceae (Grass Family)					
Calamagrostis densa	dense reedgrass		1B	On dry hills in chaparral and coniferous forests on gabbroic soils and disturbed sites between 1,300 and 4,000 feet.	Potential where habitat occurs
Muhlenbergia californica	California muhly		1B	Coastal sage, chaparral, lower montane coniferous forest, meadows near streams or seeps.	Red Hill, E of Upland (1916); Mt. Lowe (1899)

Legend:

FE Federally Listed as Endangered
FT Federally Listed as Threatened
FPE Federally Proposed as Endangered
FPT Federally Proposed as Threatened
FPD Federally Proposed for Delisting

California Native Plant Society (CNPS) Lists
1A Presumed extinct in California.
1B Rare, threatened, or endangered throughout their range
2 Rare, threatened, or endangered in CA, but more common in other states.
3 Plant species for which additional info is needed before rarity can be determined.
4 Species of limited distribution in California (i.e., naturally rare in the wild), but whose existence does not appear to be susceptible to threat.

SE State Listed as Endangered
ST State Listed as Threatened
SCE State Candidate for Endangered
SCT State Candidate for Threatened
SP State Protected
SFP State Fully Protected
SR State Rare
CSC California Special Concern Species

SPECIAL STATUS WILDLIFE SPECIES OCCURRING OR POTENTIALLY OCCURRING WITHIN THE SAN GABRIEL CANYON AREA

Wildlife				
Scientific Name	**Common Name**	**Agency Listing Status**	**Preferred Habitat**	**Location**
Invertebrates				
Order Coleoptera (Beetles)				
Paleoxenus dohrni	Dohrn's elegant eucnemid beetle		Transition zone forests, higher elevations, on incense cedar.	Potential where habitat occurs
Order Lepidoptera (Butterflies and Moths)				
Incisalia mossii hikupa	San Gabriel Mountains elfin butterfly		Rocky outcrops, cliffs where stonecrop grows.	Potential where habitat occurs
Plejebus saepiolus	San Gabriel Mountains blue butterfly		Forest openings, at streamsides, in meadows and alpine fell-fields, from cool coastal areas to upper elevations of the California mt. ranges.	Potential where habitat occurs
Order Trichoptera (Caddisflies)				
Diplectrona californica	California diplectron caddisfly		Streams, lakes, and ponds.	Potential where habitat occurs
Vertebrates - Fish				
Cyprinidae (Minnow Family)				
Gila orcutti	arroyo chub	CSC	Slow water sections of streams with mud or sand substrates.	E fork of San Gabriel River and Cattle Cyn. Creek (1999); N & W forks San Gabriel River, also Big Mermaids Cyn. Creek and Bear Creek (1999)
Rhinichthys oscultus ssp. 3	Santa Ana speckled dace	CSC	Requires permanent flowing streams with summer water temperatures of 17 to 20□C, shallow cobble and gravel.	Potential where habitat occurs
Catostomidae (Sucker Family)				
Catostomus santaanae	Santa Ana sucker	FE	Sand, rubble, boulder bottoms; cool, clear water; feed on algae.	E fork of San Gabriel River and Cattle Cyn. Creek (1999); N & W forks San Gabriel River, also Big Mermaids Cyn. Creek and Bear Creek (1999); Fish Cyn. (1986)
Vertebrates - Amphibians				
Salamandridae (Newt Family)				
Taricha torosa torosa	coast range newt	CSC	Moist woodlands.	Potential where habitat occurs

SPECIAL STATUS WILDLIFE SPECIES (Continued) OCCURRING OR POTENTIALLY OCCURRING WITHIN THE SAN GABRIEL CANYON AREA

Wildlife				
Scientific Name	**Common Name**	**Agency Listing Status**	**Preferred Habitat**	**Location**
Plethodontidae (Lungless Salamander Family)				
Ensatina eschscholtzii croceator	yellow-blotched salamander	CSC	Coniferous habitats, montane hardwood habitats, and mixed chaparral.	Potential where habitat occurs
Pelobatidae (Spadefoot Toad Family)				
Scaphiopus hammondii	western spadefoot	CSC, SP	Prefers relatively open areas in lowland grasslands, chaparral, and pine-oak woodlands, areas of sandy or gravelly soil in alluvial fans, washes, and floodplains.	Potential where habitat occurs
Bufonidae (True Toads)				
Bufo microscaphus californicus	arroyo southwestern toad	FE, CSC, SP	Washes/streams, sandy banks, grown to willows, cottonwoods or sycamores; riparian habitats of semi-arid areas, small cobbly streambeds.	Potential where habitat occurs
Ranidae (True Frog Family)				
Rana aurora draytonii	California red-legged frog	FT, CSC, SP	Humid forests, woodlands, grasslands and streamsides, especially where cattails and other plants provide good cover.	Potential where habitat occurs
Rana boylii	foothill yellow-legged frog	CSC, SP	Stream, river of woodland, chaparral and forest.	Potential where habitat occurs
Rana muscosa	mountain yellow-legged frog	FPE, CSC, SP	Sunny riverbanks, meadows, streams, isolated pools, lake borders.	Potential where habitat occurs
Vertebrates - Reptiles				
Emydidae (Box and Water Turtle Family)				
Clemmys marmorata pallida	southwestern pond turtle	CSC, SFP	Ponds, marshes, rivers, streams, irrigation ditches.	USGS 7.5' Azusa quadrangle (1992), location suppressed; Glendora quad, date and location suppressed
Gekkonidae (Gecko Family)				
Coleonyx variegatus abbotti	San Diego banded gecko		Rocky tracts, cyn. walls, and sand dunes in coastal sage and chaparral	Potential where habitat occurs
Xantusiidae (Night Lizard Family)				
Xantusia riversiana	island night lizard	FT, SP	Coastal strand, sand dunes, chaparral and woodlands.	Potential where habitat occurs
Iguanidae (Iguanid Lizard Family)				
Phrynosoma coronatum frontale	California horned lizard	CSC, SP	Scrubland, grassland, coniferous forest, broad-leaf woodlands.	Potential where habitat occurs

SPECIAL STATUS WILDLIFE SPECIES (Continued)
OCCURRING OR POTENTIALLY OCCURRING
WITHIN THE SAN GABRIEL CANYON AREA

Wildlife				
Scientific Name	**Common Name**	**Agency Listing Status**	**Preferred Habitat**	**Location**
Phrynosoma coronatum blainvillei	San Diego coast horned lizard	CSC, SP	Valley-foothill hardwood, conifer, and riparian habitats, pine-cypress, juniper and annual grassland habitats below 6,000 feet, open country, especially sandy areas, washes, flood plains, and windblown deposits.	Top of Mt. Wilson (197X); 0.5 mi. W of Santa Anita Cyn. (197X); Thompson Creek (197X); Eaton Cyn. Park (1969); Heaton Flat, E fork of San Gabriel River
Teiidae (Whiptail Lizard Family)				
Cnemidophorus hyperythrus beldingi	Belding's orange-throated whiptail	CSC, SP	Valley-foothill hardwood forests, conifer, mixed conifer, and desert scrub habitats.	Potential where habitat occurs
Cnemidophorus tigris multiscutatus	coastal western whiptail		Arid and semi-arid desert to open woodlands, where vegetation is sparse.	Potential where habitat occurs
Anniellidae (Legless Lizard Family)				
Anniella pulchra pulchra	silvery legless lizard	CSC	Several habitats but especially in coastal dune, valley-foothill, chaparral, and coastal scrub habitats.	Potential where habitat occurs
Boidae (Boa Family)				
Charina bottae umbratica	southern rubber boa	ST, SP	Grassland, broken chaparral, woodland and forest, under rock bark of dead trees.	Potential where habitat occurs
Colubridae (Colubrid Snake Family)				
Diadophis punctatus modestus	San Bernardino ring-neck snake		Open, relatively rocky areas within valley-foothill, mixed chaparral, and annual grass habitats.	Big Dalton Cyn. and Glendora Mt. Rd.
Lampropeltis zonata parvirubra	San Bernardino mountain kingsnake	CSC	Moist woods, coniferous forests, woodland and chaparral.	Glendora, San Dimas, Little Dalton Cyn., and Big Dalton Cyn.
Lampropeltis zonata pulchra	San Diego mountain kingsnake	CSC, SP	Moist woods, coniferous forests, woodland and chaparral.	Glendora, San Dimas, Little Dalton Cyn., and Big Dalton Cyn.
Salvador hexalepis virgultea	coast patch-nosed snake	CSC	Coastal chaparral, desert scrub, washes, sandy flats, and rocky areas. Barren creosote bush desert flats. Sagebrush semi-deserts; sea level to 7,000 feet.	Potential where habitat occurs
Thamnophis hammondii	two-striped garter snake	CSC, SP	Riparian and freshwater marshes with perennial water.	San Gabriel River below Morris Dam
Vertebrates - Birds				
Ardeidae (Heron, Egret, and Bittern Family)				
Ixobrychus exilis hesperis	western least bittern	CSC	Emergent wetlands of cattails and tules.	Potential where habitat occurs

SPECIAL STATUS WILDLIFE SPECIES (Continued) OCCURRING OR POTENTIALLY OCCURRING WITHIN THE SAN GABRIEL CANYON AREA

Wildlife				
Scientific Name	**Common Name**	**Agency Listing Status**	**Preferred Habitat**	**Location**
Phalacrocoracidae (Cormorant Family)				
Phalacrocorax auritus	double-crested cormorant	CSC	Coasts, bays, lakes, and rivers.	Potential where habitat occurs
Accipitridae (Hawks, Kites, Harriers and Eagle Family)				
Accipiter cooperi	Cooper's hawk	CSC	Open woodlands especially riparian woodland.	Potential where habitat occurs
Accipiter striatus	sharp-shinned hawk	CSC	Woodlands; forages over chaparral and other scrublands; prefers riparian habitats and north-facing slopes, with plucking perch sites.	Potential where habitat occurs
Aquila chrysaetos	golden eagle	CSC, SFP	Mountains, deserts, and open country; prefer to forage over grasslands, deserts, savannahs and early successional stages of forest and shrub habitats.	Big Dalton drainage area
Buteo swainsoni	Swainson's hawk	ST	Plains, ranges, open hills, sparse trees.	Potential where habitat occurs
Circus cyaneus	northern harrier	CSC	Coastal salt marshes, freshwater marshes, grasslands, and agricultural fields; occasionally forages over open desert and brushlands.	Potential where habitat occurs
Elanus leucurus	white-tailed kite	SFP	Grasslands with scattered trees, near marshes, along highways.	Potential where habitat occurs
Haliaeetus leucocephalus	bald eagle	FT, FPD, CSC, SE	Lakes, reservoirs, rivers, offshore islands, and some rangelands and coastal wetlands in Southern California.	Potential where habitat occurs
Pandion haliaetus	osprey	CSC	Rivers, lakes, and coasts, mixed conifer.	Potential where habitat occurs
Falconidae (Falcon Family)				
Falco columbarius	merlin	CSC	Coastlines, wetlands, woodlands, agricultural fields, and grasslands.	Potential where habitat occurs
Falco mexicanus	prairie falcon	CSC	Grasslands, savannahs, rangeland, agricultural fields, and desert scrub; often uses sheltered cliff ledges for cover.	Potential where habitat occurs
Phasianidae (Quail, Pheasant, and Grouse Family)				
Oreortyx picta	mountain quail	CSC	Found throughout state in major montane habitats. Found seasonally in open, brushy stands of conifer and deciduous forest and woodland, and chaparral.	Potential where habitat occurs

SPECIAL STATUS WILDLIFE SPECIES (Continued) OCCURRING OR POTENTIALLY OCCURRING WITHIN THE SAN GABRIEL CANYON AREA

Wildlife				
Scientific Name	**Common Name**	**Agency Listing Status**	**Preferred Habitat**	**Location**
Cuculidae (Cuckoos and Roadrunner Family)				
Coccyzus americanus occidentalis	western yellow-billed cuckoo	SE	Riverine woodlands, thickets, and farms.	Near Cattle Cyn. (1931)
Strigidae (True Owl Family)				
Asio otus	long-eared owl	CSC	Riparian and live oak woodlands.	Potential where habitat occurs
Athene cunicularia hypugea	burrowing owl	CSC	Dry grasslands, desert habitats, and open pinyon-juniper and ponderosa pine woodlands below 5,300 feet elevation. Prefers berms, ditches, and grasslands adjacent to rivers, agricultural, and scrub areas.	Potential where habitat occurs
Strix occidentalis occidentalis	California spotted owl	CSC	Oak and oak-conifer habitats.	Potential where habitat occurs
Apodidae (Swift Family)				
Chaetura vauxi	Vaux's swift	CSC	Redwood and douglas fir habitats.	Big Dalton Cyn. area (1993)
Cypseloides niger	black swift	CSC	Steep, rocky, often moist cliffs and crevice or caves on sea cliffs, deep cyns.	Sturtevant Falls, Santa Anita Cyn. (1986); Wolfskill Falls, near Mt. Baldy (1986).
Tyrannidae (Tyrant Flycatcher Family)				
Empidonax traillii	willow flycatcher	SE	Wet meadow and montane riparian habitats, river valleys and large mt. meadows.	Potential where habitat occurs
Empidonax traillii extimus	southwestern willow flycatcher	FE	Low elevational sites: Riparian woodlands that contain water and low growing willow thickets. High elevational sites: Large, flat, wet meadows that contain patches of willow trees.	Potential where habitat occurs
Alaudidae (Lark Family)				
Eremophila alpestris actia	California horned lark	CSC	Open habitats, grasslands along the coast, deserts near sea level to alpine dwarf shrub habitat, uncommonly in coniferous and chaparral habitats.	Potential where habitat occurs
Hirundinidae (Swallow Family)				
Progne subis	purple martin	CSC	Towns, farms, open or semi-open country.	Potential where habitat occurs
Riparia riparia	bank swallow	ST	Riparian and other lowland habitats W of the desert.	Potential where habitat occurs

SPECIAL STATUS WILDLIFE SPECIES (Continued) OCCURRING OR POTENTIALLY OCCURRING WITHIN THE SAN GABRIEL CANYON AREA

Wildlife				
Scientific Name	**Common Name**	**Agency Listing Status**	**Preferred Habitat**	**Location**
Troglodytidae (Wren Family)				
Campylorhynchus brunneicapillus couesi	coastal cactus wren	CSC	Coastal sage scrub, vegetation with thickets of prickly pear or cholla cactus.	Potential where habitat occurs
Muscicapidae (Kinglets, Gnatcatchers, Thrushes, and Babbler Family)				
Polioptila californica californica	California gnatcatcher	FT, CSC	Coastal sage scrub vegetation below 2,500 feet elevation in Riverside County and generally below 1,000 feet elevation along coastal slopes; generally avoids steep slopes and dense vegetation for nesting.	Arcadia (1928); Indian Hill, Claremont (1918); near Bio Field Station/Rancho Santa Ana Botanic Garden (1994)
Laniidae (Shrike Family)				
Lanius ludovicianus	loggerhead shrike	CSC	Open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches.	Potential where habitat occurs
Vireonidae (Vireo Family)				
Vireo bellii pusillus	least Bell's vireo	FE, SE	Perennial and intermittent streams with low, dense riparian scrub and riparian woodland habitats below 2,000 ft.; nests primarily in willows and forages in the riparian and occasionally in adjoining upland habitats.	Mouth of Fish Cyn. (1974); mouth of Tassel Cyn. (1975)
Emberizidae (Wood Warblers, Tanagers, Buntings, and Blackbird Family)				
Agelaius tricolor	tricolored blackbird	CSC	Freshwater marshes and riparian scrub.	Potential where habitat occurs
Aimophila ruficeps canescens	Southern California (ashy) rufous-crowned sparrow	CSC	Generally, steep, rocky areas within coastal sage scrub and chaparral, often with scattered bunches of grass; prefers relatively recently burned areas.	Potential where habitat occurs
Amphispiza belli	Bell's sparrow	CSC	Dense, dry chamise chaparral and coastal slopes of coastal sage scrub.	Potential where habitat occurs
Dendroica petechia brewsteri	yellow warbler	CSC	Riparian woodlands, montane chaparral, and mixed conifer habitats.	Big Dalton Cyn. (1993)
Icteria virens	yellow-breasted chat	CSC	Riparian woodlands with a thick understory.	Potential where habitat occurs
Piranga rubra	summer tanager	CSC	Desert riparian areas dominated by cottonwoods and willows.	Potential where habitat occurs
Vermivora virginiae	Virginia's warbler	CSC	Arid, shrubby, mixed conifer, pinyon-juniper, montane chaparral	Recent record (no date) of a pair successfully breeding near Blue Ridge

SPECIAL STATUS WILDLIFE SPECIES (Continued) OCCURRING OR POTENTIALLY OCCURRING WITHIN THE SAN GABRIEL CANYON AREA

Wildlife				
Scientific Name	**Common Name**	**Agency Listing Status**	**Preferred Habitat**	**Location**
Mammals				
Phyllostomidae (Leaf-Nosed Bat Family)				
Macrotus californicus	California leaf-nosed bat	CSC	Desert riparian, desert wash, desert scrub, desert succulent shrub, alkali desert scrub, and palm oasis. Roosts in tunnels, caves and possible buildings and bridges.	Potential where habitat occurs
Vespertilionidae (Evening Bat Family)				
Antrozous pallidus	pallid bat	CSC	Nests in dry, rocky habitats/caves, crevices in rocks, arid habitats including deserts, chaparral, and scrublands.	Potential where habitat occurs
Corynorhinus (Plecotus) townsendii pallescens	pale big-eared bat	CSC	Caves, tunnels, or other structures for roosting, vegetation and mesic edges for feeding, extremely sensitive to roosting site disturbance, maternity roosts are in warm places.	Potential where habitat occurs
Corynorhinus (Plecotus) townsendii townsendii	Townsend's big-eared bat	CSC	Caves, mine tunnels, and buildings.	Potential where habitat occurs
Myotis ciliolabrum	small-footed bat	CSC	Primarily found in relatively arid wooded and brushy uplands near water from sea level to 8,900 feet.	Potential where habitat occurs
Myotis evotis	long-eared bat	CSC	Occurs along entire coast.	Potential where habitat occurs
Myotis thysanodes	Fringed myotis		Grassland/oak savannah, cottonwood-southern willow scrub, riparian scrub, oak woodland, open riverbed and bank.	Potential where habitat occurs
Myotis volans	long-legged myotis		Most common in woodland and forest habitats above 4,000 feet; also forages in chaparral, coastal scrub, shrub habitats from sea level to 11,400 feet.	Potential where habitat occurs
Myotis yumanensis	Yuma myotis	CSC	Open forests and woodlands with water are optimal but uses a variety of habitats.	Potential where habitat occurs

SPECIAL STATUS WILDLIFE SPECIES (Continued) OCCURRING OR POTENTIALLY OCCURRING WITHIN THE SAN GABRIEL CANYON AREA

Wildlife				
Scientific Name	**Common Name**	**Agency Listing Status**	**Preferred Habitat**	**Location**
Molossidae (Free-Tailed Bat Family)				
Eumops perotis californicus	western mastiff bat	CSC	Primarily arid lowlands, especially deserts. Open, semi-arid to arid habitats including conifer and deciduous woodlands, coastal scrub, annual and perennial grasslands, palm oases, chaparral, desert scrub, and urban.	Potential where habitat occurs
Leporidae (Hares and Rabbit Family)				
Lepus californicus bennettii	San Diego black-tailed jackrabbit	CSC	Open brushlands and scrub habitats between sea level and 4,000 feet elevation.	Potential where habitat occurs
Heteromyidae (Pocket Mice and Kangaroo Rat Family)				
Chaetodipus fallax	San Diego pocket mouse	CSC	Sandy herbaceous areas, usually in association with rocks or coarse gravel, sagebrush, scrub, annual grassland, chaparral and desert scrubs.	Historic records from alluvial scrub areas near lower San Antonio Creek
Dipodomys merriami parvus	San Bernardino Merriam's kangaroo rat	FE, CSC	Alluvial fan scrub.	Potential where habitat occurs
Perognathus longimembris brevinasus	Los Angeles pocket mouse	CSC	Coastal sage scrub, and grasslands, desert cactus, creosote bush and sagebrush habitats.	Potential where habitat occurs
Muridae (Mice, Rats, and Vole Family)				
Neotoma lepida intermedia	San Diego desert woodrat	CSC	Chaparral, coastal sage scrub, and pinyon-juniper woodland.	Several records from different localities in San Gabriel Cyn. and Azusa
Onychomys torridus ramona	southern grasshopper mouse	CSC	Grasslands, desert areas, especially scrub with friable soils.	Potential where habitat occurs
Procyonidae (Raccoon Family)				
Bassariscus astutus octarus	ringtail cat	SFP	Mixture of forest and shrublands in close association with rocky areas or riparian habitats.	Historic records from numerous cyns. including San Dimas and San Gabriel

SPECIAL STATUS WILDLIFE SPECIES (Continued) OCCURRING OR POTENTIALLY OCCURRING WITHIN THE SAN GABRIEL CANYON AREA

Wildlife				
Scientific Name	**Common Name**	**Agency Listing Status**	**Preferred Habitat**	**Location**

Legend

Agency Lists

FE	Federally Listed as Endangered	SCE	State Candidate for Endangered
FT	Federally Listed as Threatened	SCT	State Candidate for Threatened
FPE	Federally Proposed as Endangered	SP	State Protected
FPT	Federally Proposed as Threatened	SFP	State Fully Protected
FPD	Federally Proposed for Delisting	SR	State Rare
SE	State Listed as Endangered	CSC	California Special Concern Species
ST	State Listed as Threatened		

Project Site

Several special status habitats occur on the project site including: California Sagebrush Scrub, Scalebroom Scrub, Southern Willow Scrub, Mule Fat Scrub, and Coast Live Oak Woodland.

Below is a list of special status plant and wildlife species which have been determined to have some potential, albeit low in some cases, to occur specifically on the site based on the range of the species and the habitat available on and surrounding the site:

Plants

- Greata's aster (*Aster greatae*)
- Braunton's milk-vetch (*Astragalus brauntonii*)
- Nevin's barberry (*Berberis nevinii*)
- Thread-leaved brodiaea (*Brodiaea filifolia*)
- Slender mariposa lily (*Calochortus clavatus* var. *gracilis*)
- Plummer's mariposa lily (*Calochortus plummerae*)
- Slender-horned spineflower (*Dodecahema leptoceras*)
- San Gabriel River dudleya (*Dudleya cymosa* ssp. *crebrifolia*)
- San Gabriel Mountains dudleya (*Dudleya densiflora*) - *thought to occur on the site
- Mesa horkelia (*Horkelia cuneata* ssp. *puberula*)
- Robinson's pepper-grass (*Lepidium virginicum* var. robinsonii)
- Rayless ragwort (*Senecio aphanactis*)

- San Bernardino aster (*Symphyotrichum defoliatum*)
- Sonoran maiden fern (*Thelypteris puberula* var. *sonorensis*)

Wildlife

- Cooper's hawk (*Accipiter cooperii*)
- Sharp-shinned hawk (*Accipiter striatus*)
- Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*)
- Coastal western whiptail (*Aspidoscelis tigris stejnegeri*)
- Santa Ana sucker (*Catostomus santaanae*)
- Yellow warbler (*Dendroica petechia brewsteri*)
- Willow flycatcher (*Empidonax traillii*)
- Southwestern pond turtle (*Emys* (=*Clemmys*) *marmorata pallida*)
- Arroyo chub (*Gila orcuttii*)
- Yellow-breasted chat (*Icteria virens*)
- San Diego black-tailed jackrabbit (*Lepus californicus bennettii*)
- Big free -tailed bat (*Nyctinomops macrotis*)
- Los Angeles pocket mouse (*Perognathus longimembris brevinasus*)
- Coast (San Diego) horned lizard (*Phrynosoma coronatum* [*blainvillii* population])
- Coastal California gnatcatcher (*Polioptila californica californica*)
- Santa Ana speckled dace (*Rhinichthys osculus* ssp. 3)
- Coast Range newt (*Taricha torosa torosa*)
- American badger (*Taxidea taxus*)
- Two-striped garter snake (*Thamnophis hammondii*)
- Least Bell's vireo (*Vireo bellii pusillus*)

Of these species, eight are either state or federally listed as threatened or endangered. The potential for these species to occur on the site is considered very low. One species, the San Gabriel River dudleya, although not a listed species, is very rare and is known to occur in the immediate vicinity of the property. Proposed plans should avoid impacts to this species if feasible.

REGIONAL BIOLOGICAL VALUE

The San Gabriel Canyon and surrounding area support a rich diversity of biological resources within close proximity to large urban areas. In summary, the Canyon area contains habitat of the rare species (i.e., San Gabriel bedstraw and the San Gabriel Mountains dudleya) as well as several plant communities within this area that are CDFG highest inventory priority communities due to their restricted distribution in the Southern California region. These communities include: walnut woodland, oak riparian woodland, southern willow scrub, coastal sage scrub, and alluvial fan scrub.

The three major canyons within this area support well developed and diverse riparian woodlands, as well as a source of water for most, if not all, of the year. These represent important stopover and overwintering areas for a wide variety of migratory birds, as well as essential habitat for resident species. These canyons also support seasonal and more frequent movement for wide-ranging mammals which must move over large areas to fulfill their habitat requirements.

Virtually all of the native biotic communities within this area are relatively undisturbed over most of their extent. As such, and because urbanization throughout much of the foothill regions has removed large expanses of these communities, those in the San Gabriel Canyon area are particularly important to the region's natural heritage.

RESTORATION RECOMMENDATIONS

The proposed River Wilderness Park project has potential to contribute to the sustainment of the biological diversity that exists in the Canyon area. Through careful planning and consideration of key resources, the project may promote and protect rare habitat types and plant and animals species while encouraging light public use. Although some riparian vegetation is present on the site, plant communities such as cottonwood-willow riparian woodland and alder riparian woodland could be enhanced and restored along the banks of the river. Oak woodlands and coastal sage scrub communities could be restored in other upland portions of the site. Existing populations of rare plants in the vicinity of the site, such as San Gabriel River dudleya, could be protected and their expansion promoted through restoration efforts. In addition, many special status wildlife species prefer riparian zones and would be attracted to restored riparian communities. The establishment of these plant communities at such a desirable location, (i.e., adjacent to the river, contiguous with an expansive wilderness area, and within an important canyon corridor) will promote wildlife usage and enhance the biological resource values of the region.

SUMMARY OF BIOLOGICAL CONSTRAINTS

If present on the site, special status species may be a potential constraint to development of a wilderness park or other uses. Development of the site would be expected to increase public recreational uses at the location and may impact species directly (loss or habitat) or indirectly (introduction of non-native species, erosion/sedimentation resulting from trail construction, etc.). If needed, focused surveys for special status plant and wildlife species should be conducted for those species with potential to occur, and if possible, project development should avoid impacting these resources. In addition, these resources may be "highlighted" as part of the educational element of the wilderness park.

A second set of constraints is related to water and wetlands. Regulatory permits or agreements from the U.S. Army Corps of Engineers (USACE) and CDFG would be required prior to any alteration of any USACE or CDFG jurisdictional area. Further, any impacts to special status habitats may require appropriate mitigation. Finally, if any oak trees on the site may be impacted, an oak tree survey should be performed and a subsequent application for a tree removal permit from the City of Azusa should be processed prior to any impacts occurring.

Please contact Marc Blain at (626) 351-2000 if you have questions or comments.

Sincerely,

BONTERRA CONSULTING

Thomas E. Smith, Jr., AICP
Principal

Marc Blain
Biological Resources Manager

Enclosures: Exhibit 1 – Vegetation Map

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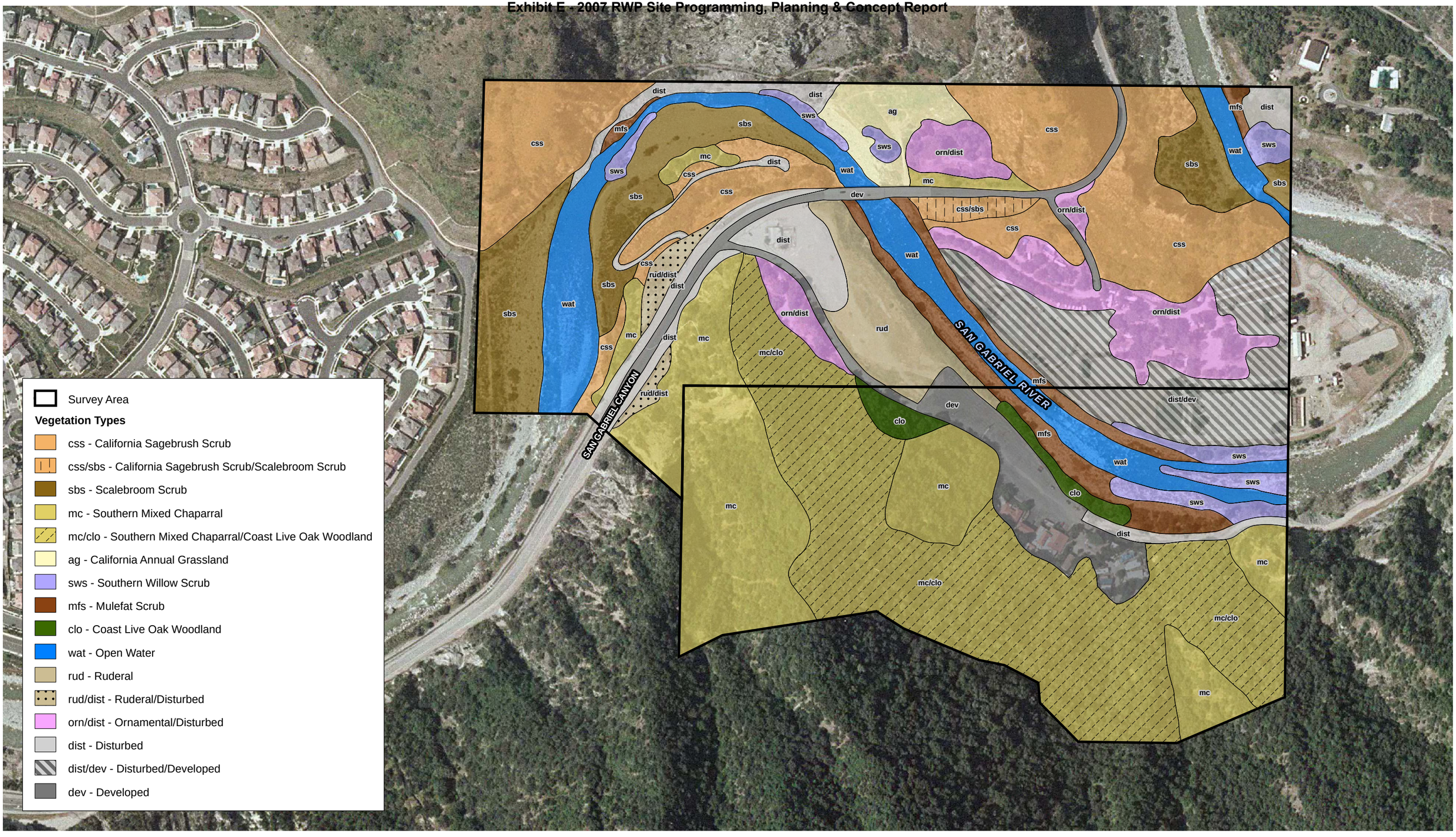
Exhibit E - 2007 RWP Site Programming, Planning & Concept Report



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Vegetation Types

Exhibit 1

BlueGrn J001 - Azusa River Park

N W E S

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Feet

BonTerra CONSULTING

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Exhibit E - 2007 RWP Site Programming, Planning & Concept Report

APPENDIX B3

HYDROLOGICAL AND HYDRAULIC CONDITIONS

Exhibit E - 2007 RWP Site Programming, Planning & Concept Report

BlueGreen
Open Space Planning & Design



Hydraulic Conditions and Preliminary Feasibility of Improvements at the El Encanto Property Site

Report prepared for:

Watershed Conservation Authority

by:
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August 2007

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Introduction

The purpose of this work is to evaluate current hydraulic conditions of the San Gabriel River along the El Encanto Property site. In particular, the goal is to compile planning-relevant data and evaluate the preliminary feasibility of site improvements and restoration work within this river reach. Potential improvements include a) the creation of a river viewing terrace on the southern bank of the property, b) trails along both river banks, and c) an optional pedestrian bridge that would connect the two parcels of the El Encanto Property. Riparian restoration would include both river banks along the El Encanto property.

Site Location

The El Encanto property is located in the southern San Gabriel Mountains at the border to the Angeles National Forest. The site is located within the City of Azusa, adjacent to State Route 39, and adjacent to the San Gabriel River. From the site the river extends downstream through the San Gabriel Valley before entering the Pacific Ocean between Long Beach and Seal Beach.

Description of the Watershed

The drainage area above the site is approximately 220 square miles of rugged mountainous terrain with high steep drainage divides. The maximum elevation is at 10,064 feet at Mount San Antonio (Mt. Baldy) the highest peak in the drainage area. Average slopes of the San Gabriel River in the mountains is about 5% and about 1% along the stream channel in the lower canyon area. The San Gabriel Mountains upstream of the site is a complex mix of igneous and metamorphic rocks that are highly fractured, faulted, and tectonically active, resulting in extremely high rates of erosion. In the steep mountainous areas of the watershed sediment yield is very high, especially following wildfires. Cogswell, San Gabriel, and Morris Dams intercept virtually all sediment produced upstream of theses structures.

Climate and Precipitation

The climate of the area is temperate and semi-arid with warm, dry summers and mild, moist winters. Higher elevations tend to have more moderate summers and colder winters with significant amounts of precipitation including snow in winter. The majority of rainfall occurs between the months of December and March. Extended rainless periods in the summer months are common.

Rainfall events result dominantly from winter storms that are associated with extra-tropical cyclones originating in the North Pacific. They are characterized by hours of light to moderate precipitation with occasional heavy showers. Snow is common above 6000 feet. Local thunderstorms may occur at any time of the year in conjunction or following general winter storms. They may also occur in late summer when desert thunderstorms occasionally drift westward across the mountains enhanced by moisture originating from tropical storms to the south. These thunderstorms can result in very high

rainfall intensities for periods of one to three hours and cause very heavy runoff. General summer storms do occur in the region, but are rare and limited to late summer and are fed by tropical moisture.

Utilizing National Weather Service Climatography data for Station Pasadena, the average daily minimum and maximum temperatures in winter range from about 44 to 62 degrees F. Summer average daily minima and maxima are around 68 and 91 degree F. The mean annual precipitation of the area is about 21 inches. All-time low and high extremes of temperature are 23 and 110 degree F, respectively (Department of Commerce, NOAA, 2002, 2004).

However, temperature and precipitation vary greatly when moving from the foothill areas into the higher elevations. At elevations of 8000 to 10,000 feet temperatures range from about 10 to 22 degree F in winter to about 45 to 60 degree F in summer. Extremes are about minus 30 and 75 degree F at the highest elevations. Areas below 6ooo feet do not generally experience significant periods of freezing (U.S. Army Corps of Engineers, 1991).

Data for pan evaporation within the drainage area indicate that mean monthly evaporation ranges from less than 1 inch in winter to about 8 inches in summer at forest elevations, to 2-3 inches in winter, and 9-10 inches in summer, at lower elevations. On days of strong, dry Santa Ana winds, evaporation can be considerably greater than one inch in 24 hours (U.S. Army Corps of Engineers, 1991).

Hydraulic Structures Surrounding the Site

Stream flow at the site is regulated by three dams within the watershed: Cogswell, San Gabriel, and Morris Dams. Cogswell dam was built in 1934 and is a rockfill structure designed for flood control and water conservation purposes with a storage capacity of 8968 acre feet. It is located along the West Fork of the San Gabriel River and is operated and maintained by Los Angeles County Department of Public Works (LACDPW). San Gabriel dam, completed in 1939, was also built as a rockfill structure for water conservation purposes. It has a capacity of 44,183 acre feet and is also operated and owned by the County of Los Angeles. San Gabriel Dam is located about 5 miles upstream of the El Encanto property.

Finally, Morris Dam, only two miles above the El Encanto property is owned by the Metropolitan Water District (MWD). It is a concrete gravity structure that was originally constructed by the City of Pasadena as Pine Canyon Dam in 1934. It was sold to the MWD in 1935 and managed by the MWD until 1995. Since then it is operated by LACDPW but remains in ownership of the MWD. Morris Dam has a storage capacity of 22,551 acre feet.

Currently, LADPW is working on substantially improving the outlet structures of Morris dam (LACDPW, 2007), which are outdated and allow very little flexibility in release patterns. The modifications will allow LADPW to conjunctively manage reservoir discharges to efficiently conserve water at its downstream spreading grounds. It is anticipated that larger releases would stay within the historic range of outflows and would continue to fluctuate from year to year based on annual rainfall inflow. However, the work will remove gaps in current operational capabilities to allow more flexibility in matching the needs of downstream conjunctive use facilities and water agencies.

Significant downstream structures are the Engineered Flood Control Channel about 1 mile downstream of the El Encanto property. The Flood Control Channel consists of a series of 7 invert stabilizers and 10 drop structures. The channel is trapezoidal with earthen levees armored by grouted rock revetments, and has a capacity of 98,000 cfs.

Flow Regime and Reservoir Management

Natural floods result from high-intensity rainfall on stony, shallow soils, with shallow depth to bedrock, and steep gradients. Smaller streams in the watershed are intermittent, with little or no flow during the dry season. Flood hydrographs are typically less than 12 hours in duration and storms usually last less than 48 hours. Since the construction of the dams within the watershed, the stream flow of the San Gabriel River at the El Encanto property is characterized by high flood peaks of relatively short duration, substantially moderated or delayed by upstream storage.

The current release patterns at Morris Dam (USACOE, 1991) are substantially impacted by inefficient release valves and problems related to clogging of intake structures by sediment. Essentially, the normal release valves cannot be used during a storm, because sediment moves through the reservoir and clogs the intakes. Therefore, the intake valves must be kept closed until storm inflow is on the falling limb during smaller floods. Only then, once the largest load of sediment has entered the reservoir and has settled, can the valves be opened to reduce reservoir levels. This is commonly done when inflow drops to less than 1700 cfs. At this point, the valves are opened to a setting that matches inflow plus an additional 300 cfs in order to “draw down” the reservoir to a normal operating level below 1130 feet.

Only during large floods that raise water surfaces to the spillway level, are the valves used as relieve outlets. During these floods, valves remain closed until the reservoir is filled to capacity and water exits through the spillway at a flow rate of 2000 cfs. The valves are then opened to their maximum, contributing around 5,000 cfs at that moment in time.

Largest Floods

Before closure of the upstream dams one very large flood occurred on January 18, 1916 when a peak discharge of 40,000 cfs was recorded at the stream gaging station between Morris Dam and the El Encanto Property. The exact meteorological conditions of the storm causing this flood are not well reported.

The two largest floods following the closure of the upstream dams occurred in 1938 and 1969. The flood of 1938 occurred between 27 February - 3 March 1938 and is the largest flood recorded. This storm produces a maximum discharge of 65,700 cfs and developed from a series of low-latitude north Pacific disturbances, bringing several bands of intense rainfall to southern California during a 5-day period. Average rainfall depth over the drainage area amounted to 21.50 inches, 12.16 inches of which fell in 24 hours(USACOE, 1991).

The second largest storm following dam closure occurred 23-27 January 1969, producing discharge of 29,850 cfs at the Azusa Gaging Station. The period of 18-27

January 1969 was very wet throughout southern California when a series of warm storms originating south of Hawaii moved into this area. After a short break rain resumed on January 23 and peaked with a very intense band of rain early January 25. The precipitation for the period of 23-26 January amounted to more than 23 inches in the upper West and North Forks of the San Gabriel River watershed. Average rainfall over the drainage area during the period 23-27 January was 21.71 inches, 13.81 of which fell in 24 hours (USACOE, 1991).

Site Flood Protection

Any permanent structures along the San Gabriel River would have to be constructed to be safe from flooding and also comply with local flood control requirements. A potential pedestrian bridge across the San Gabriel River would have to satisfy the County of Los Angeles Standards of Flood Protection – in this case, the Capital Flood.

The capital flood is a flood discharge calculated with the rational method, a surface runoff model that uses appropriate rainfall and infiltration rates, combined with appropriate routing calculations. For this area, certain assumed conditions and water levels within the upstream reservoirs, and knowledge of reservoir release management patterns have to be included in the calculations.

The capital flood for this river reach is reported as 86,700 cfs based on a 1948-study performed at the Morris Dam (Jared Deck, LACDPW, 2007, pers. comm.). Assuming that this value is still valid after alteration of the release patterns since then, any bridge structure crossing the San Gabriel River would have to be designed to withstand a flood of this magnitude. The Capital Flood Protection would also govern over any physical alterations of the bank areas of the river channel and even minor alterations would have to be shown not to impact flood safety at the Capital Flood level of protection.

It should be mentioned that not all proposed features envisioned at the El Encanto site would have to be safe from capital flood inundation. For example, a nature trail and viewing platform along the bank of the stream do not have to be sited outside of the capital flood inundation zone, as long, as they are closed to public access during major floods and they withstand substantial inundation and do not otherwise increase flood hazards or cause other damage.

Nevertheless, it is important to understand the probability of flood inundation and customary flow conditions that all future improvements would likely be exposed to in order to design these elements properly. Frequency of inundation is equally important for anticipated habitat restoration along the banks. Restoration and planting plans would have to take the physical character of flooding and the frequency of inundation into account to be successful.

Flood Frequency Estimates

One positive feature of the site is the fact that a long flood record has been recorded for the stream reach. A gaging station has been in existence just 1 mile above the site since 1895 (Table 1). However, obtaining a true understanding of the current flood frequencies is non-trivial, because construction of the upstream reservoirs have altered the flow regime of the stream below. In addition, management of flood releases,

maintenance of standard water surface elevations, and draw-down rates between successive storms can substantially alter the statistical nature of discharge data measured at the gaging station below the dam.

Table 1

Yearly Summary Statistics
Los Angeles County Department of Public Works
Gaging Station: U8-R San Gabriel River below Morris Dam

Season	Daily CFS			Total Runoff	Peak Inflow	
	Maximum	Minimum	Mean	(Acre-feet)	Date	CFS
1895-96	134	0	N.D.	N.D.		
1896-97	1,760.00	0	95.6	69,200		N.D.
1897-98	1,600.00	0	9.6	6,920		N.D.
1898-99	16	0	0.1	74		N.D.
1899-00	49	0	0.4	272		N.D.
1900-01	5,170.00	0	94.1	68,100	5-Feb	N.D.
1901-02	318	0	4.3	3,100		6,250
1902-03	2,940.00	0	104	74,900		N.D.
1903-04	1,070.00	0	9.3	6,720		N.D.
1904-05	2,940.00	0	172	124,000		N.D.
1905-06	7,950.00	0	262	190,000		N.D.
1906-07	6,730.00	0	406	293,000		N.D.
1907-08	1,160.00	0	46.4	33,700		N.D.
1908-09	7,030.00	0	197	143,000		N.D.
1909-10	12,400.00	0	137	99,100	1-Jan	13,900
1910-11	9,100.00	0	321	231,000	10-Mar	13,500
1911-12	2,950.00	0	55.5	40,300		N.D.
1912-13	1,880.00	0	25.6	18,600		N.D.
1913-14	11,800.00	0	359	260,000	20-Feb	18,100
1914-15	1,110.00	0	108	77,900	29-Jan	2,770
1915-16	22,300.00	0	315	228,000	18-Jan	40,000
1916-17	3,900.00	0	49.3	35,700		N.D.
1917-18	4,940.00	0	123	88,600	17-Mar	8,680
1918-19	76	0	3.2	2,290	11-Feb	230
1919-20	2,400.00	0	94.6	68,700	2-Mar	5,000
1920-21	2,050.00	0	40.1	29,000	14-Mar	4,000
1921-22	16,000.00	0	505	365,000	19-Dec	22,300
1922-23	2,250.00	0	44	31,800	13-Dec	3,670
1923-24	253	0	3.5	2,540	26-Mar	510
1924-25	588	0	4.2	3,030	4-Mar	3,000
1925-26	5,530.00	0	113	81,700	7-Apr	14,900
1926-27	11,400.00	0	123	88,900	16-Feb	18,200
1927-28	672	0	4.1	2,940	4-Feb	1,810
1928-29	411	0	10	7,210	10-Mar	895
1929-30	396	0	21.5	15,600	15-Mar	586
1930-31	601	0	9.5	6,900	26-Apr	1,450
1931-32	5,830.00	0	120	87,200	9-Feb	7,500
1932-33	1,630.00	0	21.9	15,900	19-Jan	5,820
1933-34	2,380.00	0	30.4	22,080	1-Jan	6,120
1934-35	460	0	102	74,080	9-Feb	507
1935-36	224	0	31.6	22,980	10-Apr	455
1936-37	1,770.00	0	195	141,100	20-Feb	1,950
1937-38	21,660.00	0.1	415	300,200	2-Mar	65,700
1938-39	316	6.5	53.5	38,680		N.D.
1939-40	506	0	50.5	36,640	24-Jun	506
1940-41	3,870.00	0	317	229,300	4-Mar	4,460
1941-42	370	2.5	13.1	9,480	20-Apr	422
1942-43	10,370.00	2	334	242,000	23-Jan	12,100
1943-44	2,710.00	3.6	184	133,700	22-Feb	5,170
1944-45	980	6.1	62.8	45,490	6-Feb	988
1945-46	937	0.3	75.9	54,930	23-Dec	980
1946-47	2,930.00	0	74.9	54,220	31-Dec	2,980
1947-48	1,170.00	0	18.1	13,170	2-Jun	1,320
1948-49	61	0	5.7	4,140	27-Oct	79
1949-50	7.9	0	0.7	51	31-Jul	8

Yearly Summary Statistics
Los Angeles County Department of Public Works
Gaging Station: U8-R San Gabriel River below Morris Dam

Season	Daily CFS			Total Runoff	Peak Inflow	
	Maximum	Minimum	Mean	(Acre-feet)	Date	CFS
1950-51	47	0	8.6	6,220	27-Apr	168
1951-52	3,530.00	0	91.1	66,120		N.D.
1952-53	1,190.00	0	69.4	50,240		N.D.
1953-54	960	0	34.6	25,030	16-Apr	9,420
1954-55	9.9	0	0.1	86	26-Sep	10
1955-56	43	0	0.2	176	30-Sep	45
1956-57	650	0	12.4	9,010	14-Apr	656
1957-58	2,470.00	0	241	174,100	5-Apr	2,780
1958-59	348	0	11.3	8,200	24-Feb	364
1959-60	0	0	0	0		0
1960-61	7.5	0	1.7	1,250	6-May	9
1961-62	1,520.00	0	102	73,590	12-Feb	1,650
1962-63	27	0	1	712	4-Sep	45
1963-64	22	0	0.2	160	26-Aug	50
1964-65	276	0	10.7	981	12-Jun	291
1965-66	7,260.00	0	225	162,900	23-Nov	8,640
1966-67	3,750.00	0	232	167,900	6-Dec	5,680
1967-68	236	0	31.7	23,030	25-Nov	326
1968-69	19,300.00	0	750	543,000	25-Feb	29,850
1969-70	1,060.00	0	52.4	37,970	28-Feb	1,102
1970-71	434	0	31.4	22,760	4-Jan	439
1971-72	299	0	15.3	11,090	8-Dec	299
1972-73	849	0	131	94,790	19-Mar	918
1973-74	310	0	60.8	44,010	7-Nov	364
1974-75	248	0	29.7	21,500		248
1975-76	191	0	28.8	20,870	25-Mar	178
1976-77	267	0	21.8	15,760	13-Oct	273
1977-78	10,800.00	0	630.1	456,170	4-Mar	14,100
1978-79	504	0	149.2	108,000	22-Apr	519
1979-80	8,310.00	0	473.3	337,410	19-Feb	8,720
1980-81	415	0	37.8	27,335	11-Dec	514
1981-82	586	0	90.2	65,284	24-Mar	5,490
1982-83	11,600.00	0	15.9	352,733	2-Mar	11,900
1983-84	485	0	2.2	48,419	13-Oct	552
1984-85	464	0	48.5	35,100	1-Jan	469
1985-86	831	0	131	94,778	25-Feb	856
1986-87	186	0	60.8	43,995	23-Feb	212
1987-88	253	0	94.1	67,673	8-Jun	793
1988-89	434	0.4	68	49,058	5-Jan	434
1989-90	166	0.1	64	46,101	28-Apr	162
1990-91	785	0	113	80,999	28-Jul	793
1991-92	1,740.00	0.8	206	149,508	15-Feb	3,460
1992-93	9,500.00	0	655	474,300	14-Jan	9,500
1993-94	480	0	57.8	41,860	2-Aug	1,490
1994-95	*	*	*	*		*
1995-96	552	0.4	124	89,820	25-Sep	1,220
1996-97	696	0.3	90.3	65,340	2-Feb	1,620
1997-98	7,200.00	0	365	264,000	24-Feb	10,300
1998-99	250	0	33.1	23,970	1-Mar	3,140
1999-00	316	1.2	59.1	42,940	1-May	834
2000-01	490	2	65.3	47,240	9-May	1,240
2001-02	242.1	2.3	65.5	47,415.90	31-Oct	1,183
2002-03	746.8	1.9	118	85,273.40	14-Nov	1,070
2003-04	676.8	1.1	89	64,272.90	6-Oct	683
2004-05	15,900.00	21	748	541,000.00	11-Jan	20,700

M	Data Missing
*	Record incomplete
E	Estimate
N.D.	Not determined
**	Record not Computed
+	Less than 0.05 Acre Feet or less

Several simple observations can be made in analyzing the yearly flood peaks, most importantly, that the likelihood of small to intermediate flood events between roughly 1,000 cfs and 5,000 cfs was reduced through the closure of the upstream dams. This is somewhat expected since the very purpose of the dams is to hold back smaller floods and temporarily store water for conservation purposes and gradual release. As evidenced by some relatively large floods after the closure of the dam, it appears that dam closure has not affected the largest floods. Apparently, the capacity of the reservoirs is exceeded and the very large floods move through the reservoirs with little or no flow reduction, presumably, through spillway releases.

The arising dilemma is that these gaging records cannot be assumed to be drawn from a statistical population of flows that is stable over time, which is an important assumption, when analyzing stream data using normal, log-normal, Gumbel or Log-Pearson III distributions. Hence, in a first step of this analysis, the gaging record was reduced to the time after the closure of Morris Dam (1935) in order to reduce the effects of flow regime changes.

Post-1935 data were used to develop recurrence interval curves utilizing log-normal, Gumbel or Log-Pearson III distributions. These curves were also visually compared to the simple "rank-order" probabilities, calculated as $R_t = (n+1)/\text{rank}$, where R_t is the observed rank-order recurrence interval, and n is the number of years or observations.

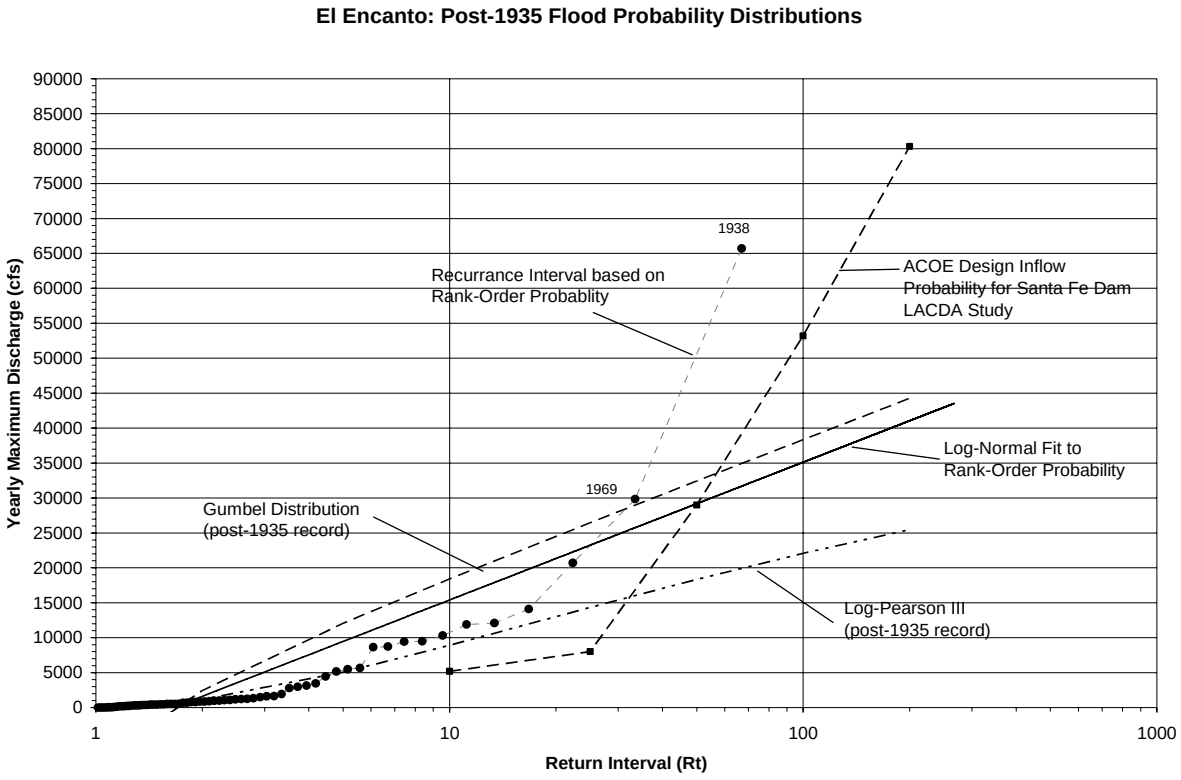


Figure 1: Post-1935 Flood Probabilities plotted with rank-order recurrence intervals.

As can be seen in Figure 1, the largest two floods of record plot outside the three most common statistical distributions used for natural stream flow data. One possible explanation is that at least the 1938 flood was an extremely large event that must be considered an outlier that is, in fact, representative of a 1000-2000 year flood. Another possibility is that flood regime alterations due to upstream dams were such that none of the common flood probability distributions for natural streams are applicable to this reach.

The first possible explanation is less likely to be correct, because the complete 110-year record includes another extreme value, the flood of 1916, which is also far above the common distributions. Further analysis of various data sub-sets indicates that there is a difference between before and after dam-closure distributions. However, the differences are not great enough to explain why none of the common statistical distributions approximate the simple rank-order probabilities.

In essence, this suggests that both explanations may be true to some degree, but that their relative effects are inextricable within the existing data sets. Hence, this brief analysis indicates that this watershed is capable of producing some very extreme floods that appear substantially different in statistical nature from small to intermediate floods. These differences cannot be satisfactorily predicted nor separated from the cumulative effects of dam closures and dam management.

Therefore, it appears prudent to minimize statistical inference, and only utilize the simpler rank-ordered probabilities of the entire record to come up with a graphical representations of the flood recurrence intervals. While that ignores the physical reality of meteorologically extreme events and flow regimes that are potentially altered through dam operations, there is some comfort in utilizing long data records knowing that any graphical representation should be superior when the true nature of the underlying distributions are unknown and the record is reasonably long -- both are the case here.

The graphical method will approximate the low and intermediate discharges quite well even though it is less reliable in determining the recurrence intervals for the largest 2-3 floods. This graphical determination of flood frequencies is the equivalent of plotting observed rank-order recurrence intervals versus discharge and fitting a visual line as demonstrated in figure 2.

The plotted data appear to be organized in three segments that may hint at three somewhat discrete populations. Three separate log-normal distributions were fitted to the data allowing continuous calculation of frequencies. It should be noted that the third relationship, approximating values for the largest floods, also approaches recurrence intervals calculated for inflow probabilities for Santa Fe Dam (USACOE, 1991), based on surface runoff models used by the Army Corps of Engineers.

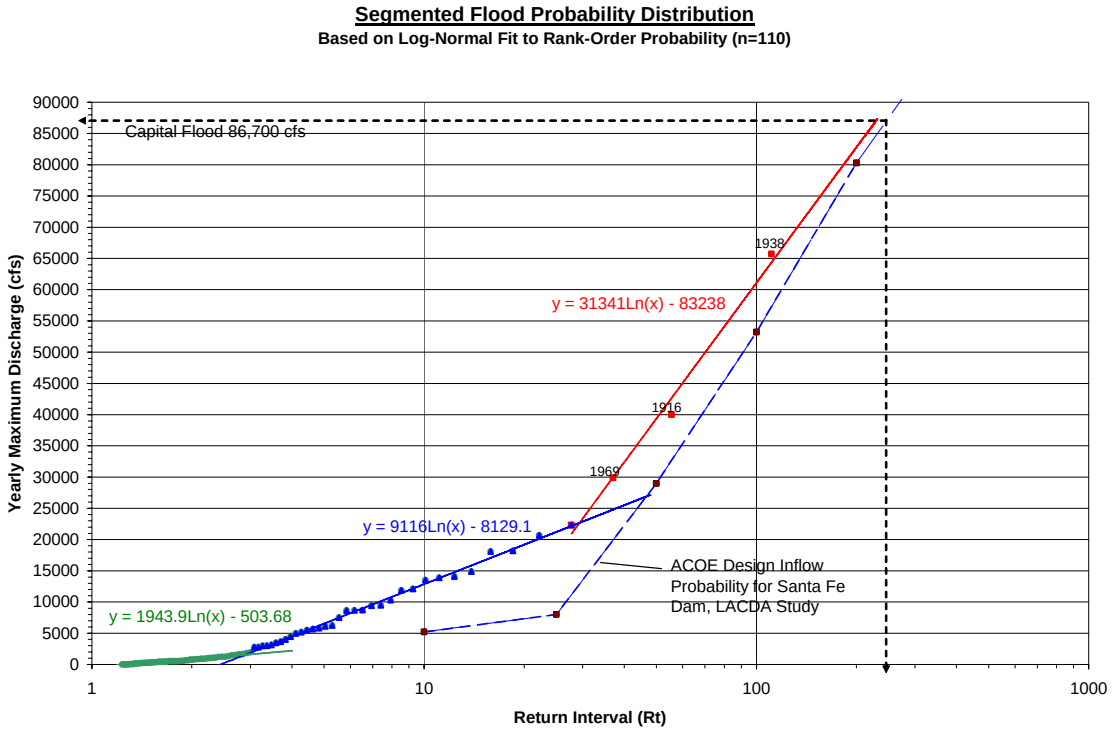


Figure 2: Suggested Flood Recurrence Intervals for Planning Purposes of Plan Elements not requiring Capital Flood Protection.

Table 2: Proposed Recurrance Intervals	
Rt	Q
(yr)	(cfs)
2	844
3	1,886
4	4,508
5	6,543
6	8,205
7	9,610
8	10,827
9	11,901
10	12,861
15	16,557
20	19,180
25	21,214
30	23,358
35	28,189
40	32,374
50	39,368
60	45,082
70	49,913
80	54,098
90	57,790
100	61,092

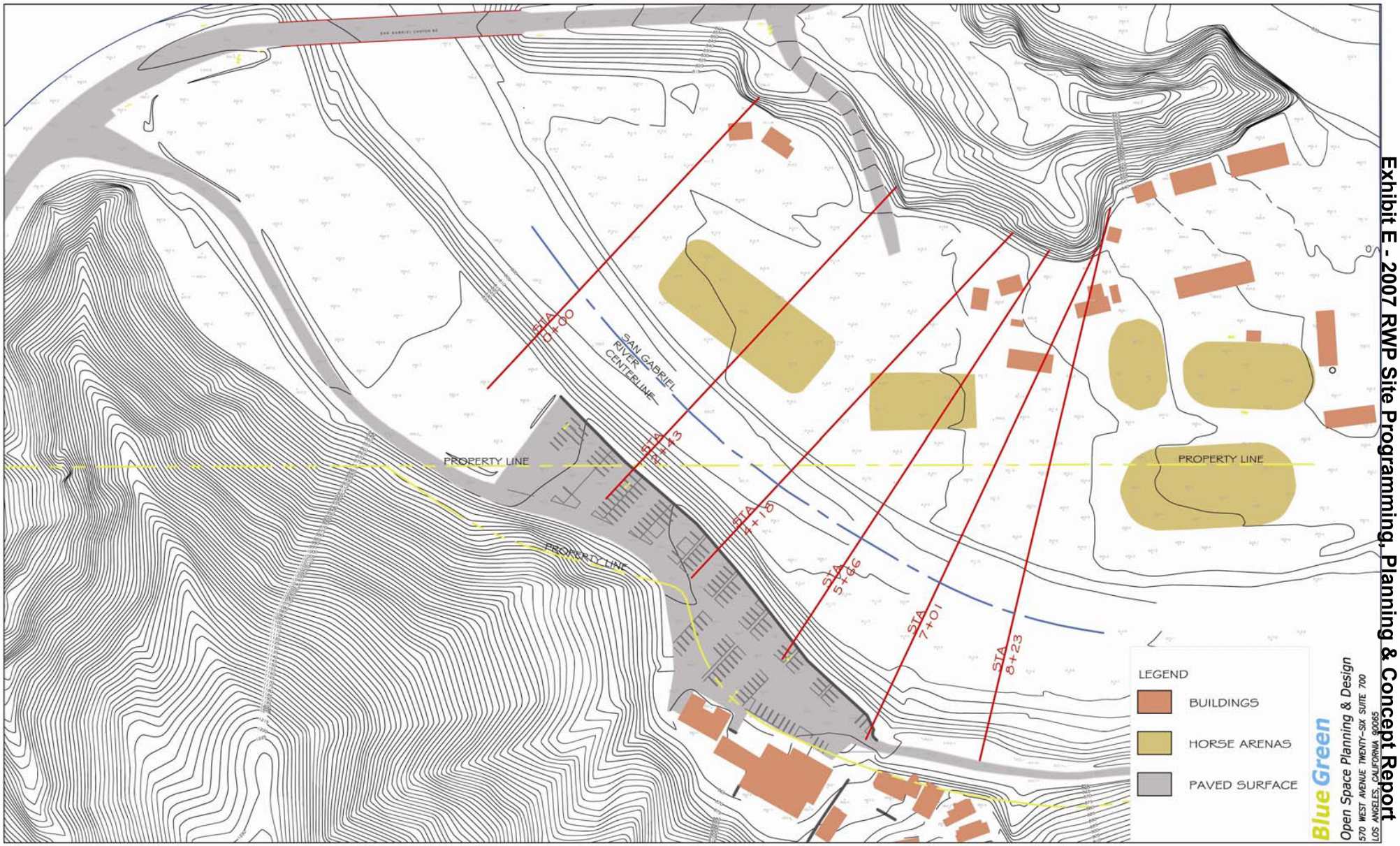
It is proposed to use the segmented graphical recurrence intervals summarized in Table 2 for the design of plan elements such as determining trail elevations along the stream banks, and estimating inundation levels and frequencies for the development of planting plans for the riparian restoration areas, in other words, for elements that are not subject to strict engineering safety requirements or the Capital Flood protection level.

HEC-RAS Model

The goal of this final step is to determine the existing channel capacity (bankfull discharge) and also to determine a set of likely water surface elevations within the study area that will be of relevance to bank restoration work as well as to determine a most suitable location for a potential pedestrian bridge.

For this purpose a HEC-RAS Model (3.1.3) was created from 6 cross-sections taken from the topographic survey (Map 1, and Figure 3a and 3b). The model was run allowing for a mixed sub/supercritical flow regime using normal depth and the average between the thalweg slope and the bank slope to approximate the initial boundary conditions. Standard Manning's roughness coefficient tables (based on Chow's tabulation) were used to determine initial channel bed roughness. These roughness values were later slightly modified by calibrating model roughness using the flood of 11 January 2005 which had a maximum discharge of 20,700 cfs.

The calibration was performed by carefully adjusting roughness coefficients until water surface elevations and the lateral extent of inundation of the model matched the mapped extent of flood scour and vegetation removal caused by the 2005 flood, which are prominently visible on the recent aerial photography and in the field. The final channel roughness values for this 25-year flood amounted to 0.045 for the upper two third of the model area and 0.050 for the lower third. It is probably advisable to increase these values for smaller floods to account for relative depth effects due to the large boulders and form roughness elements that are far less submerged during lower discharges. Over-bank area and floodplain roughness was set to 0.060 to account for thick brush along the southern bank and larger obstacles on the northern floodplain. It should be noted that the model does not account for stream channel curvature in the actual flow calculations. Hence, the resulting model should be viewed as strictly one-dimensional.



Map 1: Cross Section Locations for HEC-RAS Model

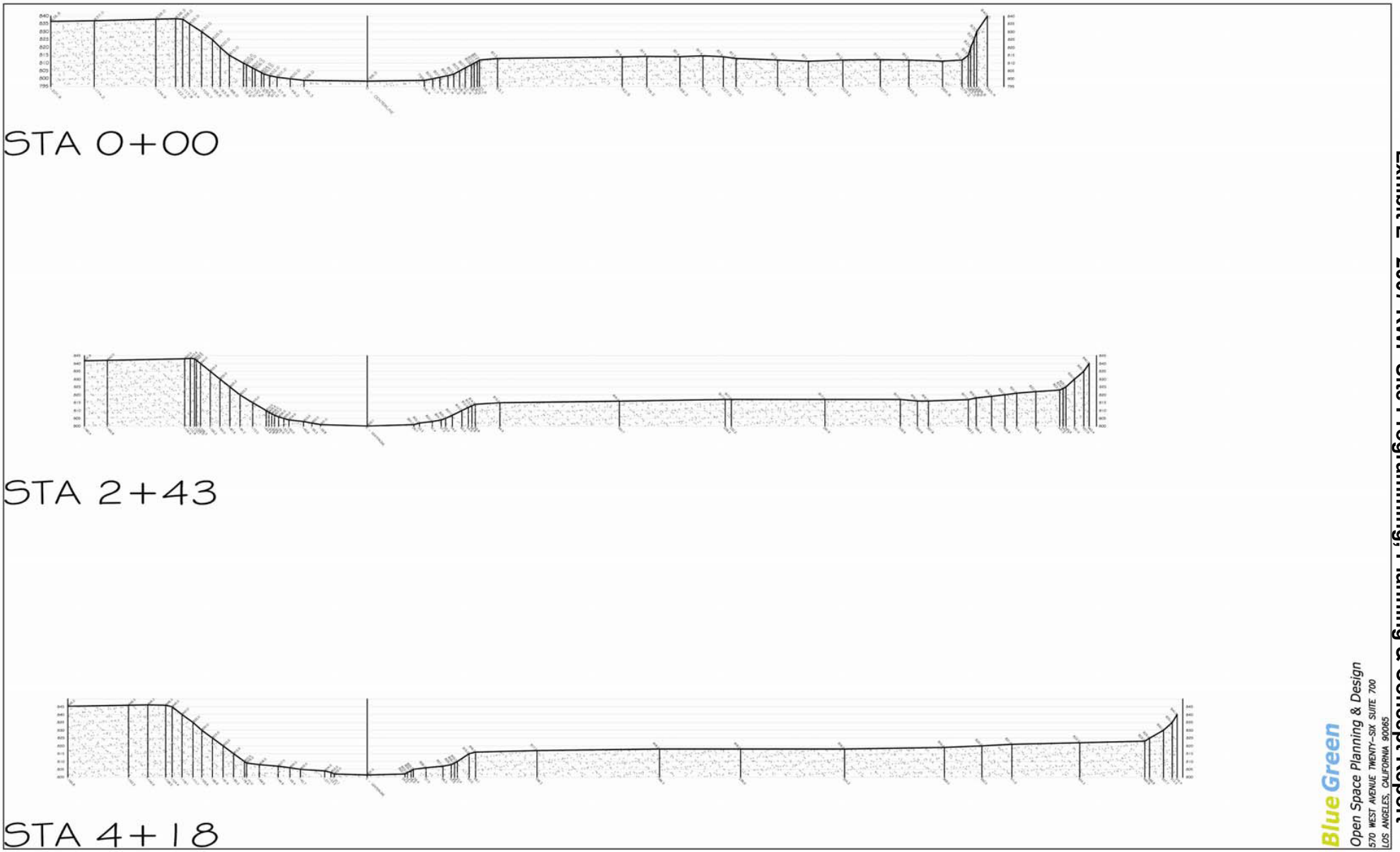


Figure 3a: Cross Sections for HEC-RAS Model

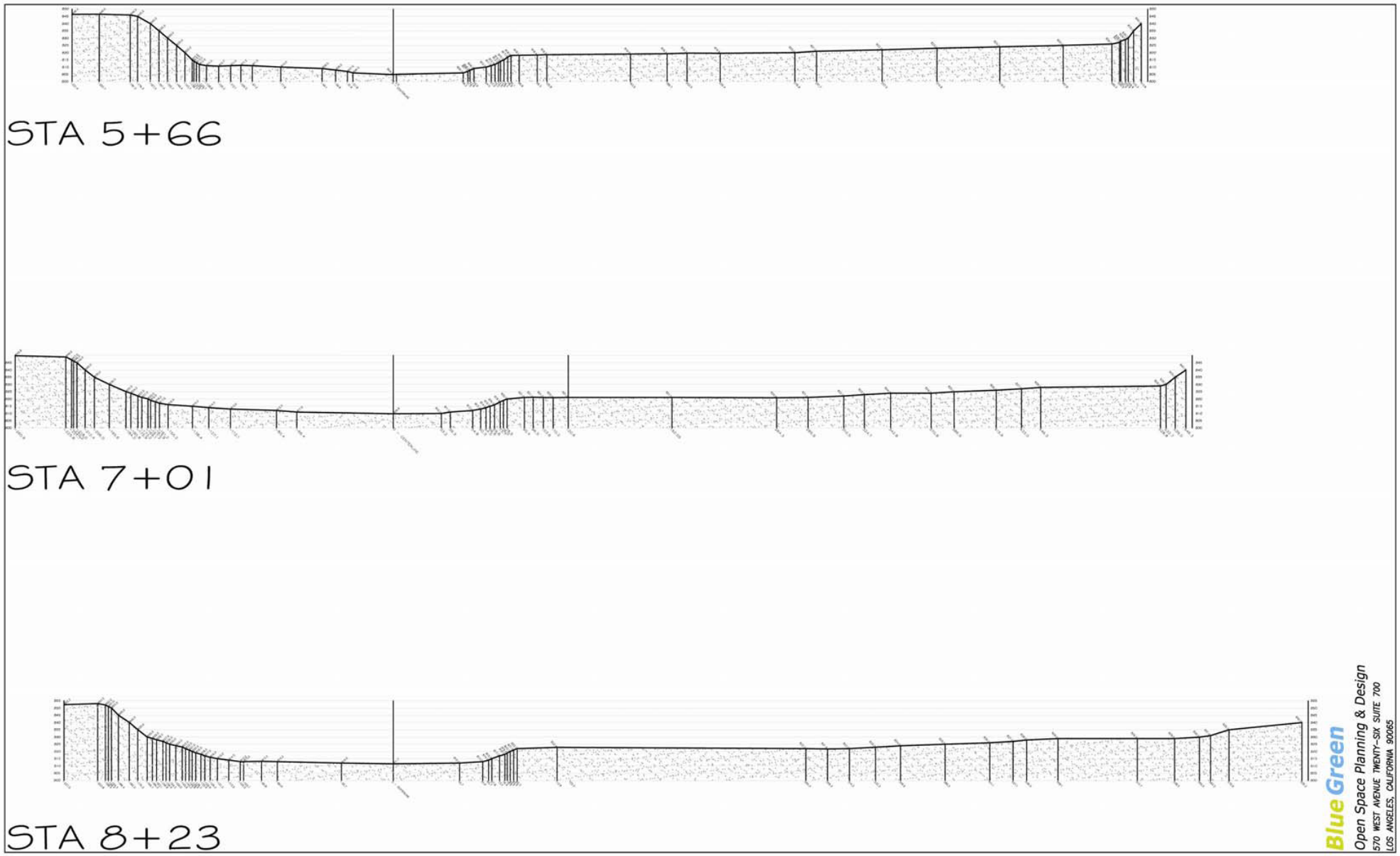


Figure 3b: Cross Sections for HEC-RAS Model

Bankfull Discharge

Flooding is an integral part of a natural stream's mechanics. The amount of discharge required for the initiation of flooding and its statistical frequency is considered one of the more important diagnostic tools in hydraulic analyses. A general rule of thumb for natural streams is that they would exceed their channel capacity about every 2 years and subsequently inundate the floodplains. In semi-arid and Mediterranean climates this value is often adjusted upward to account for larger variability of discharges and more complex channel shapes and sedimentary dynamics.

The geomorphology of the study area is that of an incised bedrock controlled canyon meander. The northern portion of the property is part of a large point bar, whereas the southern bank constitutes a steep cut bank. It appears that the northern bank line of the point bar is representative of the pre-1935 or historic top of the channel bank. It is also today's "top of the bank" although no actual inundation of the point bar complex has taken place outside of the two largest measured floods of 1938 and 1969 of the post-dam closure era.

Using the HEC-RAS model by incrementally increasing discharge until water levels rise above the northern banks it was determined that bankfull discharge amounts to about 22,500 cfs. Using the above recurrence interval estimates this would be approximately the 29-year flood. This value is far greater than one would see in a natural system. Generally, one would expect that in a natural canyon type environment, even a large and complex point bar would be at least partially inundated every 5-10 years.

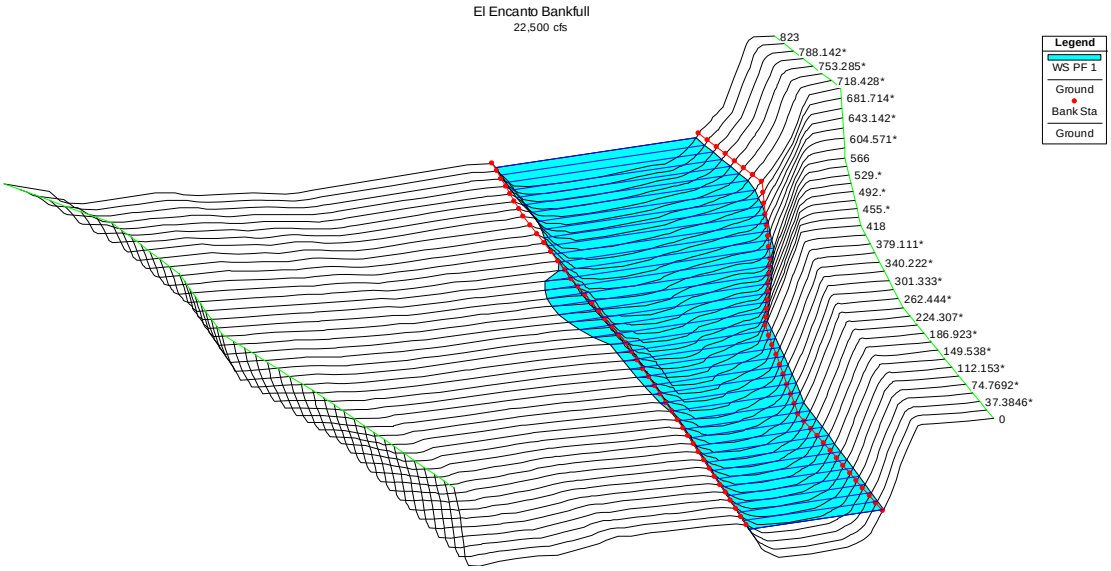


Figure 4: Onset of floodplain inundation in the center of the reach at 22,500cfs with an estimated recurrence interval of 29 years.

This observed discrepancy is likely due to the cumulative effects of the upstream dams on the sediment supply of the channel. As in many other similar cases, closure of dams often leads to substantial "starvation" of downstream channels with subsequent down-cutting or entrenchment through continuous removal of finer sediments during re-working of the channel deposits by larger floods that do not re-supply sediments.

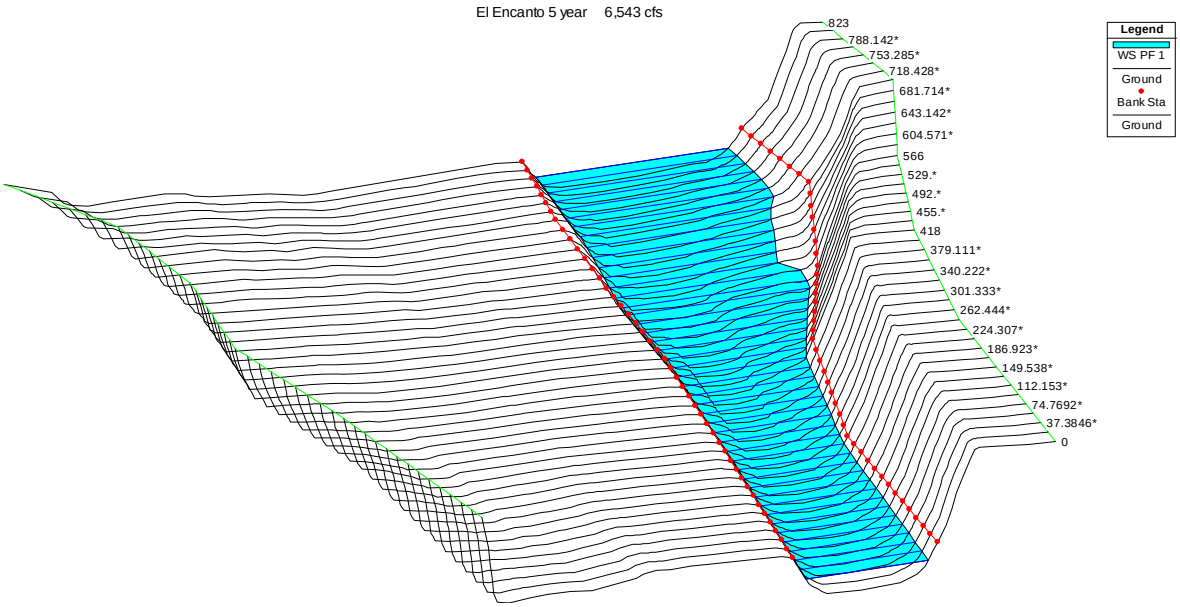


Figure 5: Model results for the 5 year flood of approximately 6,543 cfs.

Assuming a natural bankfull flood recurrence interval of 5 years and comparing water surface elevations for the 5-year flood with those of current bankfull discharge it can be suggested that vertical down-cutting due to post-1935 channel degradation would have amounted to about 7ft in the center portion of the reach.

Capital Flood

Using the capital flood discharge of 86,700 cfs in the HEC-RAS model shows substantial flooding across the majority of the study area and virtually the entire point bar.

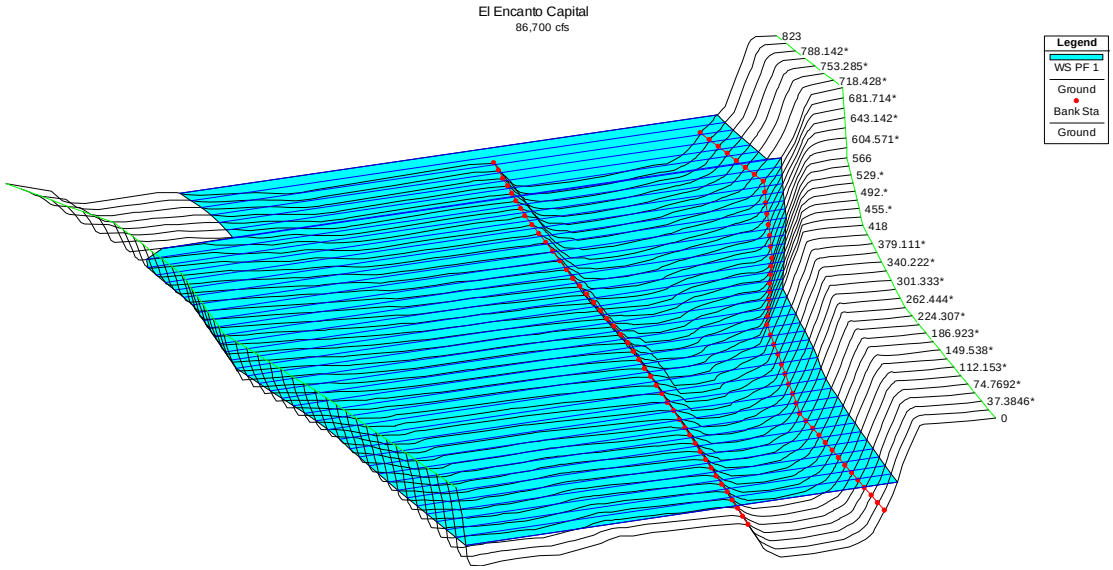


Figure 6: Flooding caused by the Capital Flood of 86,700 cfs.

While a flood of this magnitude is unprecedented within the historical record of the area, it constitutes somewhat of a "worst case scenario" for planning considerations. Among the proposed El Encanto Project elements only two components would have to adhere to the safety standards set by this flood, a potential pedestrian bridge and structural stream bank alterations.

A pedestrian bridge across the stream would have to be constructed so that the lower bridge chords would be above the projected water surface elevations. Depending on the exact location of the bridge crossing along this model reach this lower chord elevation would be somewhere between 820 and 828 ft without accounting for safety margins. Total required bridge clearance would be between 15 and 22 ft.

One area of concern would be the bridge approaches on the northern bank, because the entire floodplain is inundated during the capital flood. However, it would be infeasible to construct a bridge spanning the entire floodplain. This question would have to be addressed during a more detailed engineering study leading up to more detailed plans. However, as part of the conceptual planning process it was assumed that a small bridge spanning only the regular channel from bank to bank would be allowable for a pedestrian facility.

Judging by the data of this study it appears that a pedestrian bridge would be most feasible at the downstream end of the model reach. Approximate minimum dimensions at the lower end would have to be about 140-150 ft length without the bridge approaches, and a clearance of 21-25 ft above the existing thalweg. Moving the bridge further upstream would require the bridge to increase in length and size.

Since this bridge would likely be the most costly element of the future park, it would probably be one of the last or even optional elements to be implemented mainly

because some of the extended goals of the Azuza River Wilderness Park would have to be realized in order to justify such an expense. The potential purchase of the neighboring property on the south bank, currently owned by Dr. Kim, or a land swap with the equestrian facility on the north bank would certainly improve feasibility of a pedestrian bridge and reduce the future cost of implementation.

Potential stream bank alterations may also require compliance with the flood safety requirements imposed by the capital flood. Generally, it would have to be shown that any alterations to the banks would be safe to withstand erosion or scour from a flood of that magnitude and not otherwise reduce flood safety. The anticipated bank alterations along the project reach would primarily include reduction of bank slopes and laying back the slope along the existing parking lot area.

It is not anticipated that these modification, if done using appropriate hydraulic engineering principles, and by choosing appropriate slope armoring materials, would pose any adverse hydraulic effects, as long, as the cross-sectional area is increased through material removal. However, it is not suggested that alterations of the banks are done below the 5 year flood levels or around an elevation of 810 ft. Even if suitable bank armor materials are available, these areas contain very large boulders that are deeply embedded in the channel materials. Dislodging this complex armor may result in substantial instability of the channel bed.

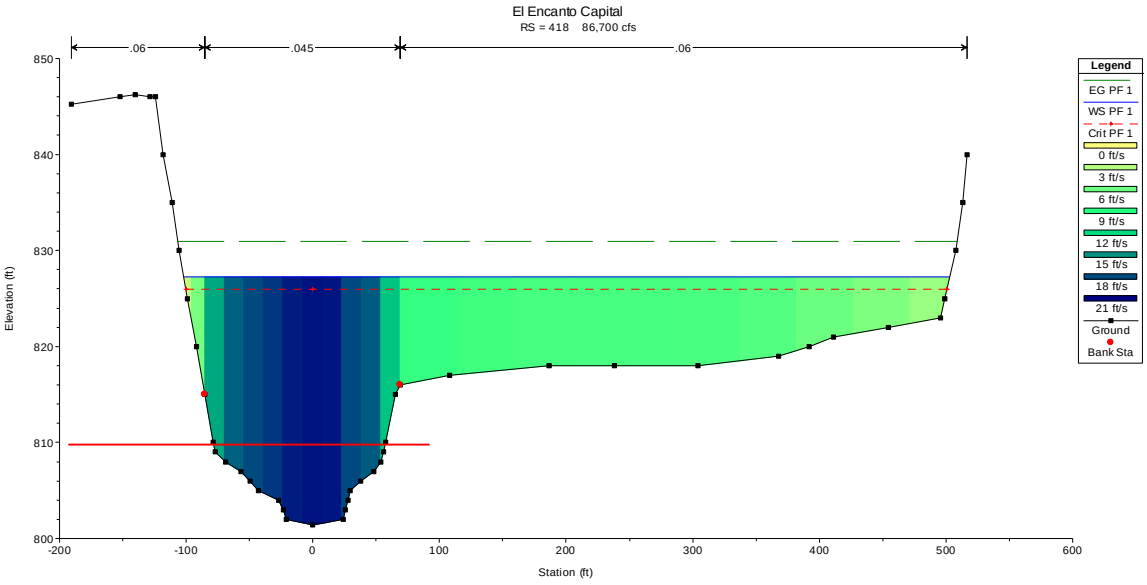


Figure 7: Flow velocity zones along section 418 for the Capital Flood

Bank Elevation Zones

The above hydraulic analysis ultimately leads to a set of recommended bank zones that are determined by certain frequencies of inundation that are relevant to either flood safety or associated physical conditions along the river reach that will dictate restoration strategy. The zones are summarized in figure 8.

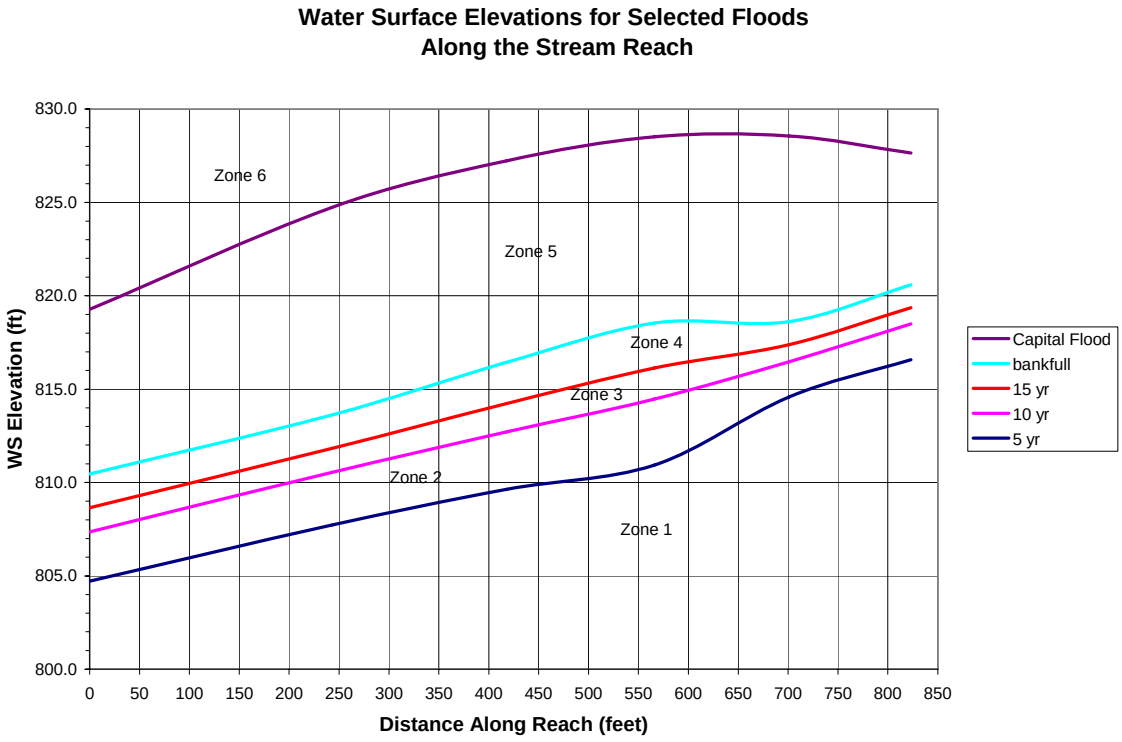


Figure 8: Recommended Flood Zones along the Banks.

Zone 1
This is the actual active stream channel comprised of boulders and cobbles. No physical alterations should be done within this zone except for limited planting of very flood-resistant riparian plants that thrive under conditions of frequent inundation and erosion.

Zone 2
This zone is reserved for riparian plantings that are commonly impacted by floods and often depend on flooding as a mechanism of propagation or rejuvenation. Intense flooding is a certainty for this zone in 5-10 year intervals. This is a zone that would be a major candidate for limited bank alterations along the northern bank. Alterations could include laying back of the top slope to create narrow benches or a series of small pocket benches that would function similar to floodplains and be inundated frequently. Constructed properly, the pockets could be supplemented by sand to mimic a sandy river beach environment. Along western streams these environments tend to be prime willow

riparian ecosystems. No other physical alterations should take place in this zone and it is not recommended to allow public access within this zone.

Zone 3
This zone is an area that functions as a transition to the less flood tolerant plant species that are adjusted to infrequent flooding every 10-15 years. Similar to Zone 2 this area could be used for bank alterations of the northern bank. Inundated less frequently, this area would sustain larger trees species. No other structural improvements should be allowed in this zone.

Zone 4
This Zone is located between the 15 year flood level and bankfull discharge for the channel. It is well suited for the planting of the larger riparian tree species but also allows planting of general oak woodland varieties. While this area appears to be a stream bank topographically, it would be part of the upland vegetation areas from a hydrologic perspective. It is anticipated that some of the nature trails along the stream would be located in the upper portion of this zone because it would provide access to restored riparian and upland areas simultaneously and because a primitive nature trail would unlikely sustain major damage in this area. No other structural alterations are recommended in this zone.

Zone 5
This zone is only inundated infrequently and is sufficiently removed from flooding to allow planting of a large variety of non-riparian plants including large oak trees. Structural changes to the steep slope of the southern bank would be feasible in this zone, and it is suggested that various larger trail improvements and viewing areas can be designed for this zone. At elevations above 820 ft in the central portion of the reach structures would have a 30-year flood protection, and even the Capital Flood would only produce flow velocities of 3-6 ft/s in this area.

Zone 6
Any structures requiring the Capital Flood Protection would be located in this zone.

Endnote:

The intent of this work is to narrow down the available planning choices for restoration work and structural improvements at the El Encanto Property. This is done by careful evaluation of the hydrologic and hydraulic boundary conditions imposed by the San Gabriel River. This work is performed using scientific principles commonly employed in the sciences and hydrology. This is a planning study and all work is preliminary. None of this work constitutes engineering work required for actual project design implementation and permitting. While we believe that this material is highly useful in the future, all project elements will require substantial additional work including a final engineering review and engineering approval.

Sources:

County of Los Angeles Department of Public Works (2007): Morris Dam Water Supply Enhancement Project, Final Initial Study and Mitigated Negative Declaration, Prepared By: EDAW Inc., March 2007.

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United States Department of Commerce, NOAA (2002): Climatography of the United States, No.81, Monthly Station Normals of Temperature, Precipitation, and Heating and Cooling Degree Days 1971 – 2000.

United States Department of Commerce, NOAA (2004): Climatography of the United States, No.20, Monthly Station Summaries 1971 – 2000.

Exhibit E - 2007 RWP Site Programming, Planning & Concept Report

APPENDIX B4

EXISTING ARCHITECTURAL CONDITIONS

Exhibit E - 2007 RWP Site Programming, Planning & Concept Report

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EL ENCANTO
Architectural Report

ALAN BERNSTEIN, AIA + ASLA,

ARCHITECTS AND LANDSCAPE ARCHITECTS

Wednesday, September 19, 2007

Figure: Proposed Overall Building

DESIGN AND RENOVATION OF EXISTING BUILDINGS

Introduction

Alan Bernstein, Architects and Landscape Architects are the architectural consultant for the project. The firm focused on the reviewing the existing structures on site, which included the restaurant, garage and apartment units. Documents were prepared defining the alternative building programs or uses. Placement and design of proposed additional architectural elements such as the trellis and façade changes were reviewed. We prepared design standards, pertinent technical criteria and guidelines to be considered when designing an open space facility that is to be efficient, effective and responsive to the present and future operational requirements of the proposed users.

The architects participated in workshop meetings with the project team to understand and convey the possibilities of the structures on the site. Three alternative approaches for the programmatic uses of the structures and architectural design were prepared. Presentations were made to the Agencies, the Stakeholders and the Public, resulting in the selection of the "Nature Experience" program, a low impact outdoor experience of the site. The interior use of the structures is to be by the Rivers and Mountains Conservancy. The Public is to use the exterior spaces such as the proposed trellis and porches.

We have also developed sustainable strategies for the structures. The strategies would be in two parts, building materials and energy conservation. The approach to the conservation of materials and energy relates and influences the design guidelines.

The Existing Conditions – Residential Structures

Originally, the El Encanto Restaurant was a beautiful two-story single-family stucco residence in a Spanish Mediterranean style with clay barrel roof tile, rough textured stucco, stone fireplaces and wood lintels over the windows. It is built with un-reinforced masonry, which was common at the time the structure was built. It probably had a lawn down to the river. People came to enjoy the restaurant and the cool river water for the day. Up until a few years ago the main building served as a Restaurant.

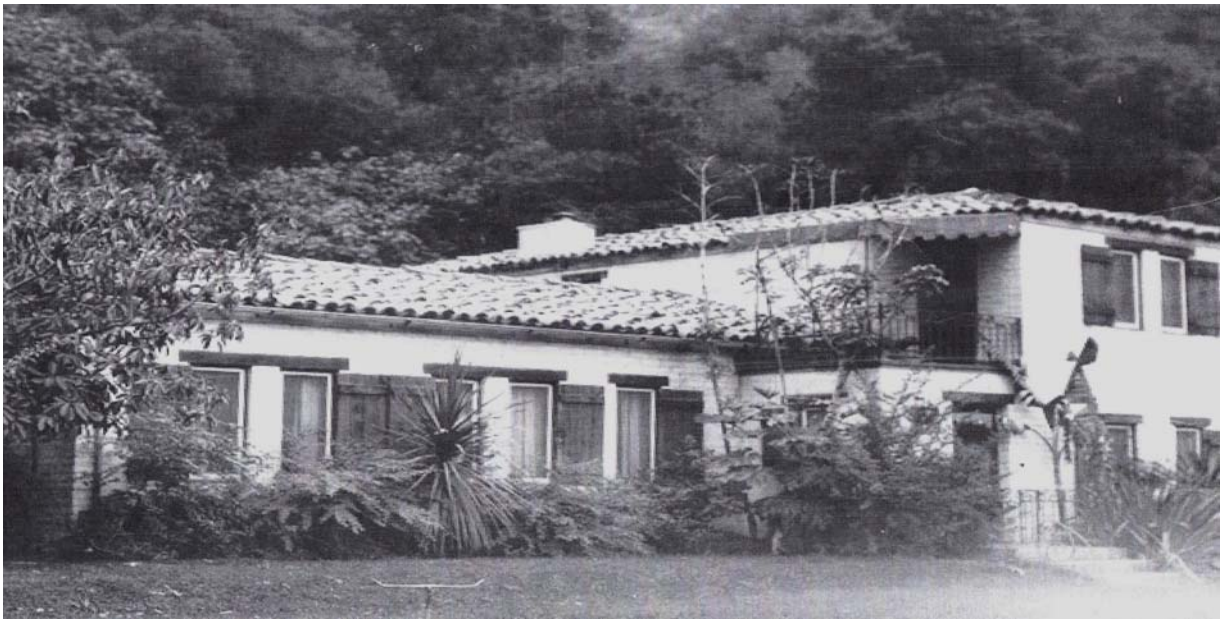


Figure: Original Photo of House

At the center of the current restaurant is the original residence.

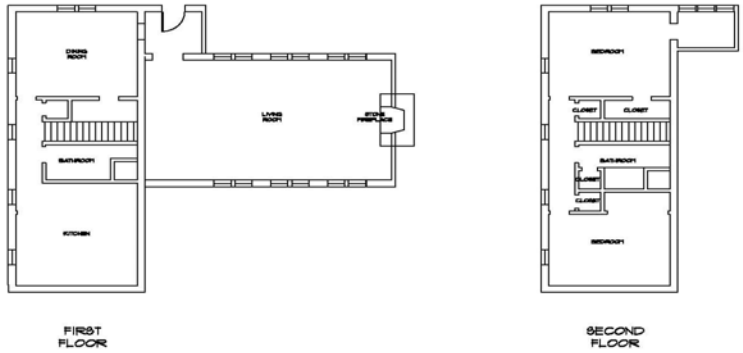


Figure: Original Floor Plan of House

As a restaurant in the 1960's, additions appear to be made on all sides of the original house at different times. Till we arrive at today's building, which is broken up into four major rooms plus service spaces. In the rear of the building is a patio that is shaded by the verdant growth of trees on the steep hillside. Retaining walls keep water from the hillside from flowing on to the patio and into the building.

Figure: Existing Restaurant

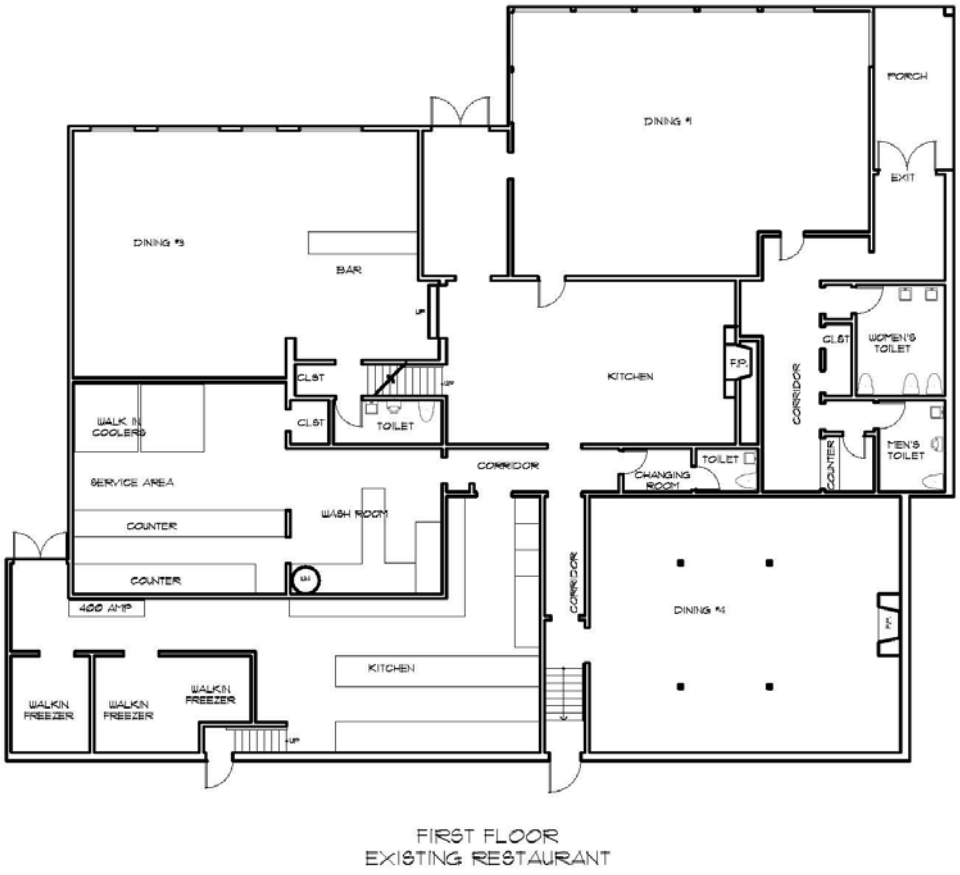


Figure: Existing Restaurant Floor Plan

Figure: Existing Front Elevations

To the northwest or left of the restaurant is a carport and garages with a small single residential unit above. The buildings are also stucco built at a latter time as the restaurant expanded. Between these buildings water drains down from the slope above through the carport.

Figure: Existing Garage and Apartment

Further to the left of the main building is a two-unit apartment structure. It appears this structure was built after the structures because of the slump block retaining walls in front of the structure. One unit is currently the Rangers residence.

Figure: Existing Two-Unit Apartment

To the right of the restaurant and up the hill was a 10-unit mobile home park. The area is further discussed by Blue Green Consultants.

Square footage of the existing building for the first floor is 7636 square feet to outside of the walls. The second floor is 844 square feet. The total square footage of the main building is estimated at 8480 square feet.

Architectural Building Analysis of Existing Restaurant Building

The architects reviewed the existing restaurant structure in 2006; we recommend renovating the existing structure rather than demolishing it and building a new structure. The existing structure has positive and negative aspects as follows:

Geology: From old paintings and photos of the site the original house structure appears to be on solid ground. From the house to the river the ground slopes dramatically. This sloped area is now a flat parking lot with fill that is probably not certified or compacted fill. Rebuilding on this site may lead to extensive geologic testing, extensive removal of un-compacted soil, cleaning, replacing and re-compacting of soil in small lifts or layers to create a certified and compacted pad.

Drainage: Surface runoff from the slope behind the structure is probably the largest risk. Walls on the patio; the channel between the structures; and the constant running water indicated the drainage will be an on going issue. With the assistance of a Civil Engineer, the drainage can be attractive feature of the site. The drainage maybe expressed by different government agencies, as something other than drainage, such as a creek or environmentally sensitive habitat area. If so, any new structure would need to be set back away from this zone, or require zoning modifications and variances from many different agencies.

Figure: Drainage Looking Through Carport

Figure: Drainage Looking Up The Hill

Structural: The original Mediterranean style house is un-reinforced masonry. Our recommendation is to remove the structure from the core of the building and provide a new roof. The other option is to reinforce the existing structure. Either way structural engineering will be required. For public use the buildings should be brought up to current earthquake structural standards.

Architectural: The rooms in the front (river side) of the building are comfortable with the natural light flowing in. The proposed rooms in the back of the building do not have natural light. If used for a conference room or storage as proposed then these rooms are acceptable.

The physical condition of the buildings needs repair work because they have been neglected. In the rear dinning room the wood beams show signs of dry rot and there are holes in the wall to the outside. The building through out is in need of good maintenance and a new roof.

Permits: It should be noted that rebuilding would require various permits and conformance to current codes. This may result in variance, modification and planning hearings. Besides the planning and building departments, other agencies governing the river would review the plans.

Conclusion: Taking in all these factors it would either be expensive to build a new building in this location. Or we may not be able to build in this location because of the various Planning, Zoning Geologic and Building Code constraints.

Current Status

Other architectural consultants have prepared plans for the renovation to convert the use from a restaurant to an office. The Plans describe renovating the toilet room's finishes and plumbing, to repair the roof, provide handicap accessibility, provide new lighting and improvements to the electrical systems, provide improvements to the air conditioning systems and increase the structural integrity of the building.

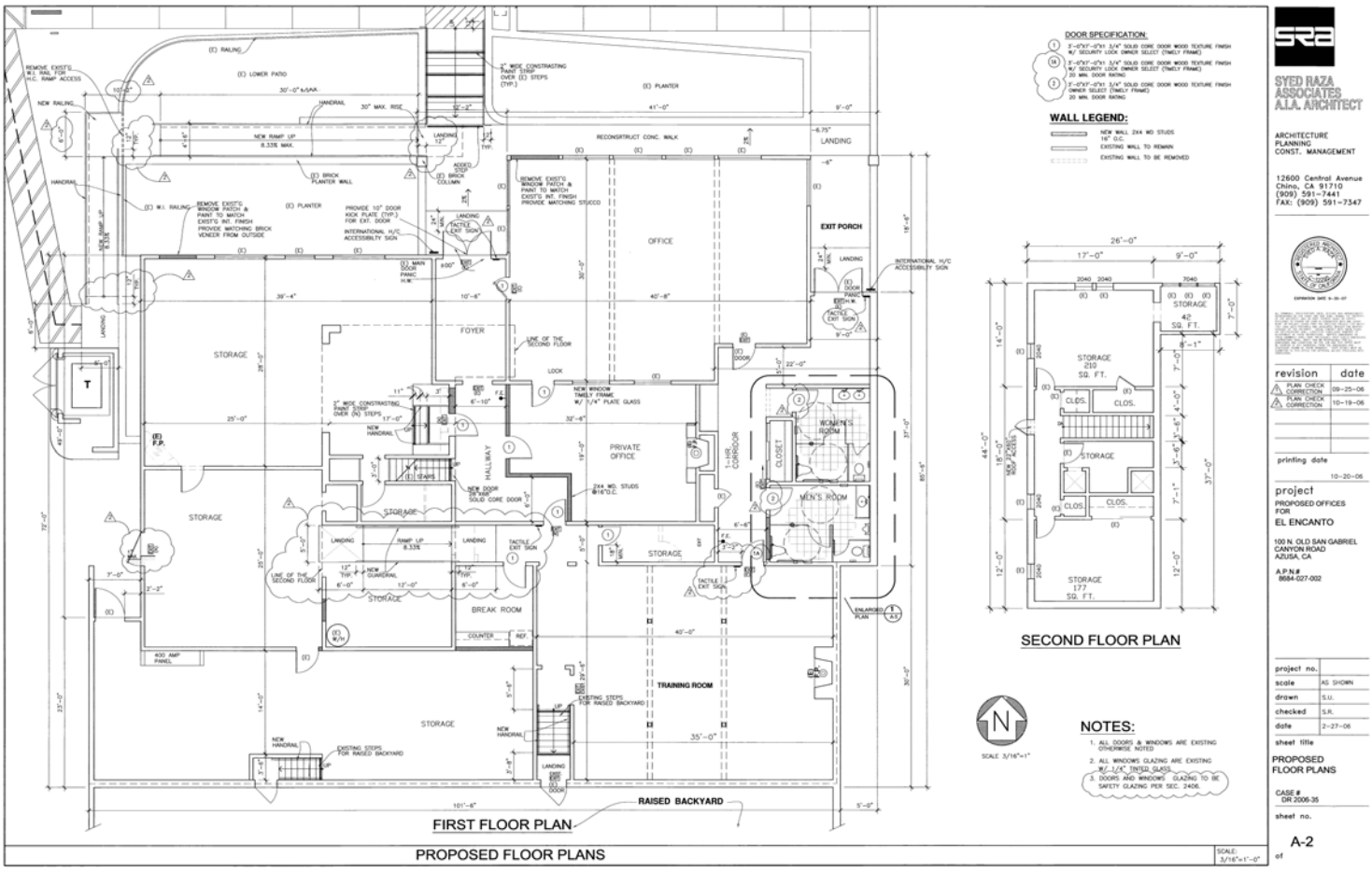


Figure: Remodeled floor for new offices

Zoning

In brief discussion with Lawrence Onaga, Assistant Director for Community Development for the City of Azusa, has participated in one Technical Advisory Committee meeting and is familiar with the project; he says that the area is designated as Open Space. This appears to have a wide range of interpretations including the near by horse facility and the Buddhist Temple. There is no set determination for parking requirements for the park portion of the project. A recommended allowance of space shall be set aside for 1 or 2 school buses that may visit the site and for weekend visitors. Visitors could use the office space parking on weekends.

For the Administrative or Office use by the Rivers and Mountains Conservancy one space per 300 square feet is required by the City of Azusa. The total square footage of the building is 8480 to outside face of walls. Approximately 33% of the building will be use for office space. The remainder shall be storage or conference facility. For Storage Space one space per every 2500 square feet.

For each residential one bedroom apartment one parking space within a garage is required. If all three apartments are used then 3 covered garage spaces will be required. If they are used for administrative purposes then the parking spaces can be calculated as office.

Park parking spaces	Allow 10 parking spaces Allow for 2 school buses
Office space	Allow for 20 spaces
Storage space	Allow for 1 space
Apartment units	Allow for 3 garage spaces or obtain modification

Minimum parking required spaces is estimated at 34 car parking spaces plus 2 buses. The final parking count is to be determined with the City of Azusa.

Refer to the following three pages for the City of Azusa parking requirements, Article 3 – Site Development & Operational Standards.

Chapter 88.36 – Parking and Loading

TABLE 3-7 - PARKING REQUIREMENTS BY LAND USE (Continued)

Land Use Type: Recreation, Education, Public Assembly	Vehicle Spaces Required
Commercial recreation facilities - Indoor	
Arcade, billiards, pool	1 space for each 150 gsf of floor area
Bowling alley	5 spaces for each lane, plus as required by this table for accessory uses.
Skating rink	1 space for each 100 gsf of rink, plus as required by this table for accessory uses.
Commercial recreation facility - Outdoor	Determined by Use Permit
Golf course - Spaces required as follows, plus as required by this table for accessory uses (e.g., shop, bar, restaurant, etc.)	
Golf course	4 spaces for each hole.
Golf driving range	1 space for each tee.
Miniature golf course	3 spaces for each hole.
Health/fitness facility	1 space for each 100 gsf of floor area.
Library, museum	1 space for each 300 gsf of floor area.
Meeting facility, public or private	1 space for each 8 fixed seats (or 144 in. of bench seating; or 1 space for each 100 gsf of floor area if no seats are provided; including classrooms.
School (public or private)	
Elementary or middle school	1.5 space for each classroom, plus 1 space per 5 fixed seats in auditorium, gym, or other assembly facility, or 1 space for each 35 gsf of floor assembly floor area with no fixed seats.
Secondary (high) school	1.5 spaces for each classroom, plus 1 space for each 5 students based on maximum student capacity.
College, university	1 space for each employee, plus 1 space for each 5 students based on maximum student capacity.
Specialized education/training	1 space for each 3 students, plus one space for each employee.
Studio (art, dance, martial arts, music, etc.)	1 space for each 100 gsf of floor area.
Swimming pool (public, private and commercial)	1 space for each 100 gsf of pool deck area.
Tennis/racquetball/handball or other court	3 spaces for each court, plus as required by this table for accessory uses.
Theater	
Cinema	1 space for each 5 seats; plus 7employee spaces for a multi-screen facility and 5 employee spaces for single-screen facility.
Live performance	1 space for each 4 seats.

DEVELOPMENT / ZONING CODE:

ARTICLE 3 - SITE, DEVELOPMENT & OPERATIONAL STANDARDS

CHAPTER 88.36 - PARKING AND LOADING

TABLE 3-7 - PARKING REQUIREMENTS BY LAND USE (Continued)

Land Use Type: Residential	Vehicle Spaces Required
Caretaker/manager unit	2 spaces for each unit.
Rowhouse, townhome, and courtyard units:	
Studio or and one-bedroom unit	1 space within a garage for each unit
Two to four bedroom units	2 spaces within a garage for each unit;
5 or more bedroom units	3 spaces within a garage for each unit.
Guest parking	1 guest space for each 3 units in a project of five or more units.
Duplex	2 spaces within a garage for each unit.
Live/work unit	2 spaces for each unit.
Mobile home	
Individual mobile home	2 spaces within a garage.
Mobile home within a mobile home park	2 spaces for each mobile home, plus 1 additional space for each 4 mobile homes shall be provided for guest parking, which shall be dispersed throughout the park.
Multi-family dwelling - apartments	
Studio or and one-bedroom unit	1 covered space within a garage for each unit.
Two or more bedroom unit	2 covered spaces within a garage for the first 2 bedrooms, plus one additional space, covered or uncovered, for each additional bedroom.
Guest parking for all of the above	1 space for each 3 units in a project of 5 or more units..
Organizational house	1 space for each bedroom.
Residential care home	
Six or fewer clients	2 covered spaces within a garage.
Seven or more clients	1 space for each 3 beds, plus space for on-site employee housing.
Rooming or boarding house	1 space for each bedroom.
Second unit or carriage house	As required by Section 88.42.190 (Second Units and Carriage Houses).
Senior housing project	1 space for each unit in a garage, plus 1 guest parking space for each 4 units.
Single-family dwelling, detached	2 spaces within a garage for dwelling with 4 or fewer bedrooms; 3 spaces within a garage for dwelling with 5 or more bedrooms.

TABLE 3-7 - PARKING REQUIREMENTS BY LAND USE (Continued)

Land Use Type: Services	Vehicle Spaces Required
Bank, financial service	1 space for each 200 gsf of floor area; 4 spaces minimum.
Child day care	See Section 88.42.060.
Equipment rental	1 space for each 300 gsf of floor area, plus 1 space for each 1,000 gsf of outdoor storage and rental area.
Lodging	
Bed and breakfast inn	1 space for each guest room, plus 2 covered spaces for the resident family.
Hotel or motel	1 space for each guest room, plus required spaces for accessory uses.
Medical services	
Clinic, doctor office, laboratory	1 space for each 300 gsf of floor area.
Hospital	1 space for each 2 patient beds the facility is licensed to accommodate, plus 1 space for each employee on largest shift.
Mortuary, funeral home	1 space for each 8 fixed seats (or 144 in. of bench seating; or 1 space for each 100 gsf of floor area if no seats are provided.
Offices	
Business and service	1 space for each 300 gsf of floor area; 4 spaces minimum.
Processing	1 space for each 150 gsf of floor area.
Professional	1 space for each 300 gsf of floor area; 4 spaces minimum.
Personal services - All except the following	1 space for each 250 gsf of floor area.
Laundromat	1 space for each 3 washing machines.
Vehicle services - All except the following	(All customer parking shall be clearly marked and not be used for parking of unregistered vehicles. No damaged, inoperative, wrecked, or abandoned vehicles shall be stored in any exterior area for more than five days.) 2 spaces, plus 3 spaces for each service bay (service bays do not count as spaces).
Car wash - Self service	2 spaces for each wash bay (wash bays do not count as spaces).
Car wash - Full service	4 spaces for each 20 ft of length of washing structure or area.
Veterinary clinic, animal hospital, kennel	1 space for each 300 gsf of floor area; 4 spaces minimum.

Alternative Plan Review

We reviewed several alternative and combination of uses for the main building. The uses can be classified in three major categories.

The first is used as an “Educational Center” in which the spaces are used for fixed and interactive exhibits, classrooms, staff, restrooms and a catering kitchen to serve lunch. This scenario would be geared toward students visiting for the day to the site. This scheme also had implications in the landscape development such as outdoor amphitheater and interpretive trails.

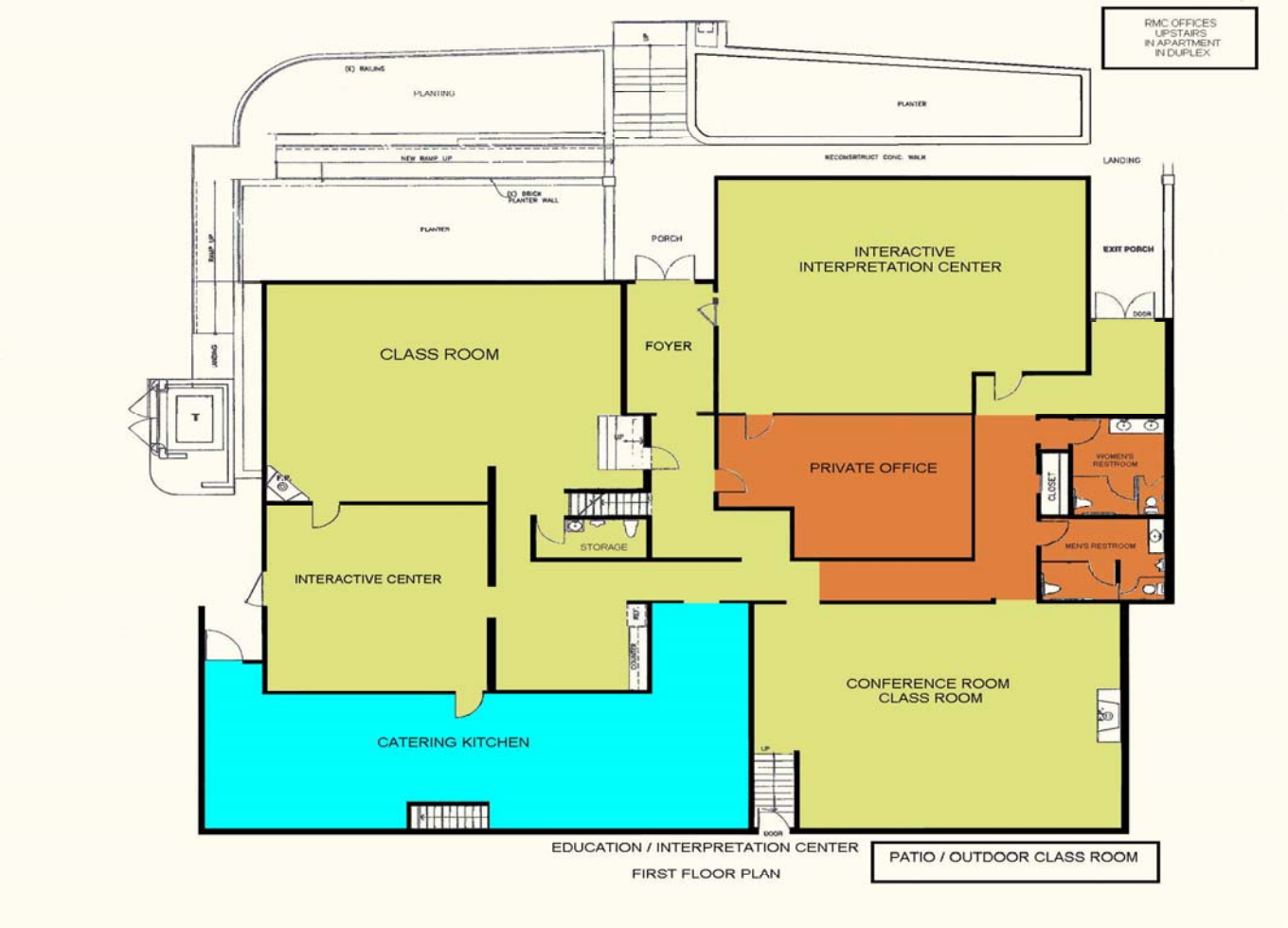


Figure: Education Center

The second category of uses was as public facilities or “Visitor Services”. This might include large restrooms for public use, nature bookstore, tearoom, tea dinning patio and outdoor spaces that could be rented to the public, museum and interpretive center.

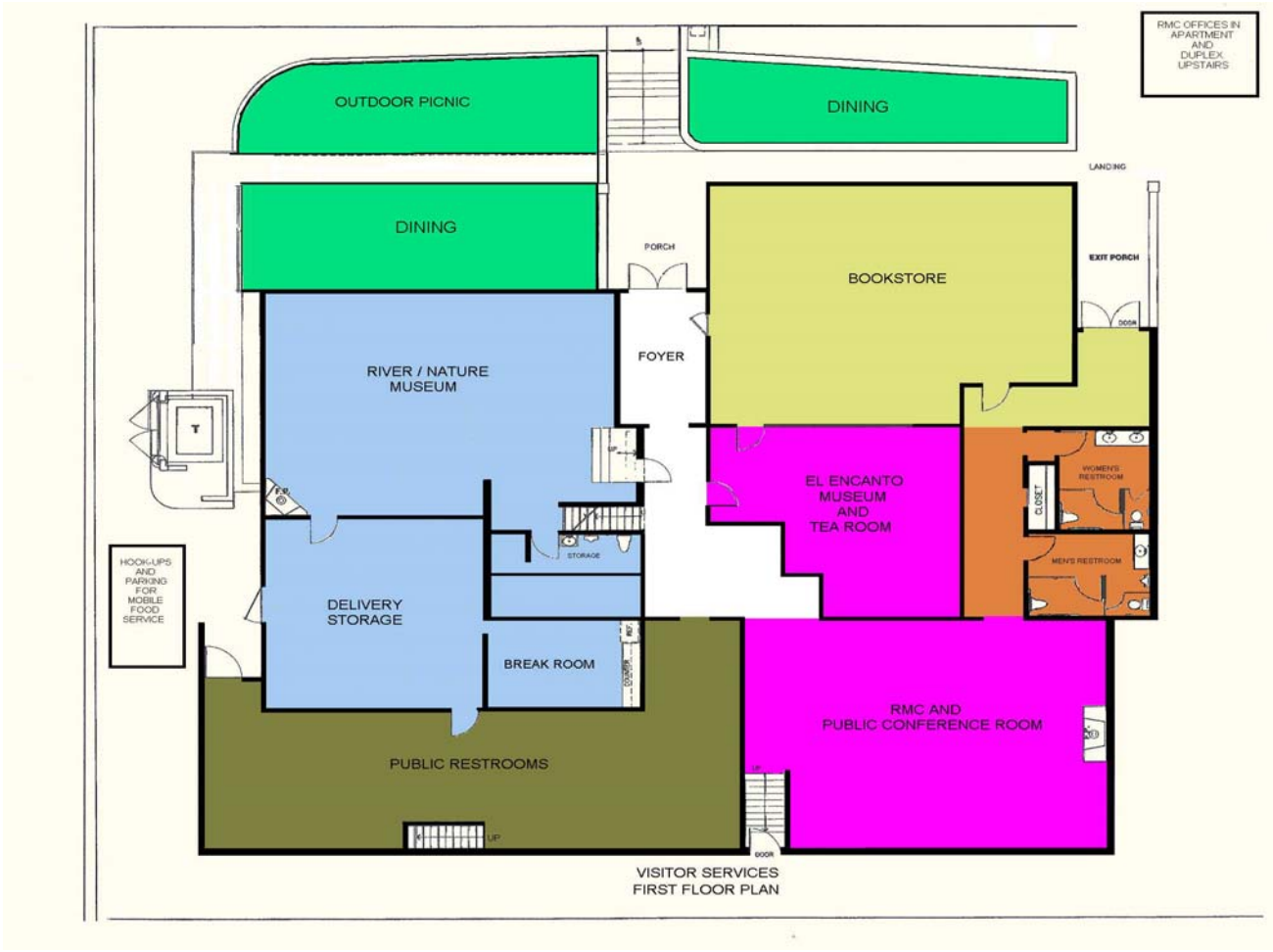


Figure: Visitor Services

The third category of use was to use the building as public agency space to manage the park or "Nature Experience". This includes offices, restrooms for the agency use, conference space for agency use and storage space. The public would then use outdoor spaces and separate restrooms. This is the program that was selected by the agencies, stakeholders, and public.

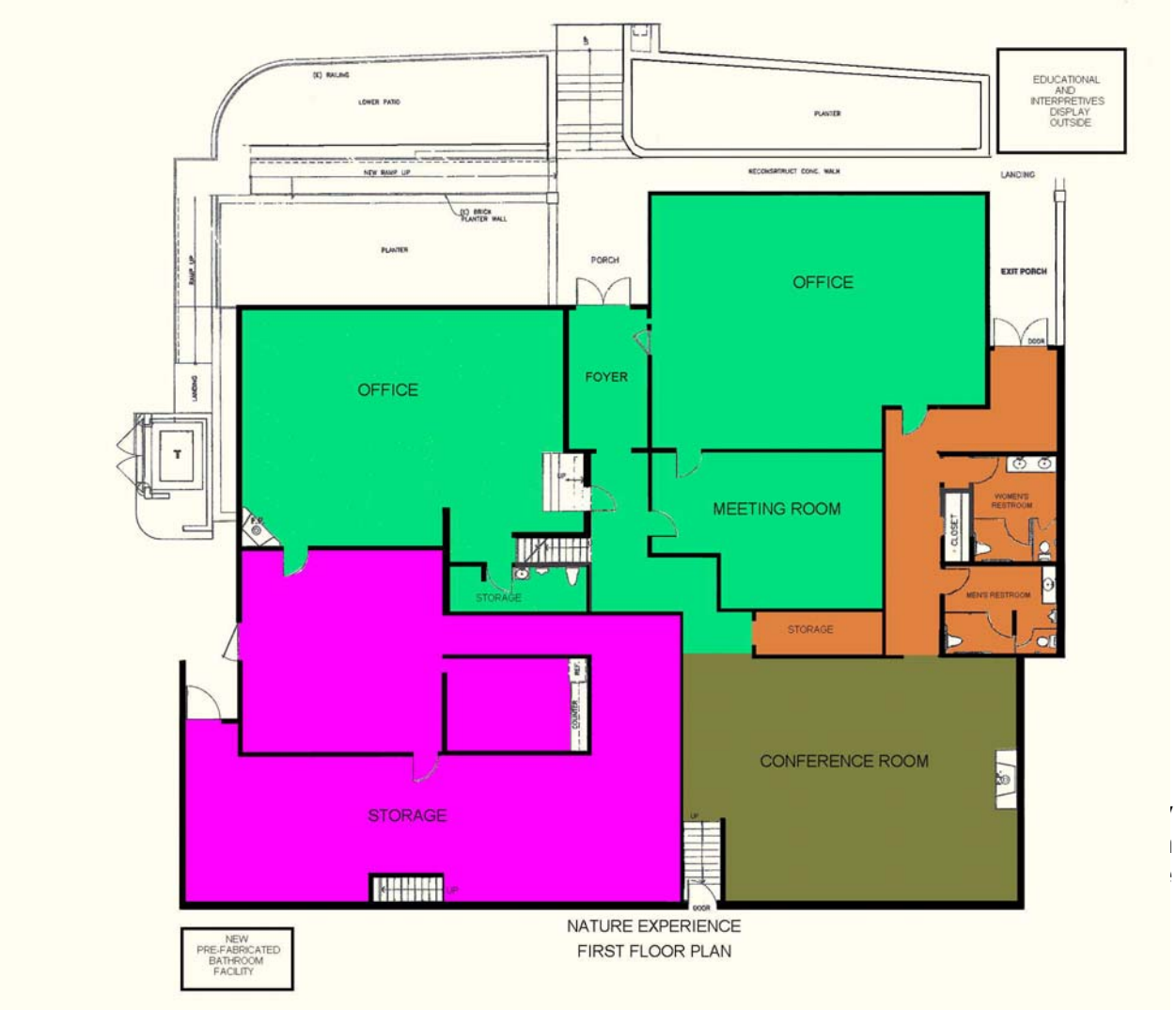


Figure: Nature Experience

Proposed Use of the Existing Buildings

Figure: Proposed Building

The occupants for the structures will be the Rivers and Mountains Conservancy and the Watershed Conservation Authority. The unit over the garage will be used as operational offices for park staff. The duplex unit will be utilized as operational offices and living quarters for a park ranger or security guard for the park. The main building is to include space for operational offices for park staff, conference room, restroom, and storage. On the exterior of the building will be a new large covered porch. This will be a place where staff or weekend visitors could sit and admire the surrounding landscape.

Large stairs would invite the visitors to the primary outdoor gathering space. Public outdoor courtyard with interpretive displays would be built between the main building and the apartments. The courtyard would have a steel trellis for longevity and fire safety. In the terraces area would be flowering trees and a simple fountain to relate to the river. Visitors could rest by the fountain or in the sun on the stairs.

The unit over garage to be used for operational offices for park staff.

The duplex unit for operational offices and living quarters for a park ranger or security guard for the park.

Two pre-fabricated restroom facilities would be brought to the site for public use. A sanitation company would maintain these units.

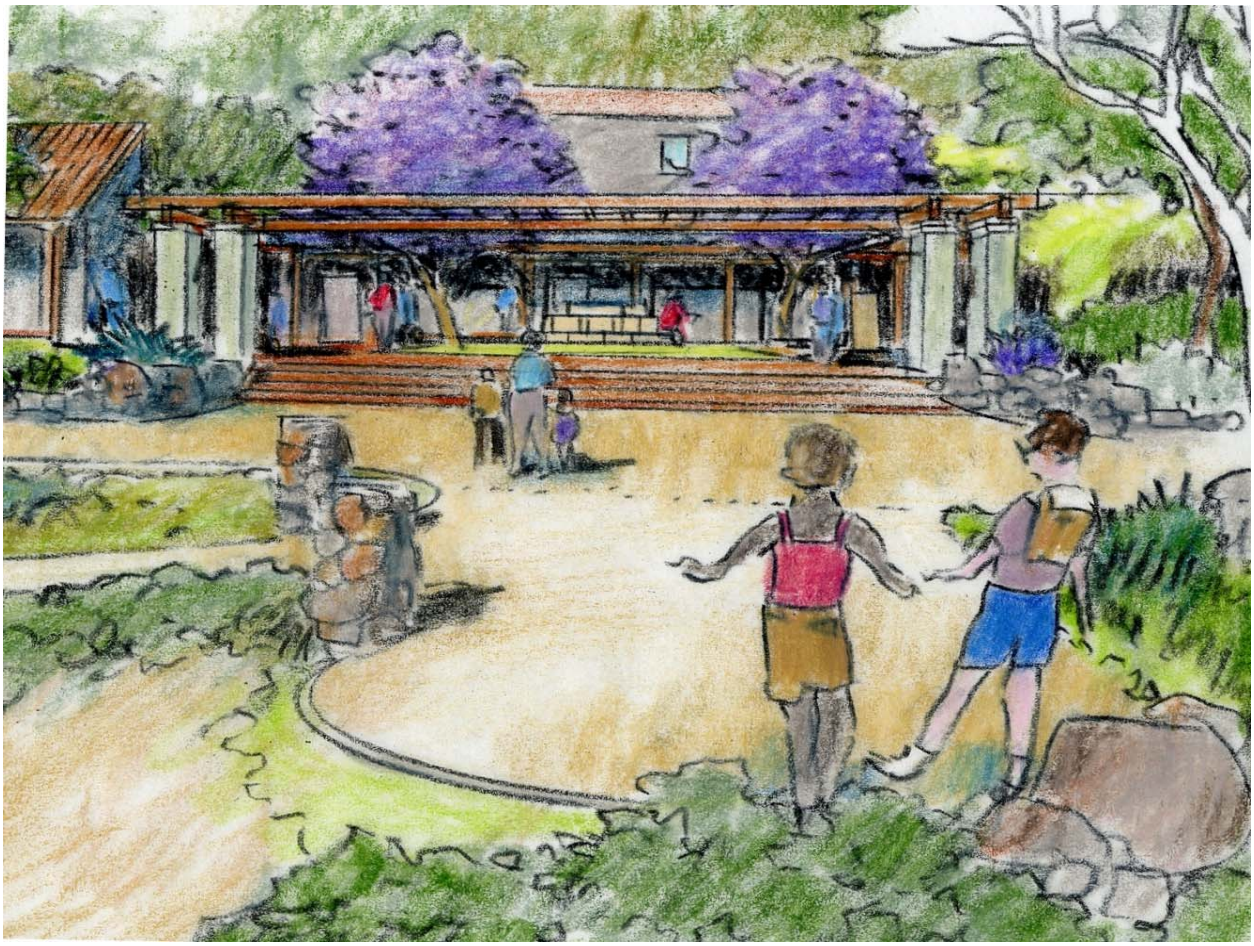


Figure: Trellis

Visitor Services

No consumer or visitor services would be provided at the site. Services will be limited to restrooms, water and trash disposal. Self-guided outdoor educational/interpretive elements will be located near the near buildings, refer to Blue Green Report.

Figure: Trellis Detail

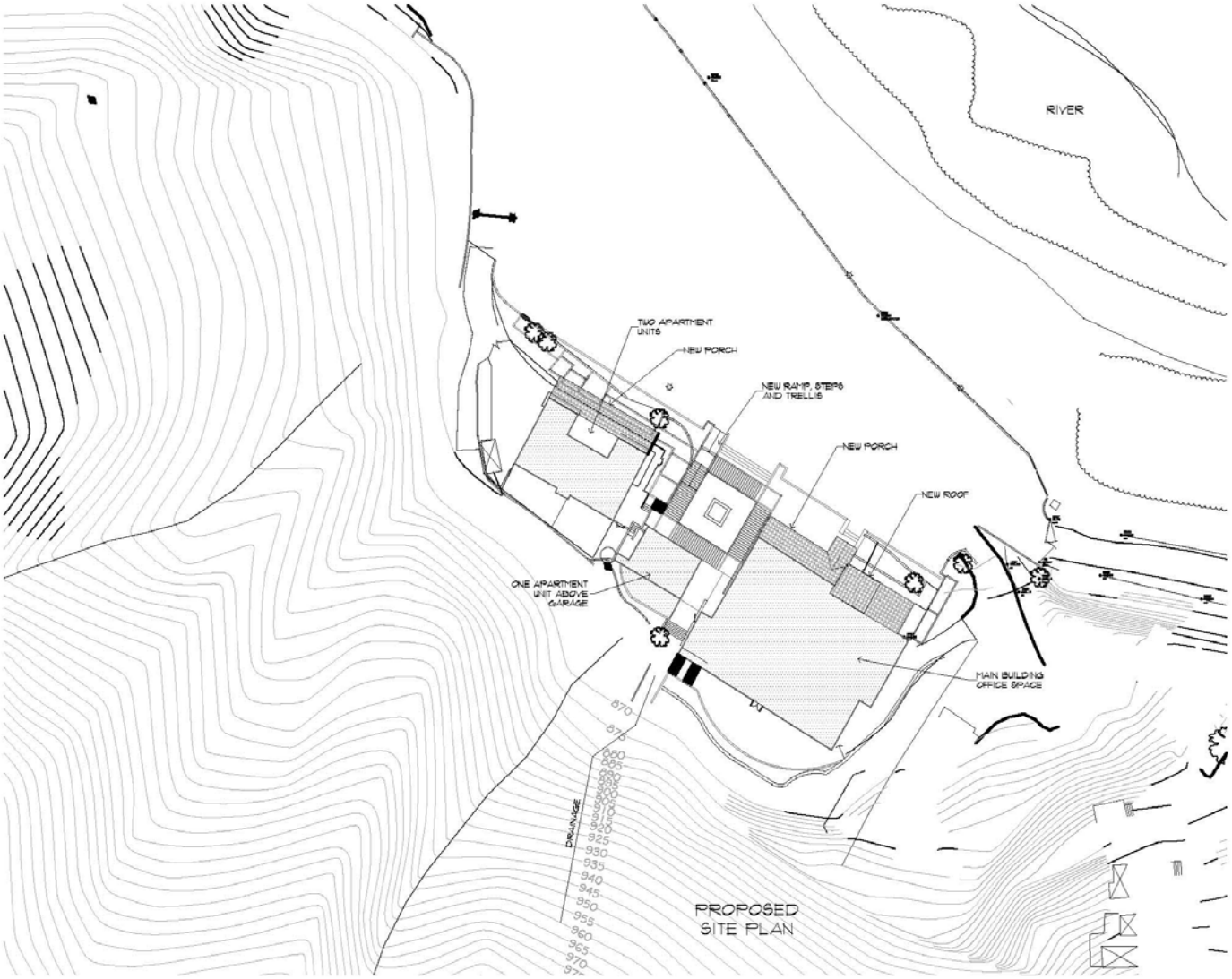


Figure: Proposed Site Plan

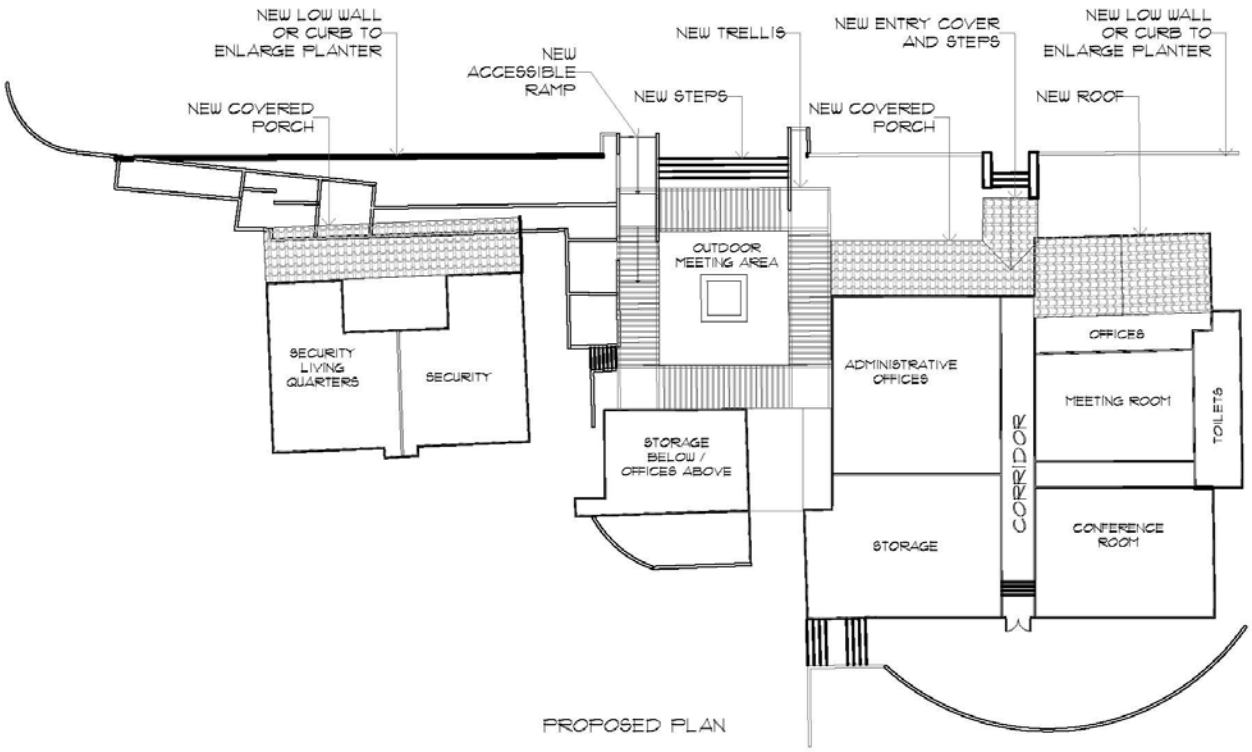
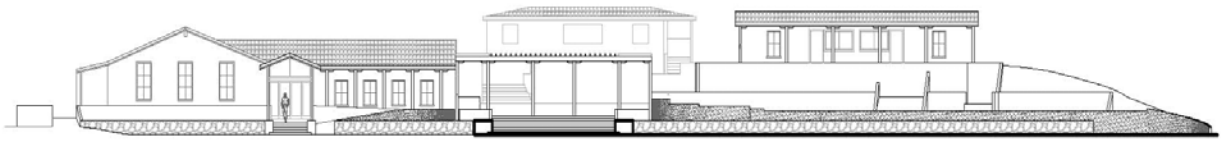


Figure: Proposed Plan



PROPOSED
ELEVATION

Figure: Proposed Front Elevation

Final Design Architectural Plan

The architect, the consultants and the stakeholders reviewed different architectural styles that would be appropriate for the building. The group came to the conclusion of interpreting the style as illustrated by a picture of a Columbian Farm House. (Casa Hacienda, Architecture in the Columbian Countryside, by Villegas, Tellez, and Castaneda, published by Villegas Editors, 1997) This style relates back to the original house that is the center of the existing structure. The style utilizes the Spanish roof tile, rough stucco texture, new porches and trellis. The new porch and trellis will help change the character of the building, with the least changes to the internal structure. The result would be complex of structures with simple façade modifications to create the Columbian Farm House reference.

Figure: Columbian Farm House

The modifications would include porches, trellis, modifications to façade windows and doors, and mansard type Spanish tile roofs on the front face of the building. We recommend the new front windows to be fiberglass frames with high performance dual glazing and window sunshades or coverings. The fiberglass frames will look like wood but will have a long maintenance free life. The front doors too can be insulated fiberglass with an impregnated wood grain then painted. Doors, windows, columns and beams would be painted a rust colored brown. The trellis and underside of the porch roof shall be wood from certified lumber by the

Forest Stewardship Council or steel. The buildings and structures shall be painted a soft green with low VOC or low-emitting emissions from paints and coatings.

The public spaces are orientated to the exterior toward the river. The porches and trellis would give the public space to gather without going inside the buildings. The porches and trellis would also offer some relief from the sun. Along with the changes to the windows and doors the new design will become a beautiful backdrop to the park and save energy. Changing the color of the buildings to blend or compliment the trees behind them could also enhance the beauty of the site.

As part of the new terracing of the Site, there will be grading in front of the buildings raising the current grade or level of the paving. As the landscape grades change, the handicap access to the building will also change. The configuration of the handicap ramps of the exterior of the building would change and allow for removal of a portion of the retaining walls. The existing retaining walls shall be waterproofed from the planter or backside and proper drainage added. The front side of the walls shall have a stucco finish to create the continuity of the buildings into the landscape. The wall shall be painted to match the buildings.

Other small buildings such as the park toilets, enclosures and trash enclosures shall integrate into the park environment. The restrooms can be screened by a combination of stone and stucco walls. The stone can come from the nearby Vulcan Material Company. The stone can be stacked from larger to smaller up to approximately 3 feet. The stucco and paint shall match the buildings.

Paving, Steps and Ramps adjoining the buildings shall be poured in place colored concrete, with exposed pea gravel finish.

Conclusion

The proposed porches and trellis will mask the existing buildings. The façade will be human in scale. The columns and roof will breakdown the massive facades that are too flat and out of proportion with the existing environment. The renovated buildings will integrate comfortably with the restoration of the river, river terraces, planting and beauty around them.

Figure: El Encanto Entrance

GREEN BUILDING GUIDELINES

The U. S. Green Building Council LEED rating system has made their definition of green design restively simple and easy to follow. To summarize the main message is to…

"Disrupt the natural surroundings as little as possible
and demand the least from the earth to support your project."

- Build buildings near existing infrastructures.
- Prevent rain and irrigation water from running off your site. Make use of it for irrigation or consider providing a gray water system to reduce potable water demand.
- Use plants to provide shade for your project. Native plants and /or low water plants for your climate zone are optimum to reduce or eliminate the need for irrigation systems.
- Select roofing and paving material that reflects light to reduce heat islands (the thermal gradient temperature change between developed and undeveloped areas).
- Consider nocturnal lives of animals and humans by reducing light trespass to adjoining properties and the night sky.
- Provide the smallest building footprint and disturb the least amount of natural plant and animal habitat.
- Incorporate details and components that encourage people to use public transportation, hybrid vehicles, or bicycles.
- Make the building as energy efficient as possible. Consider providing some of your own green power- solar, wind or hydraulic.
- Reduce ozone depleting CFC-based refrigerants and provide carbon dioxide sensors in the HVAC systems.
- Commission your building systems to assure that they are working at their peak effectiveness.
- Recycle construction waste and encourage building occupants to recycle.
- Use products with recycled content and those that are harvested and or manufactured regionally. Purchase wood products from foresters that follow the Forest Stewardship Council's (FSC) guidelines.
- Improve the quality of the air in a building for construction workers and all future occupants by eliminating tobacco smoke and specifying products with low VOC content. Provide ventilation systems that effectively introduce outside air.

- Provide natural daylight and views to as many occupants as possible.

Green Building at El Encanto

The goal of the overall project is to promote good stewardship of both the natural environment and the artifacts of the cultural landscape. By preserving the existing structure and adapting it for new uses many natural resources are saved. The footprint of the small additions to the building does not go outside of the already disturbed areas. The goal of the landscape is to restore the native riparian environment as discussed in other sections. The roof and parking lot drainage water drainage is to filter through bio swales in to the water table.

Wastewater from the buildings ties into the City sewer system. New toilets for public use on site should also tie into the City sewer system. New toilets inside the building shall be low flow toilets.

As portion of the structure are remodeled and the walls are open the walls shall be insulated. Attic spaces as well shall be insulated. In areas where there is no attic, rigid insulation shall be used under the roofing. The roof material on the flat roof shall be light in color for higher reflectance and less heat gain. Increased insulation levels will make the structures more resistant to energy loss, reducing pollution for energy production and lowering energy costs.

Air conditioning units on the roof shall be of high California State SEER ratings to provide the energy efficiency possible. The refrigerants in the units shall not rely on fluorocarbons to have less impact on the ozone layer. Good air filtering systems shall be provided to maintain excellent indoor air quality. The air handling system shall also be able to provide varying amounts of outside air up to 100%, depending on current climatic conditions. This could also be achieved through operable windows and a means of cross ventilation.

The existing flat roofs offer excellent opportunity to provide solar panels for heating of water and photovoltaic use. Since this is a public project the long payback period for solar panels can make economic sense. Painting the roof in reflective colors will also save energy

As the building is occupied there shall be a plan for Building Commissioning. This process ensures the building systems are designed, installed, tested and capable of being operated and maintained according to the owner's operational needs. Commissioning can certify that a new building begins at optimal productivity and improve the likelihood that the building will maintain this level of performance. Commissioning can restore an existing building to its designed productivity levels and can ensure that building renovations and equipment upgrades function as designed. By ensuring that the equipment and controls are operating with energy efficiency, then the money spent on these aspects will be paid back over time.

Construction Materials

Define the lowest environmental impact when specifying construction materials.
Questions to ask:

1. Where was the material shipped from?
2. What is the material made of, and can it be recycled or reused when the building is renovated or demolished?
3. Are you ordering the least amount of material necessary?
4. What is the durability and replacement cost of the material?
5. Does the material require packaging?

Material Specifications:

- Recycled materials to reduce the use of raw materials and divert material from landfills. Uses at least 5%-10% salvaged or refurbished materials, and specify that a minimum of 25%-50% of your building materials contain at least 20% post-consumer recycled content material, or a minimum of 40% post-industrial recycled content material.
- Use local and regional materials as much as possible, in order to reduce natural resources necessary from transporting materials over long distances. Specify 20%-50% of building materials be manufactured within 500 miles of the building site.
- Use rapidly renewable materials, in order to reduce the depletion of virgin materials and reduce use of petroleum-based materials. Specify 5% of total building materials be made from rapidly renewable building materials.
- For components of the building made of wood, such a flooring and framing, use a minimum of 50% wood-based materials certified in accordance with the Forest Stewardship Council Guidelines.
- Select materials with volatile organic compound (VOC) limits.

Construction Waste Management

- Make sure the infrastructure for recycling of construction and demolition materials is in place and operating at the beginning of the project. Set up an on-site system to collect and sort waste for recycling, or for reuse, and monitor the system consistently throughout all phases of construction.
- Create a recycling plan that sets goals to recycle or salvage a minimum of 50% (by weight) of construction, demolition, and land clearing waste. Aim for a minimum of 75%
- Select products and materials with minimal or no packaging, if possible.
- Purchase materials in the sizes you will need them, rather than cutting them to size.
- Consistently track and monitor the amount of waste production during construction and measure it against pre-existing goals and guidelines.

Daylighting

- When properly designed and effectively integrated with the electric lighting system, daylighting can offer significant energy savings by offsetting a portion of the electric lighting load. A related benefit is the reduction in cooling capacity and use by lowering a significant component of internal gains. In addition to energy savings, day lighting generally improves occupant satisfaction and comfort. Recent studies are implying improvements in productivity and health in daylighted schools and offices. Windows also provide visual contact with nature, time orientation, the possibility of ventilation, and emergency egress.
- Solar tubes or high reflectance duct channels the light from a skylight down to a diffuser lens in the room. These will be advantageous in lowering electric light costs
- A building designed for daylighting but with an integrated electric lighting system will be a net energy loser because of the increased thermal loads. When the electric lighting load is reduced will there be more than offsetting in electric and cooling loads. The benefits from daylighting are maximized both occupancy and lighting sensors are used to control the electric lighting.

End

Exhibit E - 2007 RWP Site Programming, Planning & Concept Report

APPENDIX B5

CEQA RECOMMENDATIONS

Exhibit E - 2007 RWP Site Programming, Planning & Concept Report

AZUSA RIVER WILDERNESS PARK
RECOMMENDED CEQA APPROACH

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August 22, 2007
(Revised September 13, 2007)

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FIGURES

Figure **Follows Page**

Azusa River Wilderness Park
Recommended CEQA Approach

The Watershed Conservation Authority (WCA), in collaboration with the City of Azusa, purchased the former El Encanto restaurant site located on Highway 39 north of the City of Azusa, and has completed a Final Park Plan for the approximately 40-acre park site. The purpose of this memorandum is to provide a recommendation of the type of CEQA documentation appropriate to support implementation of the Azusa River Wilderness Park (proposed project). This memo summarizes the proposed project, describes the recommended CEQA documentation and the reasons for this recommendation, and discusses the anticipated environmental issues for the project to be analyzed in the CEQA document; technical reports and other specific information that would be required to complete these analyses are also described.

EXISTING CONDITIONS

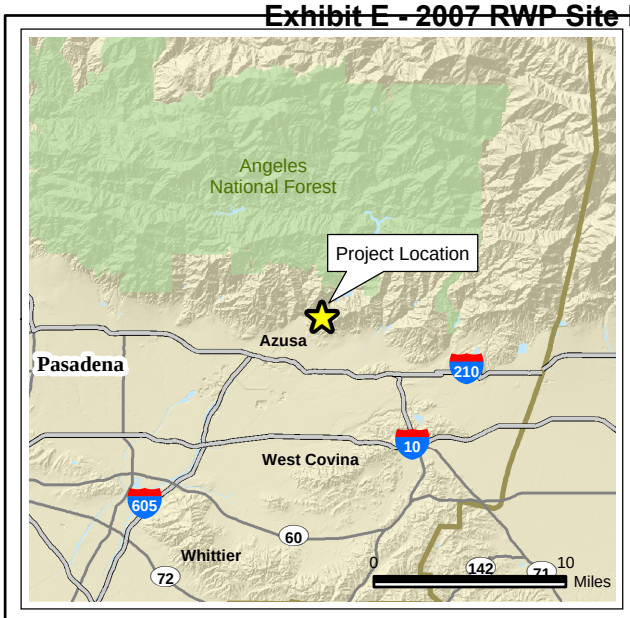
The proposed Azusa River Wilderness Park is located within San Gabriel Canyon adjacent to the San Gabriel River just south of the Angeles National Forest. The site is accessed from San Gabriel Canyon Road and is located southeasterly of the Mountain Cove residential development and southerly of Morris Dam. Figure 1 shows the regional location and local vicinity of the project site.

Existing land uses include the previously active El Encanto Restaurant and associated asphalt-paved parking lot, a small community of mobile homes, and residential structures for on-site park security. A privately owned equestrian facility is located to the north of the proposed project (across the San Gabriel River), and a Buddhist Temple site is offsite and to the northeast. A County owned and maintained dirt road connects the project site to Morris Dam to the northeast. Natural hillside open space is located directly to the south and west of the project site.

PROJECT DESCRIPTION

The proposed project includes several master-planned components that together would create a nature- and community-oriented public park. The San Gabriel River is the dominant natural feature of the project site and one of the objectives of the project is to create connectivity between the project site and the river, including terraced riverbank surfaces and improved native habitats. The Azusa River Wilderness Park components would be constructed in phases over a 10 to 15 year horizon. The proposed project includes the following activities, which are shown in Figures 2 through 5:

- External renovation of main building;
- Construction of a public courtyard with interpretive displays with improved exterior lighting;
- Construction of two pre-fabricated restroom facilities;
- Construction of observational overlook with park shelter;
- Removal of mobile home park and construction of special-use area with park shelter;
- Construction of bird watching and observation overlooks with educational/interpretive elements;
- Improvements to stormwater facilities;



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Regional and Local Location

Figure 1

Azusa River Wilderness Park

N W E S

0.5 0.25 0 0.5 Miles

BonTerra CONSULTING

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Site Plan

Figure 2

Azusa River Wilderness Park

N
W E
S

Source: BlueGreen 2007

BonTerra CONSULTING

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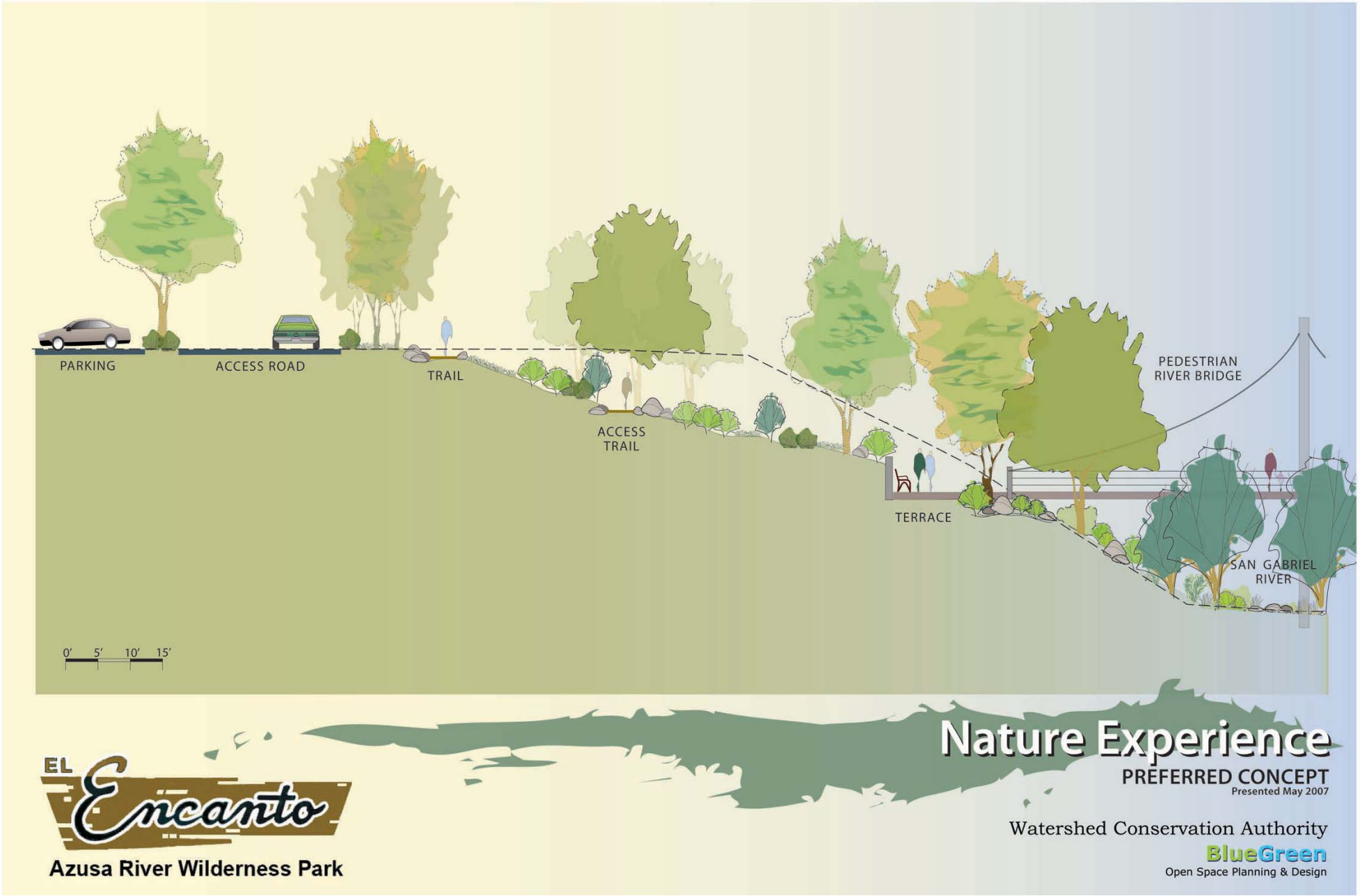

Site Cross-Section

Figure 3

Azusa River Wilderness Park

Source: BlueGreen 2007

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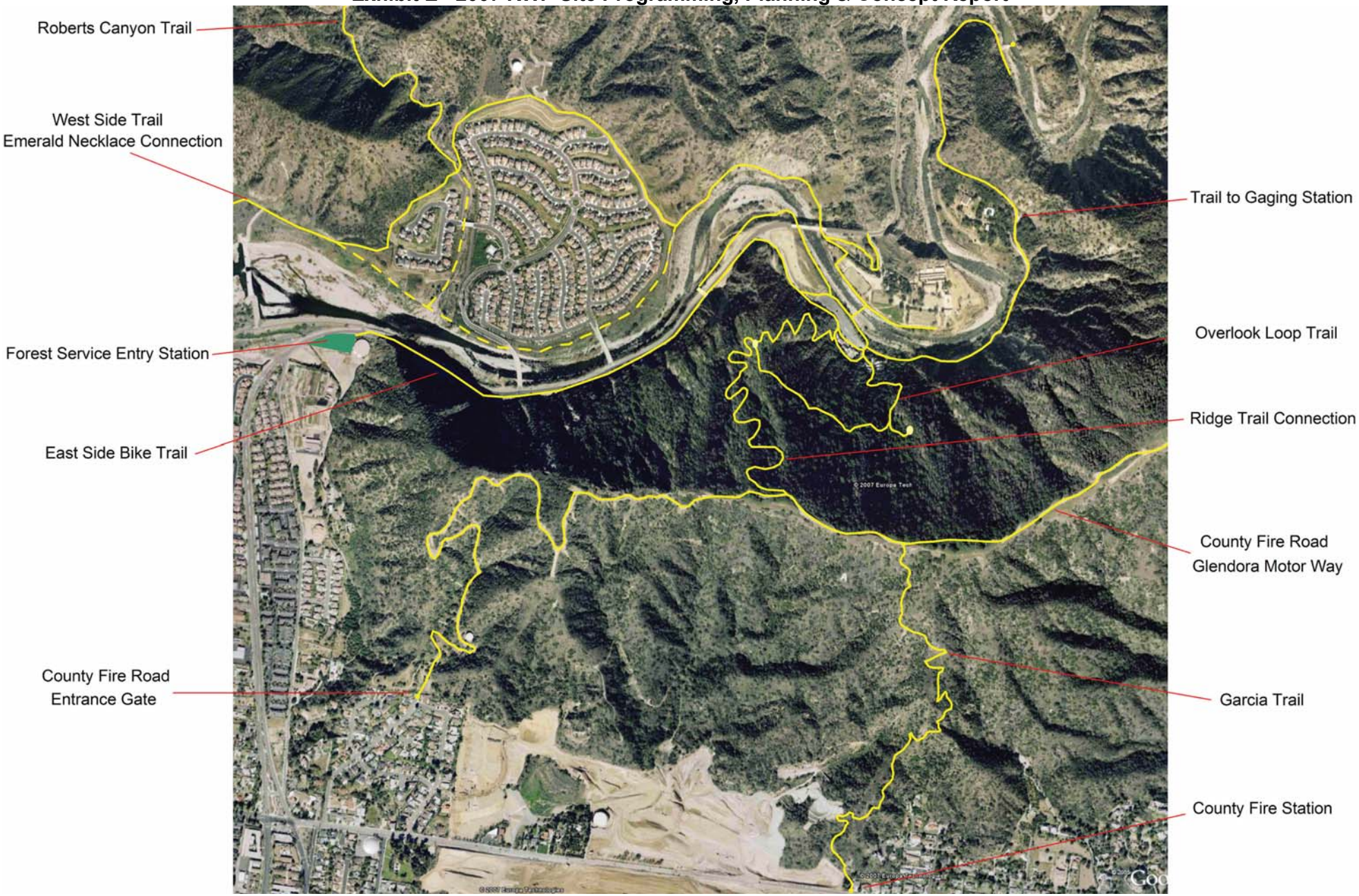

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Potential Trail Connections

Figure 4

Azusa River Wilderness Park

Source: BlueGreen 2007

BonTerra CONSULTING

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Building Plan

Figure 5

Azusa River Wilderness Park

Source: BlueGreen 2007

BonTerra CONSULTING

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- Elimination of a portion of the paved parking area and restoration of riparian/floodplain areas;
- New loop trail to overlooks on slope with way-finding signage and distance markers;
- New trail to ridge with access to Glendora Mountain Motorway and Garcia Trail (no bikes);
- ADA trail with interpretive displays;
- Traffic calming on Highway 39 to include crosswalk with in-ground strobe lights;
- River trails on both banks of river below Hwy 39 bridge;
- River trail on the northern bank to Taylor House;
- Pedestrian river bridge (optional);
- Land swap to retain the equestrian arena

RECOMMENDED CEQA DOCUMENTATION

The implementation of the Azusa River Wilderness Park Master Plan will be phased over time. More information is known about the construction of some components of the project than others. For example, the location of the pedestrian bridge crossing of the San Gabriel River is undecided; therefore, the technical details of its construction are not known.

Given the phasing uncertainties regarding the implementation schedule of some project elements, the WCA has two feasible alternatives for preparing environmental documentation pursuant to the California Environmental Quality Act (CEQA): a Program Environmental Impact Report (PEIR) or a Mitigated Negative Declaration (MND). The WCA would be the Lead Agency for preparation of the CEQA documentation and would therefore evaluate, and if appropriate, certify the PEIR/MND. The WCA has the principal responsibility for carrying out and implementing the project because: (1) the project occurs within WCA's jurisdiction and substantially affects the mission of the WCA; (2) the WCA has been the lead proponent of the project and has assumed the primary task of implementing the Azusa River Wilderness Park; and (3) the WCA has the expertise to implement the project.

Option 1: Program Environmental Impact Report

The preparation of a Program Environmental Impact Report (PEIR) would be the most appropriate environmental document for the evaluation of all known impacts associated with the implementation of the Azusa River Wilderness Park. As stated in Section 15168(a) of the CEQA Guidelines, a PEIR is an EIR which may be prepared on a series of actions that can be characterized as one large project and are related either:

1) Geographically,
2) As logical parts in the chain of contemplated actions,
3) In connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program, or
4) As individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways.

The CEQA Guidelines state that:

> Use of the Program EIR also enables the Lead Agency to characterize the overall program as the project being approved at that time. Following this approach, when individual activities within the program are proposed, the agency would be required to examine the individual activities to determine whether their effects were fully analyzed in the Program EIR. If the activities would have no effects beyond those analyzed in the Program EIR, the agency could assert that the activities are merely part of the program which had been approved earlier, and no further CEQA compliance would be required. This approach offers many possibilities for agencies to reduce the costs of CEQA compliance and still achieve high levels of environmental protection.

The phasing of the Azusa River Wilderness Park would allow for some components of the project to be comprehensively evaluated in the PEIR pursuant to CEQA due to their near-term implementation schedule, while other components that would occur in future years, would be evaluated more generally (i.e., pedestrian bridge construction) to reflect the information available at this time.

The PEIR would be used by WCA and other agencies with decision-making authority over the project to identify: potential significant environmental impacts of the project; proposed mitigation that would reduce significant impacts to less-than-significant levels, and if applicable, any unavoidable significant impacts that would result from the project and/or cumulatively from other projects. In addition, project alternatives would be considered and evaluated.

Option 2: Mitigated Negative Declaration

An MND would be the appropriate environmental document if it was decided that certain components of the Master Plan would be analyzed pursuant to CEQA at a later date. Components of the Master Plan for which there are no detailed development plans currently available would not be analyzed under the MND. For example, the location of the pedestrian bridge crossing is undecided as are the technical details of the bridge's construction. Furthermore, there is no funding in place to finance the construction and maintenance of the proposed bridge. Therefore, this optional component of the project is too uncertain and speculative to include as part of the current CEQA review. Only those Master Plan components for which construction-level details and specific site locations are known would be included in the MND and therefore, cleared for commencement of construction upon certification of the environmental document and approval of the specific project components evaluated in the MND. All necessary mitigation measures to address environmental impacts from the near term implementation of Master Plan components evaluated in the MND would be incorporated into the Project Description of the MND, as required by CEQA.

ANTICIPATED ENVIRONMENTAL ISSUES AND TECHNICAL REPORTS

The purpose of a CEQA Initial Study is to determine which environmental topics require further analysis in an EIR in order to determine whether significant impacts would result from project implementation. Based on our understanding of the proposed project, BonTerra Consulting anticipates that the following topics would require analysis in the PEIR/MND:

Aesthetics

The proposed project would generally be considered an improvement to the existing aesthetic character of the site. The proposed removal of a portion of the parking lot and subsequent expansion of terraced overlooks and native habitat restoration areas would represent a

substantive change to the current aesthetics of the site that would generally be considered favorable. Other substantial changes to aesthetics would include the construction of the proposed trail system and pedestrian bridge. An analysis of the change in site aesthetics would rely on aerial views, ground level photography and cross-sections of the proposed project.

Air Quality

Emissions generated during construction of the terraces, particularly related to earthmoving/grading activities and truck trips, would be the primary air quality concern for the proposed project. In addition to dust and vehicle emissions generated by these grading activities, demolition debris (e.g., parking lot asphalt and mobile home accessory structures) and possibly alluvial soil materials would need to be hauled off-site. Operational activities on the site would also likely increase emissions due to increases in site visitation (vehicle activity) when compared to the current land uses. All construction and operations related emissions would need to be quantified and analyzed in an Air Quality Technical Report, which would summarize the results of air quality modeling for the proposed project, assess the project's consistency with the South Coast Air Quality Management District 2007 Air Quality Management Plan, and assess affects to sensitive receptors in the project area. The project's impacts on global warming would also need to be discussed.

Biological Resources

An analysis of on-site biological resources would be required to determine the project's impacts and to set forth appropriate mitigation measures. Development of the site would be expected to increase public recreational uses at the location and may impact some biological species directly (loss or habitat) or indirectly (introduction of non-native species, erosion/sedimentation resulting from trail construction, etc.). Focused surveys for special status plant and wildlife species should be conducted for those species with potential to occur on the project site.

Construction of the proposed project would also require the issuance of permits by the Army Corps of Engineers (Corps), State Water Resources Control Board (SWRCB), and California Department of Fish and Game (CDFG) for grading and site improvements that would affect within jurisdictional areas (i.e., "waters of the United States"), the limits of which would be determined through the completion of a jurisdictional delineation. Finally, if any oak trees on the site would be impacted, an oak tree survey would need to be performed and a subsequent application for a tree removal permit from the City of Azusa should be processed prior to any impacts occurring.

Cultural Resources

Potential impacts to archaeological, paleontological, as well as historical resources would be analyzed in the PEIR/MND. Because the proposed project involves excavation in native soils, there is a potential to encounter archaeological and/or paleontological resources. As such, a records search at the South Central Coastal Information Center (SCCIC), California State University, Fullerton, which is the State of California's official cultural resource records repository for the County of Los Angeles would be required. The Natural History Museum of Los Angeles County would be consulted regarding potential paleontological resources on the site.

Geology and Soils

Construction and/or renovation of habitable and other public-use structures proposed for the project site and proposed grading would be analyzed in the PEIR/MND to determine if existing geologic or seismic conditions would adversely affect project development.

Hydrology and Water Quality

Construction activities that involve more than one acre of disturbance are required to obtain a National Pollutant Discharge Elimination System (NPDES) permit from the Los Angeles Regional Water Quality Control Board (LARWQCB). A Stormwater Pollution Prevention Plan (SWPPP) is required for issuance of a construction NPDES permit and Best Management Practices (BMPs) to reduce water quality impacts.

The Standard Urban Storm Water Mitigation Plan (SUSMP) requires the incorporation of BMPs into new development and redevelopment projects in Los Angeles County to prohibit non-storm water discharges and reduce pollutant discharge from storm water conveyance systems to the maximum extent practicable. The proposed project would require the development of a drainage plan and SUSMP according to the City of Azusa's stormwater management requirements.

Implementation of improvements to site drainage and the proposed pedestrian bridge crossing would require the completion of a site drainage plan and hydrology report. Bridge piers located within the streambed have the potential to impact the San Gabriel River in terms of pier scour. The hydrology report would need to analyze the pre- and post-development changes to determine that development of the project would not substantially alter drainage patterns, redirect flood flows, or place structures within a 100-year flood hazard area.

Land Use and Planning

An evaluation of changes to land use would be evaluated in the PEIR/MND. If the City of Azusa would require a zone change or Specific Plan amendment for implementation of the proposed project, then an analysis of the proposed changes would be required.

Noise

Construction would be the largest source of noise anticipated with the proposed project. The effect of construction noise on nearby sensitive receptors, such as the residents of the Buddhist Monastery to the north of the project site, would be analyzed in the PEIR/MND. The project would not be a long-term noise generator and would likely have less that significant impacts related to site operations.

Public Services

Although the proposed project would not result in population growth, it would generate increased use the project site facilities, which may necessitate an increased demand for police and/or fire protection services. Therefore, these public services are anticipated to be analyzed in the PEIR/MND.

Transportation and Traffic

Construction truck traffic is anticipated to be the primary traffic-related concern for the proposed project. An analysis of impacts to traffic and local circulation patterns during construction activities would be required. Additionally, depending on the anticipated daily use of the site, an analysis of operational impacts on the existing roadways and levels of service may be required.

Utilities and Service Systems

The project's wastewater generation, solid waste generation, and stormwater drainage features would be described and analyzed to determine if project implementation would adversely affect any existing utility and service system providers.

Other CEQA Issues

Based on our understanding of the proposed project, the following three CEQA topics would be expected to be "focused out" of the PEIR during Initial Study preparation and would not require further analysis or technical documentation:

- Agricultural Resources,
- Hazards and Hazardous Materials,
- Mineral Resources, and
- Recreation.

Other PEIR Sections

If WCA decides to prepare a PEIR, the following CEQA-required sections would need to be prepared: Executive Summary; Long-term Impacts: Significant Irreversible Environmental Changes; and Growth-Inducing Impacts. In addition to the analysis of potential short-term and long-term project-specific impacts and the analysis of direct and indirect impacts, an analysis of cumulative impacts would be required. Finally, as required by CEQA, an analysis of several alternatives to the proposed project that would either reduce or eliminate the identified impacts for the proposed project must be included in the PEIR.

PEIR TIMELINE

In general, the amount of time required for the preparation and ultimate approval of an EIR ranges from approximately 10 to 13 months, including noticing and public meeting/hearing requirements. A typical schedule that includes the required actions for the preparation of an EIR is presented below:

Tasks	Completion Period
Project Kickoff- Prepare Notice of Preparation/Initial Study	Month 1 through 2
Prepare Technical Reports/Spring Surveys	Month 2 through 6
30-day NOP Public Review Period and Scoping Meeting	Month 2 through 3
Preparation of Screencheck Draft PEIR	Month 3 through 8
Submit Second Screencheck Draft PEIR to WCA and Revise	Month 8 through 9
Draft PEIR 45-Day Public Review Period	Month 10 through 11
Submit Response to Comments to WCA	Month 11 through 12
Prepare MMP and Statement of Overriding Considerations	Month 11 through 12
Public Hearings and PEIR Certification/ File NOD	Month 13

MND TIMELINE

In general, the amount of time required for the preparation and ultimate approval of an MND ranges from approximately 6 to 9 months, including noticing and public meeting/hearing requirements. A typical schedule that includes the required actions for the preparation of an MND is presented below:

Tasks	Completion Period
Project Kickoff	Month 1
Preparation of Screencheck Draft MND	Month 1 through 3
Submit Second Screencheck Draft MND to WCA and Revise	Month 3 through 4
Draft MND 30-Day Public Review Period	Month 5
Submit Response to Comments to WCA	Month 5 through 6
Prepare MMP	Month 7
Public Hearings and MND Certification/ File NOD	Month 8 through 9

APPENDIX B6

POTENTIAL FUTURE FUNDING

Exhibit E - 2007 RWP Site Programming, Planning & Concept Report

FUNDING SOURCES
OF EL ENCANTO AZUSA RIVER WILDERNESS PARK

Funding Source	Funding Program
FEDERAL SOURCES	
U.S. Department of Agriculture, Natural Resources Conservation Service	Emergency Watershed Protection (Bank stabilization, vegetation restoration)
U.S. Army Corps of Engineers	Contiuing Autorities Program– Operations and Maintenance
	Contiuing Autorities Program–New Projects (Flood Control, Sections 208,14)
	Contiuing Autorities A Program–Project Modificaiton for Environmental Improvement (Section 1135 and Section 206)
	Congressional mandated studies (Construction costs will exceed $5 million, only authorized by Congress)
Federal Emergency Management	Flood Mitigation Assistance Program
U.S. Department of the Interior, National Park Service	Land and Water Conservation Fund (matching grants for acquisition and development of public outdoor recreation areas and facilities
	Urban Park and Recreation Recovery Program
	(Matching grants to economically distressed urban communities for rehabilitation of recreation facilties
U.S. Fish and Wildlife Service	North American Wetlands Conservaiton Act (up to $1 million in matching grants to conserve wetlands and aquatic habitat
U.S. Environmental Protection Agency	Wetland Program Development Grant (monitoring and assessment of water quality mitigation programs, improving effectiveness of compensatory mitigation, refining wetland protection strategies
U.S. Department of Transportation	SAFETEA (TEA-21 Reauthorization), provides funding for multiple use paths, trails and related projects
Federal Highway Administration	Federal Highway Administration Bridge Replacement/Rehabilitation (HBRR) Project (reauthorized under SAFETY, FHA pays 75% of replacement and modifications)
STATE SOURCES	
California Department of Water Resources	Flood Control Project Subventions Program
	Proposition 13 (Provides funds for acquisitions of easements to reduce flood hazard and provide habitat protection)
	Urban Stream Restoration Program Water Quality, Supply, Coastal Wetlands Purchase/Protection Projects (State Propostions 13, 40, 50)
	Urban Stream Restoration Program Water Quality, Supply, Coastal Wetlands Purchase/Protection Projects (State Propostions 13, 40, 50)
	Groundwater Recharge Feasibility Study and Construction Loans/Grants (Loans and grants for projects that facilitate groundwater recharge)
	Groundwater Recharge Feasibility Study and Construction Loans/Grants (Loans and grants for projects that facilitate groundwater recharge)

STATE SOURCES, cont.

California Resources Agency	River Parkways Program (currently funded under Proposition 50)
California State Water Resources Control Board	California Clean Water, Clean Air, State Neighborhood Parks and Coastal Protection Act (Proposition 40) (funds used for acquisition easements for habitat restoration projects as well as public access projects that provide wildlife-related recreational opportunities
	Cooperative Projects for Public Access (Proposition 50) (fundable projects include access roads, trails, broadwalks, interpretive facilities, lake or stream improvements)
	Habitat Enhancement and Restoration Program
	Water Security, Clean Drinking Water, Coastal and Beach Protection Act (Proposition 50)
California Coastal Canservancy	Wetlands Program (through the Southern California Wetlands Recovery Project)
	Public Access Grant Program (fundable projects include stairs, ramps, trails, otheraccess ways)
	Urban Waterfront Program (capital funds and technical assistance)
California Department of Fish and Game	Fisheries Restoration Grant Program (protect and restore coastal salmon and steelhead trout habitat)
California Department of Parks and Recreation	Per Capita Grant Programs (Proposition 40) (acquisition and development of local parks and recreational lands)
	Recreational Trails Program
	Habitat Conservation Fund
State of California	Propositoin 84–Clean Water, Parks and Coastal Protection Act
	Proposition 1B–HIghway Say, Traffic Reduction, Air Quality and Port Security Bond Act of 2006
	Proposition 1C–Disaster Preparedness and Flood Prevention Bond Act of 2006

SPECIAL DISTRICT AND LOCAL SOURCES

LA Couanty Flood Control District	Existing property assessments for drainage, local share of flood protection, and operations/maintenance
Metropolitan Water District	Financial assistance for projects that reduce dependence on imported water

PRIVATE SECTOR SOURCES

Trust for Public Land	Assistance in acquisition of open lands and potential parklands
The Conservation Fund	Assistance in acquisition of open lands and potential parklands
National Fish and Wildlife Foundation	Funds for restoration of riverine habitats

APPENDIX B7

PRELIMINARY COST ESTIMATES

Exhibit E - 2007 RWP Site Programming, Planning & Concept Report

ESTIMATE OF PROBABLE CONSTRUCTION COSTS
FOR EL ENCANTO MASTER PLAN AT THE AZUSA RIVER WILDERNESS PARK

	Quantity	Unit	Unit Cost	Subtotal	Total
PHASE I (years 2007 to 2010)					
Building Renovations					
Public Meeting Room	2,000	sf	100	200,000	
Operational Offices	8,000	sf	150	1,200,000	
Back Terrace	1,000	sf	32	32,000	
Structural as needed	1	ea	15,000	15,000	
					$1,447,000.00
Infrastructure Improvements					
Electrical as needed	1	ea	40,000	40,000	
Septic as needed	1	ea	15,000	15,000	
Water supply as needed	1	ea	24	24	
					$55,024.00
Multi use & Special Use Areas development					
Remove, demolish and grade mobile home sites	10,000	sf	3	30,000	
Demolish non-functioning water tanks (3)	3	ea	2,000	6,000	
Restore drainage and improve road crossing	2	ea	10,000	20,000	
Restore ravine near eastern property boundary	1	ea	250,000	250,000	
Restore hillside vegetation	40,000	sf	5	200,000	
Outdoor Classroom Amphitheater	1	ea	12,000	12,000	
Picnic Area	2,000	sf	7	14,000	
Restroom	1	ea	170,000	170,000	
Path, trail and circulation	900	lf	20	18,000	
Observation overlook with park shelter	1,000	sf	45	45,000	
Gates	2	ea	6,000	12,000	
Entry Gate	1	ea	15,000	15,000	
					$792,000.00
Trail Improvements					
Interpretive/Educational Elements	8	ea	2,000	16,000	
Trail to Eastern Overlook	600	lf	20	12,000	
Old San Gabriel Canyon Trail to Gauging Station	10,000	lf	3	30,000	
					$58,000.00
			TOTAL PHASE I		**$2,352,024.00**

	Quantity	Unit	Unit Cost	Subtotal	Total
PHASE II (years 2011 to 2013)					
Building Renovations					
Façade improvements	120	lf	400	48,000	
Trellised Courtyard	5,000	sf	28	140,000	
Structural as needed	1	ea	5,000	5,000	
					$193,000.00
Infrastructure Improvements					
Electrical as needed	1	ea	50,000	50,000	
Septic as needed	1	ea	15,000	15,000	
Water supply as needed	1	ea	24	24	
					$65,024.00
River View Terrace & Trail					
Grade slope for river terrace and trail	6,000	cy	35	210,000	
Construct river terrace with bridge abutment integrated	30,000	sf	12	360,000	
					$570,000.00
Parking Area					
Remove asphalt parking lot	360,000	sf	4	1,440,000	
Rebuild roadway through front park area	21,600	sf	7	151,200	
Landscape building front/parking and atrium space	2,000	sf	6	12,000	
BMPs in parking lot	4,000	lf	20	80,000	
Trees and plantings	10,000	sf	6	60,000	
Capture storm water run-off	1	ea	10,000	10,000	
Restroom facility near parking area	1	ea	200,000	200,000	
					$1,953,200.00
Habitat Restoration					
Riparian & Alluvial Habitats	30,000	sf	10	300,000	
Slope below parking area (partial)	5,400	sf	5	27,000	
					$327,000.00
Trails					
Connection to San Gabriel River bike path	10,000	lf	60	600,000	
Western Overlook Trail	10,000	lf	20	200,000	
Complete Hillside Loop Trail	30,000	lf	20	600,000	
					$1,400,000.00
Storm Water Management					
Drainage system/maintenance trail behind buildings	600	lf	40	24,000	
Direct drainage to parking lot	1	ea	2,000	2,000	
					$26,000.00
Land Swap					
Rainbow Ranch	1	ea	10,000	10,000	
					$10,000.00
Trail					
North Bank River Trail with Access to Taylor House	8,000	lf	20	160,000	
Berma Trail below Hwy 38 Bridge, northerly bank	3,000	lf	40	120,000	
					$280,000.00
Building Renovations					
As-needed	1	ea	12,000	12,000	
					$12,000.00
			TOTAL PHASE II		**$4,836,224.00**

	Quantity	Unit	Unit Cost	Subtotal	Total
PHASE III (years 2014 to 2018)					
Habitat Restoration-					
River Bank & Flood Plain	1	ea	1,000,000	1,000,000	
Woodland Slopes	1	ea	300,000	300,000	
					$1,300,000.00
Trails					
Western Overlook/Glendora Roadway/Garcia Trail	30,000	lf	20	600,000	
Underpass Trails below Hwy 38 connection to Bikeway	5,000	lf	45	225,000	
El Encanto River Trail Bridge	1	ea	2,000,000	2,000,000	
					$2,825,000.00
			TOTAL PHASE III		**$4,125,000.00**
			GRAND TOTAL		**$20,274,472.00**

Exhibit E - 2007 RWP Site Programming, Planning & Concept Report

APPENDIX B8

CREDITS AND CONTRIBUTORS

Exhibit E - 2007 RWP Site Programming, Planning & Concept Report

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Exhibit E - 2007 RWP Site Programming, Planning & Concept Report