Appendix D4
Updated Arborist Report (MBA 2007)

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Post-disturbance Arborist Report Update
Martin Ranch Project Site
Unincorporated San Bernardino County, California
San Bernardino North, California, USGS 7.5-minute

Topographic Quadrangle Map
Township 2 North, Range 5 West, Sections 25, 36 and
Devore California, USGS 7.5-minute Topographic Quadrangle Map
Township 2 North, Range 5 West, Sections 25, 36
353-Acre Study Area

Prepared for:

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Michael Brandman Associates

August 2, 2007

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SECTION 1: EXECUTIVE SUMMARY

Michael Brandman Associates (MBA) has prepared this Arborist Survey Update for a property in unincorporated San Bernardino County, California known as Martin Ranch. The focus of this survey was to perform a detailed assessment of the sensitive tree communities within the project boundary, and provide a status report of their re-establishment following the Old Fire of 2003.

The proposed Martin Ranch Development is a 353-acre property located on the foothills of San Bernardino in the Community of Verdemont, San Bernardino County. The San Bernardino National Forest borders the property on north, east and west. Residential development borders the site to the south.

The property is relatively undisturbed and consists of canyons and steep hillsides with gently sloping alluvial benches in between. The east and west fork of Cable Creek flow through the northwest portion of the property. A tributary to Cable Creek cuts across the northern section of the property from east to west. The elevation of the property ranges from 2,062 feet above mean sea level (MSL) in the southern portion of the site to 3,400 feet above MSL in the northern portion.

The project site contains nineteen different plant communities, many of which are considered sensitive by CDFG. Of these, five are tree-dominated, sensitive, vegetation communities that include California Walnut Woodland (CWW), Canyon Live Oak woodland (CLOW), sycamore-alder riparian woodland (SSARW), southern willow scrub (SWS), and sycamore alluvial woodland (SAW). All native tree vegetation communities were visually assessed, and details were recorded on each native tree-dominated vegetation community; the parameters included the primary species represented, burn severity, general health and evidence of decay/pest damage, and primary re-establishment strategy. No measurements were taken as to the stature of individual trees.

The native vegetation communities represented within the project boundary are well adapted to fire disturbance. In general, each community assessed had resiliently recovered, and in many instances, little evidence was present indicating the fire disturbance of 3 years earlier. This was best represented in the southern willow scrub and California walnut woodland where new growth had virtually masked the scars of the scorched, woody remains. The primary strategy employed by the five communities represented was stump or lignotuber regeneration although evidence of seedbank recruitment was found. Interestingly, within the sycamore-alder riparian woodland, no alder species were found during the general survey; they likely are present, but in substantially reduced numbers and are no longer an indicator species. As the woodland recovers, the presence of this species will likely increase, but at the present time, the community could be reclassified as sycamore alluvial woodland.

Although the focus was on native tree species, the gum trees (*Eucalyptus sp.*) were generally assessed as a group. These trees are not native to California, but have been imported for use as fuel and windbreaks. In many instances, these trees have been attacked by pests and show signs of decay and

structural damage from the fire. The wood is dense and heavy, and they present a potential risk if these damaged trees fail. These trees shall be independently evaluated if they are to remain as part of the project; this is imperative given the residential nature of the proposed project.

The tree-dominated, native, vegetation communities mostly occur in drainages and in areas with varied topography. To the extent feasible, it is recommended that these communities be left intact to continue their re-establishment. The gum trees onsite provide habitat to fauna, and this shall be considered when impacting these species. It is further recommended that any tree onsite earmarked to be removed be replaced at a ratio of 1:1. In areas adjacent to the preserved native woodland areas, planted trees should be native and appropriate for the setting. Trees planted within the residential landscaping should be in compliance with any accepted tree list by the local jurisdiction.

SECTION 2: INTRODUCTION

2.1 - Scope of Survey

As previously mentioned, the focus of this survey was to perform a detailed assessment of the sensitive tree communities within the project boundary. An arborist report had previously been performed in 1998 (see Section 5.1.1); this report is meant as a follow-on status report detailing changes stemming from the Old Fire of 2003. This report includes recommendations and mitigation measures meant to satisfy all applicable ordinances and permit guidelines.

2.2 - Survey Method

The site survey was conducted by George Wirtes (Certified Arborist) over 2 days and focused primarily on the native, tree-dominated vegetation communities. The assessment started at the northern-most boundary of the site, and progressed in a southerly direction. Prior to the site assessment, research was conducted pertaining to burn ecology, and maps were reviewed in GIS to provided efficient evaluation of the trees onsite. The survey was conducted from ground level with the aid of binoculars with the aid of an aerial photograph with overlain GIS vegetation layers. During the survey, details were recorded regarding each vegetation community, and photographic records were also taken of each community.

2.3 - Limitations and Exceptions of Assessment

In many instances, trees were located in steep terrain and close examination was not feasible. This survey associated with this Arborist Status Report included no soil sampling, root excavation, trunk coring/drilling or any other invasive procedure. The determinations of damage due to pest infestation and decay were made based solely on outward appearance and inspection of the tree structures. All assessments were conducted at ground level with the aid of binoculars to visually inspect the status and integrity of tree structures when possible. To the extent feasible, tree litter was removed to inspect the trunk and root crown, but in several cases, due to the lack of landscape maintenance, 100 percent of the base was not accessible.

SECTION 3: SITE AND VICINITY CHARACTERISTICS

Martin Ranch was used for agricultural purposes from the mid-19th Century through 1989. The site has remained fallow since 1989 and is mostly undeveloped. On November 24, 1980, the Panorama fire burned the site, leaving only the mature eucalyptus trees and the vegetation within the canyon areas. In October 2003, the Old Fire swept across the front of the San Bernardino Mountains burning the site's vegetation, except in the northernmost portion of Cable Canyon.

3.1 - Location

The area will be annexed into the City of San Bernardino as part of this project. The planning area is approximately 1.5 miles due east of the unincorporated community of Devore and the junction of the Interstate 215 (I-215) and Interstate 15 (I-15) freeways (see Exhibit 1).

3.2 - Local Climate

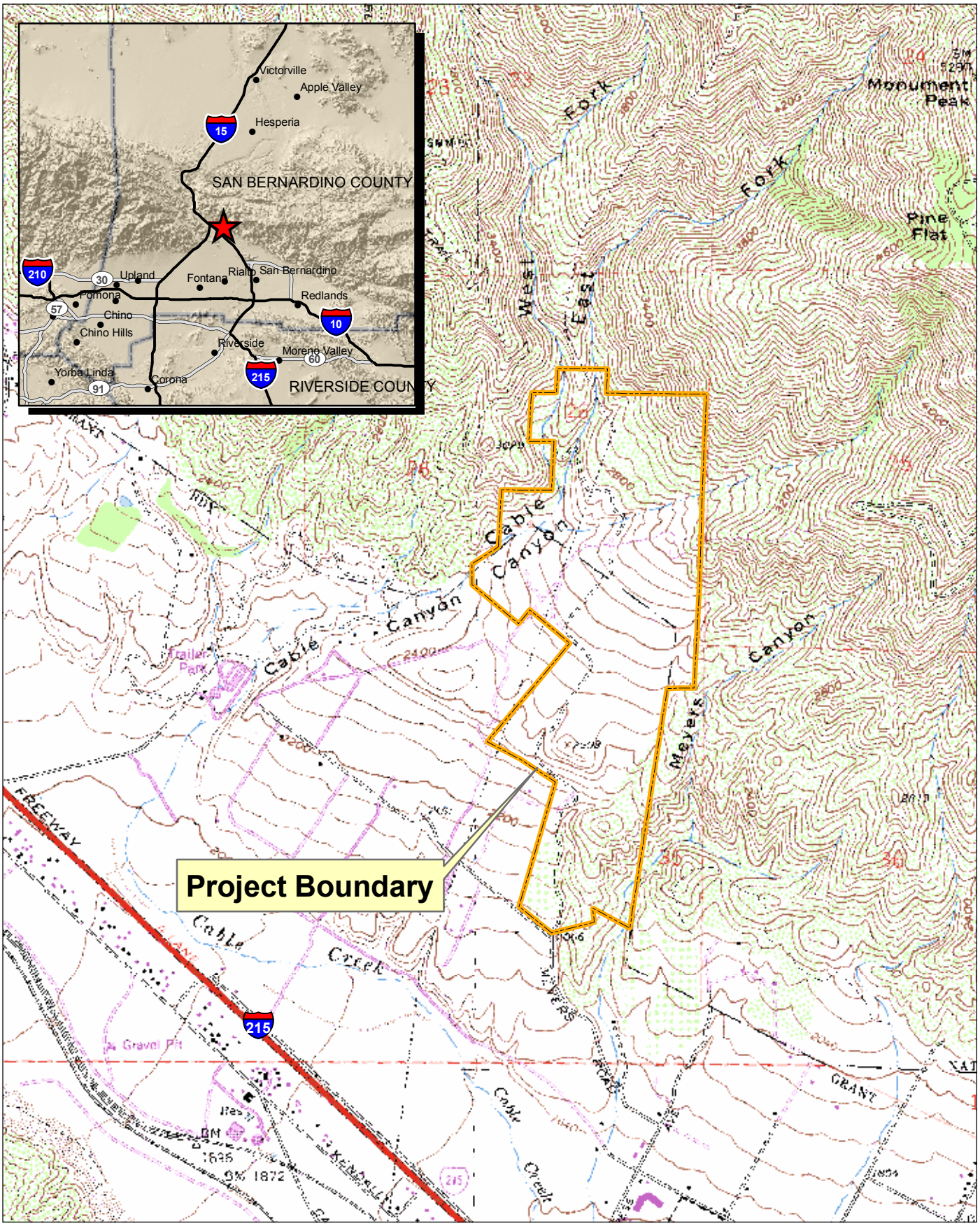
The local temperatures for the area are typical of a Mediterranean climate with hot, dry summers and cool, mild winters. The site is in USDA Hardiness Zone 9a, with an average annual minimum temperature of 20-25° F. The warmest month of the year is August with an average maximum temperature of 96.20 degrees Fahrenheit, while the coldest month of the year is December with an average minimum temperature of 41.20 degrees Fahrenheit. The area has received an average of 16.4 inches of annual precipitation. Lately, the weather has been very dry, less than 4 inches of rainfall occurred during last season.

3.3 - Soils Onsite

The majority of the soils onsite are either Tujunga gravely loamy sand or Soboba stony loamy sands. Both of these soil series are associated with the broad, smooth alluvial fans found onsite. The other soil type on site is the Saugus sandy loam and is found in the deeply incised canyon areas and along the San Andreas Fault.

3.4 - Topography

The project site is in the foothills of the San Bernardino Mountains. The property consists of canyons and steep hillsides with gently sloping alluvial benches in between. The east and west fork of Cable Creek flow through the northwest portion of the property. A tributary to Cable Creek cuts across the northern section of the property from east to west. The elevation of the property ranges from 2,010 feet above mean sea level (MSL) in the southern portion of the site to 3,540 feet above MSL in the northern portion.



Source: USGS and ESRI 2007

NORTH

800 400 0 800

Feet

Michael Brandman Associates

Exhibit 1
Regional Location and Local Vicinity

30940004 • 07/2007 | 1-RegVicMap

MARTIN RANCH ARBORIST REPORT UPDATE
SAN BERNARDINO COUNTY, CA

3.5 - Vegetation

The project site has recovered dramatically from the Old Fire of October 2003 and supports a diversity of habitats in vary seral stages. Nineteen different plant communities were identified on the project site during the biological assessment of June 2007 performed by MBA. Table 1 below summarizes these vegetation communities.

Table 1: Plant Communities

Plant Community	Acreage
California walnut woodland*	2.1
Ceonothus crassifolius chaparral	6.8
Chamise chaparral	8.3
Canyon live oak woodland*	16.5
Disturbed	2.5
Eucalyptus	5.1
Eucalyptus/Non-native grassland	10.0
Eucalyptus/Riversidean sage scrub	3.1
Non-native grassland	0.3
Northern mixed chaparral	86.3
Ornamental	3.7
Riversidean sage scrub	169.5
Riversidean alluvial fan sage scrub	9.1
Riversidean sage scrub/California walnut woodland*	24.3
Riversidean sage scrub/Eucalyptus	1.6
Southern sycamore-alder riparian woodland*	22.4
Southern willow scrub*	1.2
Southern willow scrub/California walnut woodland*	7/2
Sycamore alluvial woodland*	10.0
* indicates native, tree-dominated vegetation communities	

A detailed description of the plant communities and the plant species common to them is available in the biological assessment. The current condition of each sensitive, tree-dominated community is provided in Section 5 below.

3.6 - Tree Preservation Legislation

The project site is currently in unincorporated San Bernardino County, but is intended to be annexed by the City of San Bernardino as part of the implementation of this project. The current tree protection requirements of both agencies are provided below.

3.6.1 - San Bernardino County Code

Title 8, Division 9, Chapter 3 of the County Code provides protection of native trees within unincorporated land. The removal or destruction of any California native tree requires a removal permit by the County. A tree is defined by the County as having a diameter at breast height of 6 inches or greater. The primary goals of the legislation are:

- To promote and sustain the health, vigor and productivity of plant life and aesthetic values within the County through appropriate management techniques.
- To conserve the native plant life heritage for the benefit of all, including future generations.
- To protect native trees and plants from indiscriminate removal, and to regulate such activity.
- To provide a uniform standard for appropriate removal of native trees and plants in public and private places and streets to promote conservation of these valuable natural resources.
- To protect and maintain water productivity and quality in local watersheds.

3.6.2 - San Bernardino City Code

Chapter 15.34 of the City of San Bernardino Municipal Code provides a level of protection for all trees within the City limits. As indicated below, any removal action shall be preceded by the granting of a removal permit by the City's Development Services Department.

> "It is unlawful for any person, firm, corporation, partnership or association, either as owner, agent or otherwise, to cut down, uproot, destroy and/or remove more than five (5) trees within any thirty-six (36)-month period from a development site or parcel of property without first being issued a permit from the Development Services Department of the City of San Bernardino."

SECTION 4: BURN ECOLOGY

4.1 - Fire Disturbance Impacts

Fire affects the local environment in a variety of ways depending on topography, climate as well as vegetation health, density, and type. Depending on these factors, fire can burn with minimal effects or can scorch an area severely burning all aboveground biomass and virtually sterilizing the soil beneath.

Organic material within the ground litter layer helps to protect the soil from erosion. When an intense fire occurs, it removes this material and erosion can occur. Intense heat from fires can cause soil particles to become hydrophobic. Under these circumstances, rainwater tends to run off rather than to infiltrate through the soil thereby promoting erosion. However, the ashes that remain after a fire can also be beneficial and return to the soil, nutrients that were locked up in older vegetation. Fires can also aid in controlling pests and removing diseased trees. When these trees decay, they return even more nutrients to the soil.

The resident vegetation community is greatly impacted by fire as well. Fire typically provides space for germination by other species by opening the canopy and removing the ground litter layer. Pioneer species can take advantage of this by germinating soon after a fire disturbance. They can then compete for available resources if resident species are not well adapted to re-establish. There is also the potential for alien plants to establish after fire in previously uninfested areas. Typically, fire promotes biological diversity and healthy ecosystems; it fosters new plant growth and wildlife populations often expand as a result.

4.2 - Burn Assessment

During the tree survey, part of assessing the condition of the vegetation community was to investigate the degree to which the community was damaged in 2003. This was done preliminarily by reviewing the satellite remote sensing data provided by the USGS. On the ground, assessment was performed by identifying indicators of heat intensity and utilizing the Composite Burn Index (CBI) to assign a numeric value to the habitat based on the evidence.

4.2.1 - USGS National Burn Severity Mapping Project

The Joint USNPS-USGS National Burn Severity Mapping Project addresses the need to quantify fire effects over large and often-remote regions. It reflects collaborative efforts to bring previous research into operational implementation for fire managers and scientists. It combines image processing, data archiving, and remote sensing expertise of the USGS EROS Data Center, the local knowledge and field sampling capability of the NPS, and the fire-effects research of the USGS Northern Rocky Mountain Science Center; together they deliver an effective approach to mapping burn severity.

To accomplish this, post-fire disturbance images are taken by satellite and processed to expose distinct coloration changes as compared to pre-disturbance images. This process produces color bands that are indicative of burn severity. The resultant data is compiled and made available for use in Geographic Information Systems (GIS) (see Exhibit 2).

4.2.2 - The Composite Burn Index (CBI)

The CBI evaluation technique was created by the USGS for use within the Rocky Mountain region, but it can easily be applied to burn areas across the country; it is designed to assess burn severity within an area disturbed by fire. The CBI assigns a value to a burn area of 0 (no impact) to 3.0 (severe impact) based on the charred remnants of a burn area based; it looks at the extent of charred, woody remains, the remnant woody debris layer, and resultant species richness occurring after the disturbance. These attributes are scored independently according to strata (understory vs. overstory). A copy of the worksheet used as a guideline is included in Appendix B below.

4.3 - Fire Disturbance Recovery Strategies

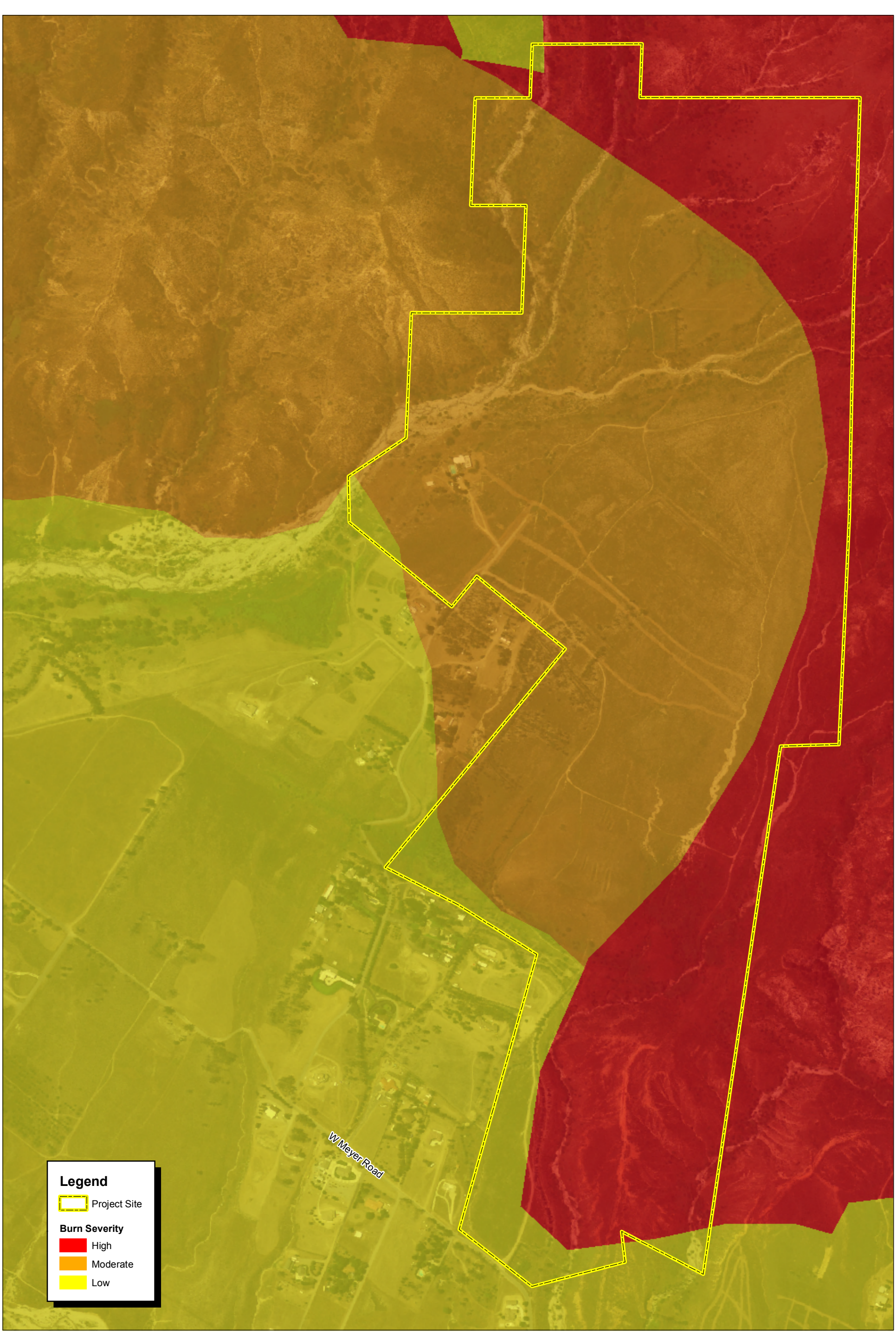
Post-fire recovery largely involves the residual species present at the time of fire; regeneration is initiated by the germination of dormant seed banks (recruitment) and resprouting from lignotubers, stumps, or other vegetative structures. Species are commonly divided into **obligate seeders**, which are ones incapable of vegetative regeneration and are present in the first post-fire year as seedlings from fire-stimulated germination of dormant seed banks; **facultative seeders**, which have post-fire germination of dormant seed banks coupled with resprouting, and **obligate resprouters**, which lack a dormant seed bank but regenerate vegetatively.

4.4 - Species Specific Fire Disturbance Strategies

Below are some of the primary indicator trees within the sensitive tree communities. Their primary regeneration strategy each is detailed as well to help illustrate their role in the re-establishment following the 2003 fire.

4.4.1 - *Juglans californica* (California Walnut)

The California black walnut grows in riparian woodlands, either in single species stands or mixed with other native trees. Most southern California walnut woodlands are subject to periodic fires and are likely **obligate resprouters**. Southern California walnut recovers well from fire. It sprouts vigorously from the trunk and root crown when the canopy has been consumed by fire. It is primarily a resprouter and does not typically produce seedlings following a fire disturbance; this is indication that most seeds may be killed by fire. This species sprouts fast as shoots from the root crowns can reach as high as 5 feet (1.5 m) in 1 year.



Source: USFS BAER Program 2007

NORTH

850 425 0

Feet

Michael Brandman Associates

Exhibit 2
Burn Severity

4.4.2 - *Platanus racemosa* (California Sycamore)

The California sycamore is a fast-growing, deciduous native tree. It typically grows along creeks and among the foothills within the coast ranges of California and is an **obligate resprouter**. California sycamores show some resilience to fires; when the canopy has been consumed by fire, it can readily recover by resprouting. Seed-based regeneration (recruitment) is not common among riparian species following fire disturbances.

4.4.3 - *Umbellularia californica* (California Bay)

Most California hardwoods sprout within a few weeks following fire in any season, and California bay presumably has this ability. California bay sprouts from the root crown or bole following fire. There is also evidence that this species is a **facultative seeder** as **s**ome studies indicate seed germination may slightly increase following light to moderate fire due to the cracking of the thin seed coat. Top-killed California bay recovers rapidly from fire. Reproductive ability is regained quickly; flowers have been noted on first-year sprouts. Seedlings establish from one-year postfire until the next fire cycle.

4.4.4 - *Alnus rhombifolia (White Alder)*

White alders are typically known to be **resprouter**, but there are conflicting reports as to their limited success in becoming re-established following a fire. White alder also have light, wind-dispersed seed that normally establishes on moist alluvium left bare from receding floodwaters. Fires that remove organic soil layers and expose mineral soils may possibly provide favorable seedbeds for the establishment of white alder seed.

4.4.5 - *Quercus chrysolepis (Canyon Live Oak)*

Canyon live oak is an **obligate resprouter** and typically sprouts prolifically from the stump or root crown after the trunk or crown is marginally damaged by fire. Because of its proclivity for sprouting, stand turnover is generally minimal. Aboveground foliage of canyon live oak is sensitive to fire, and this plant is generally top-killed by fires of even relatively low intensity. Light ground fires can seriously damage or girdle this oak or produce fatal cambium injuries to the crown and trunk. Even seedlings are often capable of resprouting after disturbance, and moderate to dense regrowth of sprouts is typical after fire. Canyon live oak sprouts vigorously from the subsurface root crown even when the upper canopy is only partially defoliated by burning or scorching.

4.4.6 - *Acer macrophyllum (Big-leaf Maple)*

Bigleaf maple is well adapted to fire and it is an **obligate resprouter**. It sprouts prolifically from its root crown following crown destruction by fire. Seedling establishment on recently burned areas has not been reported, although it could potentially invade burned sites via seed transported from off-site by wind or birds and small mammals.

4.4.7 - *Populus angustifolia (Narrowleaf Cottonwood)*

Narrowleaf cottonwood can resprout from the roots, root crown, and/or healthy and fire damaged branches after fire as it is an **obligate resprouter**. The ability to resprout from branch fragments may also aid in postfire establishment. Fire generally increases the sediment load in streams when the majority of bank stabilizing vegetation is consumed. Fire will partially or completely kill narrowleaf cottonwood depending upon severity. Mature narrowleaf cottonwood possesses thick-furrowed bark; however, the bark does not always provide adequate insulation, leaving trunks vulnerable to heat-induced xylem cavitation and scarring. Even low-severity fires may wound trees, resulting in either complete or partially killed crowns. Post-fire sprouting generally occurs after light- to moderate-severity fire in pole sized and recently mature stands. The ability to produce postfire sprouts is greatly affected by stand age and location of the water table. Sprouting potential decreases proportionally as mature trees age. High water tables aid in the sprouting ability and subsequent sprout survival.

4.4.8 - *Cerocarpus betuloides (Mountain Mahogany)*

Mountain mahogany has a high regeneration rate following a fire disturbance and is an **obligate resprouter**. Fires usually kill the crown of the tree, but the trees do not burn as quickly as other shrubs in the chaparral. They sprout new growth from their root crown and grow quickly after a fire.

4.4.9 - *Pseudotsuga macrocarpa (Bigcone Spruce)*

Bigcone spruce is likely a **facultative seeder**, but is one of only a few western conifers capable of sprouting following fire. Mature trees sprout vigorously from the branches and bole after burning. The trunk and main branches of bigcone spruce have many dormant adventitious buds, which are insulated from fire beneath thick bark. Fire or other damage to the tree stimulates cell division and growth in these buds. Consequently, epicormic stems grow from the axils of branches or from branch stubs along the trunk from the middle or upper one-third of the crown. Despite its ability to develop new crowns, bigcone spruce is not favored by frequent fire. Repeated fire depletes energy reserves and enlarges old wounds, and mortality is high in trees subjected to such fire regimes.

4.4.10 - *Prunus illicifolia (Holly-leaf Cherry)*

Hollyleaf cherry rarely establishes seedlings in the postburn environment. Following fires that kill aerial stems, hollyleaf cherry sprouts vigorously via dormant buds located on a root crown as it is an **obligate resprouter**. The root crown serves as a source of numerous dormant buds and stored carbohydrates, enabling hollyleaf cherry to rapidly reoccupy the initial postburn environment. Sprouts are initiated from surviving perennating buds located on the root crown. Since root crowns possess aggregations of dormant buds, newly sprouted individuals occur as "sprout clumps." Hollyleaf cherry cover is initially reduced following burning, but most plants rapidly regain preburn size and biomass. Hollyleaf cherry can produce sprouts 4 to 5 feet (1.2 to 1.5 m) tall within 4 years.

4.4.11 - *Quercus berberidifolia (Scrub Oak)*

Quercus berberidifolia is a drought tolerant, and it is an as it is an **obligate resprouter.** This chaparral shrub resprouts after wildfire to become re-established within its community. Resprouting success can be as high a high of 98 percent for this species as it has an unusually high regeneration success rate.

4.4.12 - *Sambucus mexicana (Mexican Elderberry)*

Following a fire, aboveground parts of the root crown may sprout, as this species is a **facultative seeder**. A severe fire can kill the root and stem buds from which sprouting occurs. When severe fire occurs, regeneration can also occur from seed banks deep in the soil. The seeds deposited are from off-site dispersal or from plants of an earlier community. Fire scarifies the hard seed coat of buried seeds and stimulates their germination, which usually occurs the first growing season after the fire. Subsequent burns may eliminate blue elderberry since it spreads slowly by seed.

4.4.13 - *Salix lasiandra (Red Willow) / Salix lasiolepis (Arroyo Willow)*

Red willow is a pioneer or early seral species commonly found on fresh alluvium as it is a **facultative seeder**. This also allows this species to withstand repeated flooding and persist. Stands help stabilize the sand or gravel deposit, and in the absence of disturbance, other communities of cottonwoods and willows establish and eventually replace it. Most willows in all stages of vigor resprout from the root crown or stem base following fire. Red willow is a prolific seeder as well, and off-site plants are important as a seed source for revegetating burned areas.

SECTION 5: TREE ASSESSMENT

Tree surveys were conducted during the course of two site visits on the days of July 10 and 16 of 2007. George Wirtes (ISA certified arborist) began with the tree communities at the northern portion of the site and collected data on each native tree community moving to the south. The tools used during the survey included binoculars, aerial photographs, topographic maps, and field guides. As previously indicated, the goal was to produce and status update of the sensitive tree communities following the fire disturbance of 2003.

5.1 - Background

5.1.1 - Arborist Report – Martin Ranch, San Bernardino County

The City of San Bernardino requires an arborist to survey all existing trees onsite and recommend the protection of certain trees, and mitigation for the loss of others. An arborist report was conducted in December 1998, approximately 5 years prior to the Old Fire of 2003. The methodology involved in this assessment included the designation of "cells" within the project site by which to classify the health of the trees onsite.

According to the 1998 Arborist Report, approximately 4,000 trees occur in Martin Ranch and fall into three categories: Native trees (34%), Eucalyptus trees (64%), and Ornamental trees (2%). Most of the native tree populations occur in the canyons that traverse the property and around natural springs.

Tables 2 and 3 below provide a summary of the general tree type found onsite. Some of the most significant native trees on the property were canyon live oak, California sycamore, and white alder in terms of age, size, and health prior to the fire. At the time, oaks and sycamores were found with trunk diameters of 3 feet or more at breast height (DBH). The largest tree was an oak measuring five feet DBH. At the time of the original arborist report, alders were catalogued with trunk diameters up to 2 feet and heights of 60 feet or more.

Table 2: Summary of Tree Type Found at Martin Ranch

Tree Type	No. of Natives	No. of Non-Natives
Naturally-occurring natives	1,195	0
Mixed natives with eucalyptus*	110	75
Eucalyptus plantation	28	2,530
Ornamental	17	35
*Represents an area of the site where eucalyptus and native trees are interspersed. This area is in the upper portion of the site in the wash.		

Table 3: Summary of Native Trees

Tree Species	Total Trees	Small Plants Not Included	Location
Umbellularia californica (California bay laurel)	372	Many	Most in Cable Canyon
Juglans californica (So. Cal. black walnut)	310	Many	Largest northern portion also on sides of most channels
Alnus rhombifolia (white alder)	218	Some	In east and west forks of Cable Creek
Platanus racemosa (California sycamore)	196	Many	Found at bottom of Meyers Creek and other tributaries
Quercus chrysolepis (canyon live oak)	154	Few	Largest in southeast fork of Cable Canyon
Acer macrophyllum (big-leaf maple)	30	Few	In east and west forks of Cable Creek
Populus angustifolia (narrowleaf cottonwood)	17	Many	Found next to water
Calocedrus decurrens (incense cedar)	11	Few	Intentionally planted at residence
Cerocarpus betuloides (mountain mahogany)	8	Some	Largest occurrence in Cable Canyon
Pseudotsuga macrocarpa (bigcone spruce)	8	Few	On east-facing slope of Cable Canyon near conflux of east and west forks
Prunus illicifolia (holly-leaf cherry)	6	Some	Tree-sized group on east side of Cable Creek, before fork
Quercus berberidifolia (scrub oak)	6	Many	Some hybrid with Q. chrysolepsis
Arctostaphylos glauca (big berry manzanita)	5	Some	Largest on steep, western canyon wall of Cable Creek
Sambucus mexicana (Mexican elderberry)	5	Many	Mostly shrubs throughout
Washingtonia filifera (California fan palm)	2	None	At existing residence
Salix lasiandra (red willow)	2	Some	Largest in west Meyers Canyon; small in Cable Creek
Salix lasiolepis (arroyo willow)	0	Many	In wet areas
TOTAL	**1,350**		

5.2 - Sensitive Native Tree Communities

The sensitive, tree-dominated, vegetation communities and stands of gum trees identified in the MBA Report of June 2007 are shown in Exhibit 3. The sensitive native tree communities were closely examined during the surveys of July 10 and 16 of 2007, and their status is described below. As previously indicated, the goal of this assessment was to gather data on each tree vegetation community and provide a status update as to its condition and current outlook. Given the limited scope of this assessment, individual trees were not tagged or specifically evaluated; the focus was extended to the entire community.

The data recorded during the field assessment included the documentation of the primary indicator species of each tree community, evidence of burn severity (using the USGS Composite Burn Index convention), as well as indications of post-disturbance status and general health of the community examined (using International Society of Arboriculture standards). Photographic records were taken and are included in Appendix A.

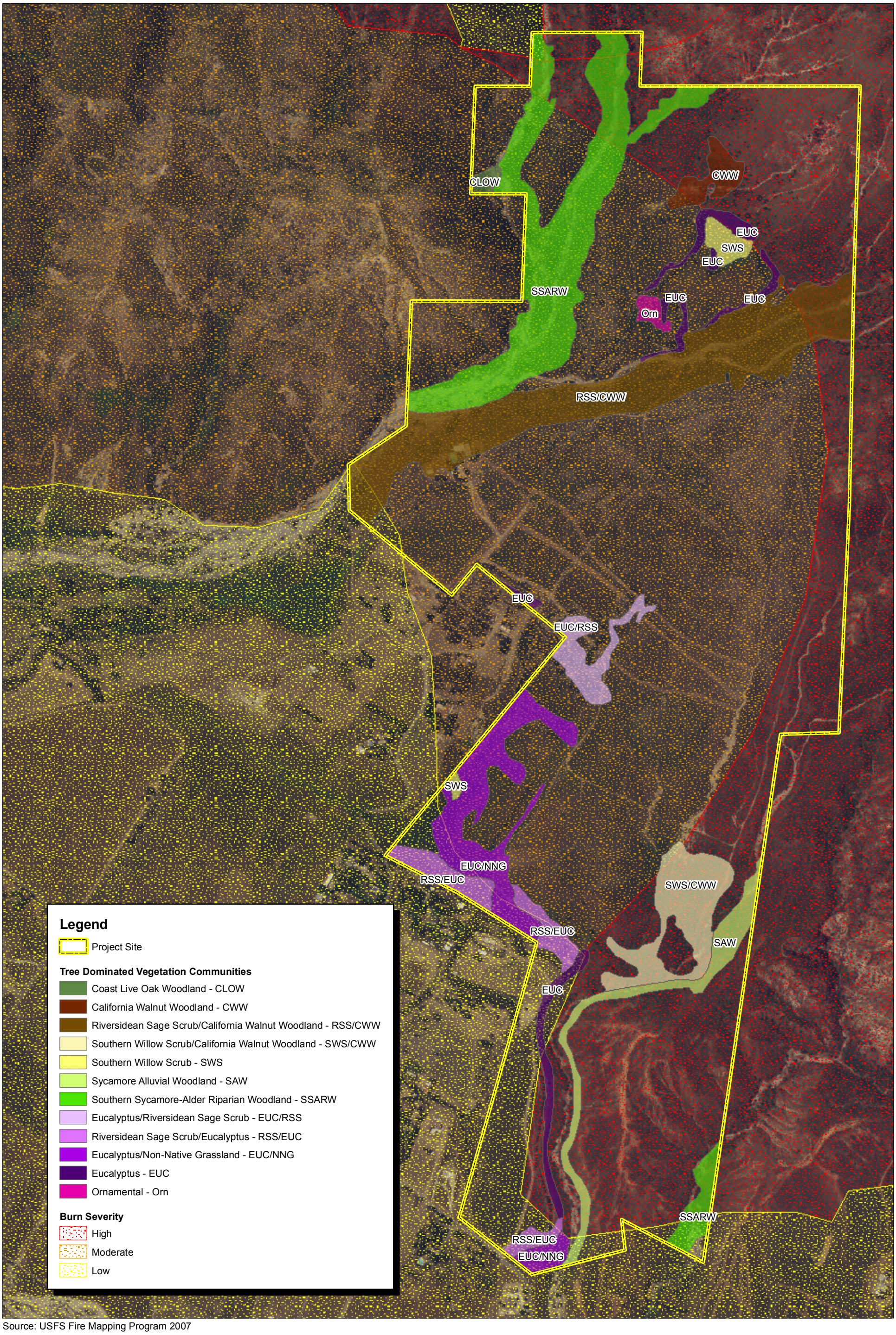
5.2.1 - California Walnut Woodland (CWW)

California walnut woodland was one of the most represented sensitive tree habitats found within the project site with at least 2.1 acres present and another 31.6 acres present that were hybridized with other communities (RSS and SWS). Hybridization with RSS occurred in xeric (drier) areas where it occurred with SWS was in mesic (wetter) areas. This vegetation type was typically found in the vicinity of natural drainages on the terraces or adjacent to ravines.

Observation: The apparent CBI index value for this community type ranged from 1.5 to 3.0 where remnants of the fire disturbance indicated 35-100 percent consumption of the vegetation canopies present at the time. At this intensity, vegetation litter was mostly removed. This community type had resiliently recovered to where new growth had sprouted masking much of the evidence from the fire. California walnut is known to recover well from fire resprouting vigorously when top-killed by fire. The primary species noted during the survey within the CWW were CA walnut, Mexican elderberry, and scrub oak in the xeric areas, with mulefat, canyon oak, willow, Ca bay, and sycamore well represented in the more mesic areas. An additional 3 to 4 acres were found at the southern portion of the project site extending west along a ravine just north of the central RSS/EUC community.

5.2.2 - Canyon Live Oak Woodland (CLOW)

A small 0.5-acre patch of canyon live oak woodland occurs in the northwestern portion of the property on the western slope of Cable Canyon's west fork.



Source: USFS Fire Mapping Program 2007

Michael Brandman Associates

NORTH

0 425 850 Feet

Exhibit 3
Tree-Dominated Vegetation Communities

Observation: This woodland too has recovered from the 2003 Old Fire with sprout regeneration and other survival mechanisms. The apparent CBI index value for this community type ranged from 1.0 to 3.0 where remnants of the fire disturbance indicated 10-100 percent consumption of the vegetation canopies. At this intensity, vegetation litter was likely removed. This tree community had adapted to the disturbance by basal resprouting if the canopy had been consumed or by epicormic sprouts if the canopy had been partially damaged. Epicormic shoots are sprouts from limbs and are an indicator that the tree had been impacted and is adapting or is stressed. The primary species noted during the survey within the CLOW were canyon oak, Ca bay, and CA walnut, Ca sycamore. Canyon live oaks are known to resprout vigorously, and disturbance can also enhance seed recruitment creating a positive outlook for this habitat following fire disturbance. Recovery in this vegetation community however, appeared to be the slowest among the communities surveyed due to the slow growth typically seen in canyon oak.

5.2.3 - Southern Sycamore-Alder Riparian Woodland (SSARW)

This riparian woodland is typically located on the floor and adjacent terraces of the primary drainages within the project area. There are 22.4 acres of southern sycamore-alder riparian woodland onsite; one site is located in association with Cable Creek in the northwest corner of the site, and the other is at the southeast corner of the property.

Observation: This woodland has recovered resiliently from the 2003 Old Fire with prolific resprouting noted on many of the trees onsite where entire canopies had been killed. The apparent CBI index value for this community type ranged from 1.0 to 3.0 where remnants of the fire disturbance indicated 10-100 percent consumption of the vegetation canopies. At this intensity, vegetation litter was mostly removed. This vegetation type had resiliently recovered to where new growth had sprouted. White alders are known to recover from fire by resprouting when top-killed by fire, but with limited success. The primary species noted during the survey within the SSARW were CA walnut, Mexican elderberry, canyon oak, willow, Ca bay, but mostly sycamore. Notably missing from this vegetation community were white alders. These trees were not visible by binocular as they had been heavily impacted by the fire of 2003. At the present time, this vegetation community is most accurately described as sycamore alluvial woodland (see Section 5.2.5 below) until the alders re-establish as an dominant species.

5.2.4 - Southern Willow Scrub

Two small areas, comprising 1.2 acres, of southern willow scrub occurred on the project site—one large patch in the north and a smaller patch along the western boundary. The community is found primarily in association with Meyer Canyon and supports arroyo willow (*Salix lasiolepis*) and red willow (*Salix laevigata*).

Observation: This woodland has resiliently recovered from the 2003 Old Fire with sprout regeneration. The apparent CBI index value for this community type ranged from 1.5 to 3.0 where remnants of the fire disturbance indicated 35-100 percent consumption of the vegetation canopies. At

this intensity, vegetation litter was mostly removed. This community had resiliently recovered to where new growth had sprouted almost completely masking evidence from the disturbance. This species is known to recover well from fire resprouting vigorously when top-killed by fire; it is also know as a seed recruiter following disturbance. The primary species noted during the survey within the SWS red and arroyo willows, canyon oaks, mulefat, Mexican elderberry, sycamore, and CA fig. Interestingly, wild grape had prolifically rebounded following the fire and aggressively competes for resources to the point of covering much of the willows (see photo in Appendix A below).

5.2.5 - Sycamore Alluvial Woodland

Dominated by western sycamore, scrub oak, and Mexican elderberry, sycamore alluvial woodland was found onsite. The 5.2 acres of woodland are associated with the braided, depositional channels of Meyers Canyon in the southern portion of the site.

Observation: This woodland has recovered resiliently from the 2003 Old Fire with prolific resprouting noted on many of the trees onsite where entire canopies had been killed. The apparent CBI index value for this community type ranged from 1.0 to 3.0 where remnants of the fire disturbance indicated 10-100 percent consumption of the vegetation canopies. At this intensity, vegetation litter was mostly removed. This community had resiliently recovered to where new growth had vigorously resprouted. The primary species noted during the survey within the SSARW were CA walnut, Mexican elderberry, canyon oak, willow, Ca bay, and sycamore.

SECTION 6: HAZARD RISK ASSESSMENT

The International Society of Arboriculture (ISA) recommends a Hazard Assessment be included with arborist reports. Such assessments are an important component of any such report and are critical if trees can potentially be located near public areas such as walkways and buildings.

A tree is considered hazardous when it has a structural defect that predisposes it to failure and the tree is located near a target.

- A target is person or property that may sustain potential injury or property damage if a tree, or a portion of a tree fails;
- Target areas include sidewalks, walkways, roads, vehicles, structures, playgrounds or any other area where people are likely to gather;
- Common hazards include dead and diseased trees, dead branches, included bark, stubs from topping cuts, broken branches (hangers), multiple leaders, tight angled crotches, and an unbalanced crown.

6.1 - Observations

Several thousand trees occur within the project boundary; many of these have fully adapted to the impacts caused by the fire of 2003, but many (especially the gum trees) present a hazard and can potentially result in injury or property damage if a tree or a portion of a tree fails.

6.1.1 - Tree Failure

The greatest hazard potential exists in areas where the fire has substantially damaged or killed large trees onsite (alder, gum, sycamore, oak, etc.), and the remaining structure or a portion of it is no longer physically sound. Within the site, many trees (especially gum) were noted as having increased dead wood and open cavities caused by the fire. Strong winds, soil saturation, and other environmental factors can lead to a total or partial failure if the integrity of the structure has been compromised (see Section 7.1.1 below).

6.1.2 - Fire-induced Decline

Fire-induced decline often follows the impacts of a fire and reduces a tree's natural defense; this can be a long, gradual process that may take years to run its course. Epicormic sprouting, poor canopy development and pest/disease infestation are indications of potential decline that were noted during the surveys. Decline can lead to the onset of decay and the infestation of pests by way of open wounds on the tree. Further compromising the structural integrity of the tree, dead wood can be aggressively attacked by fungus, termites or other pests (see Section 7.1.1 below).

SECTION 7: SUMMARY OF FINDINGS

Five sensitive, native, tree-dominated vegetation communities were assessed as part of this investigation. The goal was to determine the status of each community as an update to an existing arborist report created in 1998.

The gum trees that remain within the project site occur with varying degrees of fire damage. The stands of gum trees onsite vary in condition from dead to undisturbed. Many stands adjacent to housing structures were left unimpacted, perhaps as a result of the nearby structures being aggressively protected by fire agencies. There were *Eucalyptus* species that had been severely impacted, especially those adjacent to or located within wildlands. These trees need to be individually assessed if they are to be preserved in place. Potential hazards were noted during the field assessment that included dead trees and limbs as well as scorched, burnt out, and diseased trunks all indicating potential poor structural integrity.

The general condition of each of the native tree communities is good, as they have resiliently survived the impacts of the Old Fire; many have resprouted and grown to almost pre-disturbance conditions. Much of the southern willow scrub and California walnut woodland (CWW) have been completely restored to where charred remains have mostly been concealed by new, living canopies. An additional 3-4 acres of CWW was also found extending west along the southern base of the central hill just north of the RSS/EUC community; this is an extension of the SWS/CWW community located at the southeastern portion of the site.

No white alders were found during the surveys as their numbers had been substantially reduced by the impacts of the 2003 Fire. It is likely, however, that they may be present in reduced numbers, but as basal sprouts or in sapling form. There are conflicting reports as to their primary mode of re-establishment after a fire, but they are not known to be strong regenerators. Until the alders re-establish themselves as a dominant species, this essentially changes the vegetation communities types they were once a part of from southern sycamore-alder riparian woodland to sycamore alluvial woodland.

7.1 - Mitigations

7.1.1 - Preservation of Existing Sensitive Tree Dominated Communities

The preservation of all healthy trees onsite is the preferred option. The sensitive native tree communities onsite provide quality habitat for flora and fauna. The native habitats present are mostly located within and adjacent to ravines, slopes, and terraces and can potentially be set aside as conservation easements.

7.1.2 - Tree Replacement Ratio

The implementation of the proposed project will likely involve the removal of both, native and non-native trees. Healthy trees removed as a result of project implementation should be mitigated for at a 1:1 ratio. The species of trees to be planted should be determined be the location of the site and be appropriate for the local environmental conditions. Trees installed in the vicinity of the conservation areas should be native while species within the local landscaping should be in accordance with the City's approved tree list if available.

7.1.3 - Habitat Enhancement

Impacts to local wildlife stemming from project implementation can be mitigated to an extent by the enhancement of the areas adjacent to and within the native tree conservation areas. Furthermore, enhancement of these areas can be used as an additional mitigation measure for any native tree species impacted by the implementation of the project. Enhancement with plantings of native trees typically occurring in the adjacent community is recommended. Habitat enhancement shall be performed under the direction of a qualified biologist and include the flora typically found within or adjacent to the vegetation community.

7.2 - Other Recommendations

7.2.1 - Trees to be Removed

Many of the trees onsite pose a significant failure hazard to the public if not removed. It is recommended that all trees identified as diseased or hazardous be removed and replaced according to City guidelines. All landscaping involving this mitigation shall be performed by a firm experienced in tree maintenance and who can demonstrate this to the satisfaction of the Planning Department. Many of these trees are unstable and are unsuitable as landscape trees within a residential development. If any gum trees are to remain as part of the landscaping within the proposed project, each gum tree shall be individually assessed and mitigated for.

7.2.2 - Tree Maintenance

Trees near in residential areas and public access areas shall be carefully pruned and maintained keeping in mind the frequent force exerted upon them during wind events and the potential existing residential "targets." All landscaping involving this mitigation shall be performed by a firm experienced in tree maintenance and who can demonstrate this to the satisfaction of the Planning Department.

7.2.3 - Tree Protection during Construction

Building near trees requires that the trees be healthy at the start for the stand to recover well. Some of the trees onsite are mature/over mature and have little tolerance for root damage or other stress factors. Younger, more vital trees are more tolerant of changes in their surroundings. However, each change in

soil compaction, irrigation, under plantings, etc., takes some of an older tree's strength and vigor and further diminishes their health. The main stresses and risks of construction are:

- Soil compaction;
- Lack of water or changes in the site hydrology;
- Change of grade in the root zone;
- Physical damage to tree roots and structure;
- Dumping of potentially toxic construction wastes;
- Lack of pest control and other care;
- Dust; and
- Human error.

Mature trees take a long time to heal from or respond to injury. It could take 10 years for some trees to make a visible improvement in health after construction impacts occur. On the other hand, it could take 10 years for a tree to visibly start declining after cutting roots, compacting the soil, or raising the grade.

The following measure shall be taken for any trees that are to be preserved onsite.

1. Any tree maintenance activity onsite should be performed at the direction of an ISA Certified Arborist or ASCA Registered Consulting Arborist. All work shall be performed according to industry and ISA standards.
2. Dripline fencing shall be placed a minimum from the tree of 1-foot radius per inch diameter at breast height (for example, 6-inch trunk = 6 feet radius [12 feet diameter]) or 1 foot beyond the canopy dripline, whichever is greater.
3. Dripline fencing shall be erected such that it is visible and structurally sound enough to deter construction equipment, foot traffic, and the storing of equipment under tree canopies.
4. Raising or lowering the grade in the root zone of trees can be fatal or ruin the health of trees for years to come. Grade change and soil compaction force out the oxygen and literally press the life out of the soil. A retaining wall can be used to minimize the amount of the root zone that is affected, but it is essential that the footing not be continuous. Gravel and aeration pipes should be placed inside the retaining wall before the fill is placed. Consult with a qualified civil engineer for proper design calculations.
5. Trenching within the protection zone shall be avoided wherever possible. Most of the roots are in the top 1 to 2.5 feet of soil, and trenching can sever a large percentage of roots;
6. Oil from construction equipment, cement, concrete wash out, acid washes, paint, and solvents are toxic to tree roots. Signs should be posted on the fencing around trees notifying contractors of the fines for dumping. Portable latrines that are washed out with strong detergents, can damage the fine roots of the trees. Portable latrines should not be placed near trees, nor where frequent and regular foot traffic to them will compact the soil below the trees.

7. Construction creates large amounts of dust, and the oaks and any other trees to be preserved will need to be kept clean. Dust reduces photosynthesis on all trees. Strict dust control measures shall be implemented during construction to minimize this impact, and an occasional rinsing with a solution of water and insecticidal soap will help control pests.

SECTION 8: QUALIFICATIONS OF ARBORIST

Mr. Wirtes is a Certified Arborist with the International Society of Arboriculture (CH-08084) and was certified in November of 2005. He has conducted numerous tree assessments for residential properties that involve oak and other tree species. Mr. Wirtes' most notable projects include an oak regeneration plan for a 2.3-acre project site in Ventura County, several Joshua Tree Assessments, and tree inventories in San Bernardino County. Mr. Wirtes' education includes a BS in Biology and an MS in Environmental Science from California State University at Fullerton.

The statements made in this report do not take into account the effects of extremes of climate, vandalism, or accident, whether physical, chemical or fire. Michael Brandman Associates cannot, therefore, accept any liability in connection with these factors, nor where prescribed work is not carried out in a correct and professional manner in accordance with current good practice. The authority of this report ceases at any stated time limit within it, or if none stated after 1 year from the date of the survey or when any site conditions change, or pruning or other activity unspecified in the report are carried out to, or affecting, the subject tree(s).

SECTION 9: REFERENCES

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Appendix A: Photographic Records

Figure 1. This is a northern most CWW located within a tributary of Cable Creek; there is an increased presence of poison oak and wild grape.

Figure 2. This is a western view of the regenerated SSARW at the northwestern portion of the site. There is a noted absence of white alder.

Figure 3. This is an eastern view of the regenerated CWW located at the northeastern portion of the site.

Figure 4. This is a northern view two California walnut trees that had regenerated from basal structures following the fire disturbance.

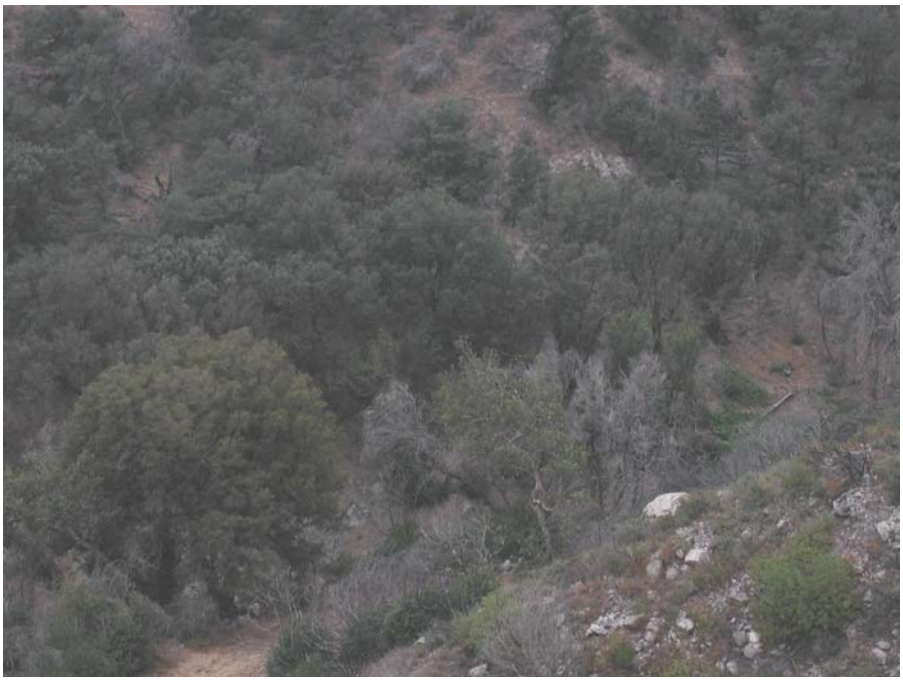


Figure 5. This is a western view of the canyon live oak woodland at the northwest corner of the project site.

Figure 6. This is northern view of the RSS/CWW located within the central interior of the site.

Figure 7. This shows the convergence of SAW and CWW located at the northwest corner of the site.

Figure 8. This is an eastern view of the CWW extending from the southern portion of the SWS/CWW documented in the biological report of 2007.

Figure 9. This is an eastern view of the same CWW extending west to the just north of the RSS/EUC community.

Figure 10. This is a northern view of the SWS community at the northeastern portion of the site. Wild grape has taken advantage of the disturbance and currently out-competes the willows for sunlight.

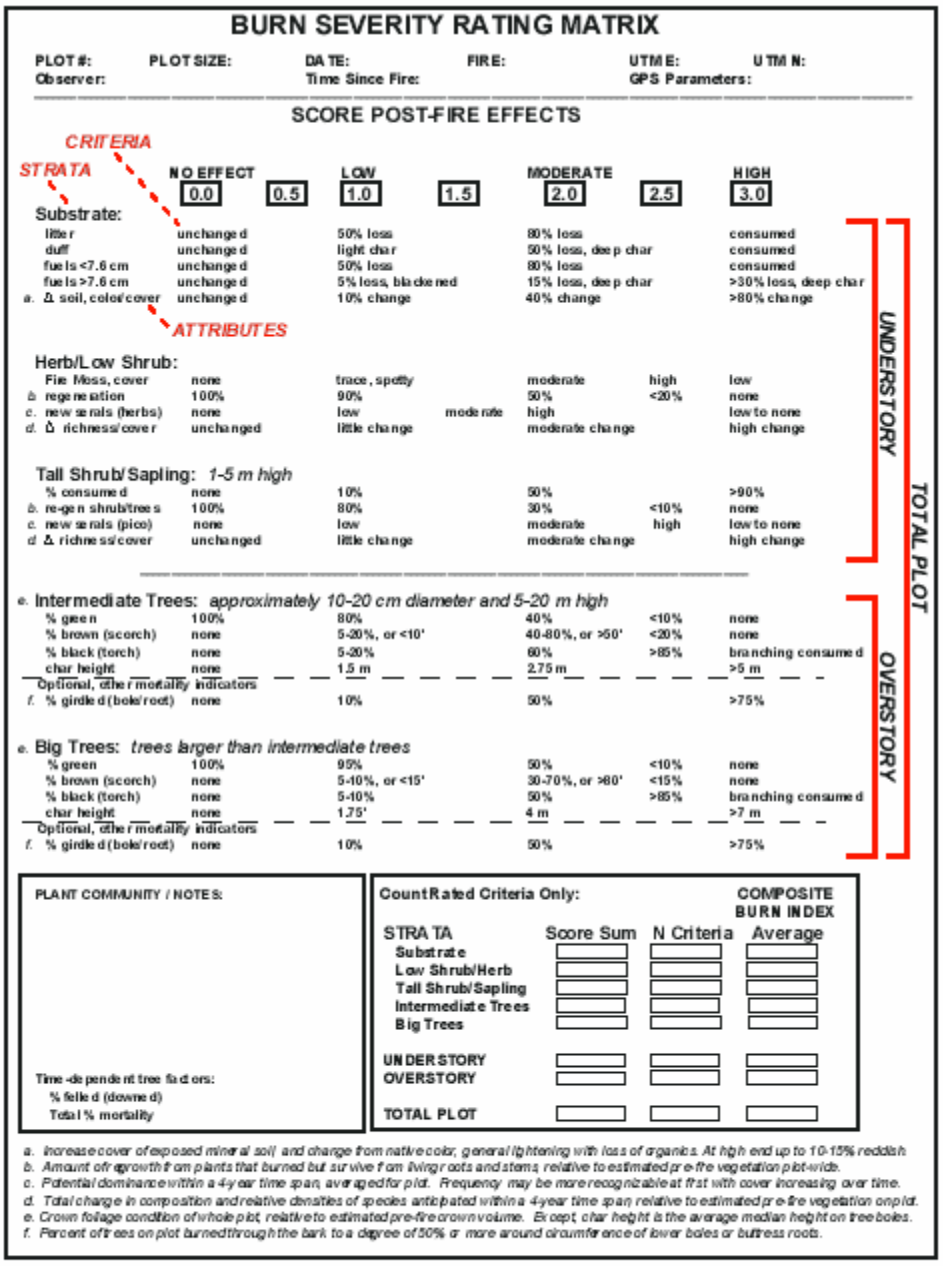
Figure 11. This is a southern view of the SAW (in ravine) community and stand of gum trees that extend to the southern boundary of the property.

Figure 12. This is an eastern view of the SAW along the eastern boundary of the site.

Figure 13. This is a western view of the SSARW community located at the southeastern portion of the site. Here too, there is a noted absence of white alder.

Figure 14. This image of a gum tree illustrates its regenerative characteristics. The stem has been hollowed out by fire and poses a potential threat of structural failure.

Appendix B: USGS Composite Burn Index Worksheet



BURN SEVERITY RATING MATRIX

PLOT #: PLOT SIZE: DATE: FIRE: UTM E: UTM N:
Observer: Time Since Fire: GPS Parameters:

SCORE POST-FIRE EFFECTS

CRITERIA / STRATA / ATTRIBUTES

	NO EFFECT 0.0	0.5	LOW 1.0	1.5	MODERATE 2.0	2.5	HIGH 3.0
Substrate:							
litter	unchanged		50% loss		80% loss		consumed
duff	unchanged		light char		50% loss, deep char		consumed
fuels <7.6 cm	unchanged		50% loss		80% loss		consumed
fuels >7.6 cm	unchanged		5% loss, blackened		15% loss, deep char		>30% loss, deep char
a. Δ soil, color/cover	unchanged		10% change		40% change		>80% change
Herb/Low Shrub:							
Fire Moss, cover	none		trace, spotty		moderate	high	low
b. regeneration	100%		90%		50%	<20%	none
c. new serals (herbs)	none		low	moderate	high		low to none
d. Δ richness/cover	unchanged		little change		moderate change		high change
Tall Shrub/Sapling: *1-5 m high*							
% consumed	none		10%		50%		>90%
b. re-gen shrub/trees	100%		80%		30%	<10%	none
c. new serals (pico)	none		low		moderate	high	low to none
d. Δ richness/cover	unchanged		little change		moderate change		high change
e. **Intermediate Trees:** *approximately 10-20 cm diameter and 5-20 m high*							
% green	100%		80%		40%	<10%	none
% brown (scorch)	none		5-20%, or <10'		40-80%, or >50'	<20%	none
% black (torch)	none		5-20%		60%	>85%	branching consumed
char height	none		1.5 m		2.75 m		>5 m
Optional, other mortality indicators							
f. % girdled (bole/root)	none		10%		50%		>75%
e. **Big Trees:** *trees larger than intermediate trees*							
% green	100%		95%		50%	<10%	none
% brown (scorch)	none		5-10%, or <15'		30-70%, or >80'	<15%	none
% black (torch)	none		5-10%		50%	>85%	branching consumed
char height	none		1.75'		4 m		>7 m
Optional, other mortality indicators							
f. % girdled (bole/root)	none		10%		50%		>75%

UNDERSTORY

OVERSTORY

TOTAL PLOT

PLANT COMMUNITY / NOTES:

Time-dependent tree factors:
% felled (downed)
Total % mortality

Count Rated Criteria Only:

STRATA	Score Sum	N Criteria	COMPOSITE BURN INDEX Average
Substrate			
Low Shrub/Herb			
Tall Shrub/Sapling			
Intermediate Trees			
Big Trees			
UNDERSTORY			
OVERSTORY			
TOTAL PLOT			

a. Increase cover of exposed mineral soil and change from native color, general lightening with loss of organics. At high end up to 10-15% reddish
b. Amount of regrowth from plants that burned but survive from living roots and stems, relative to estimated pre-fire vegetation plot-wide.
c. Potential dominance within a 4-year time span, averaged for plot. Frequency may be more recognizable at first with cover increasing over time.
d. Total change in composition and relative densities of species anticipated within a 4-year time span, relative to estimated pre-fire vegetation on plot.
e. Crown foliage condition of whole plot, relative to estimated pre-fire crown volume. Except, char height is the average median height on tree boles.
f. Percent of trees on plot burned through the bark to a degree of 50% or more around circumference of lower boles or buttress roots.

This form identifies criteria used to rate attributes in the northern U.S. Rocky Mountains. Though intended to be generic, attributes and criteria may differ slightly in other regions. Scores reference average conditions within relatively large plots (20-30 m diameter). Scores are summed and averaged by strata, understory/overstory, and overall to yield composite indices, lower right.