Appendix D1
Arborist Report (Integrated Urban Forestry 1998)

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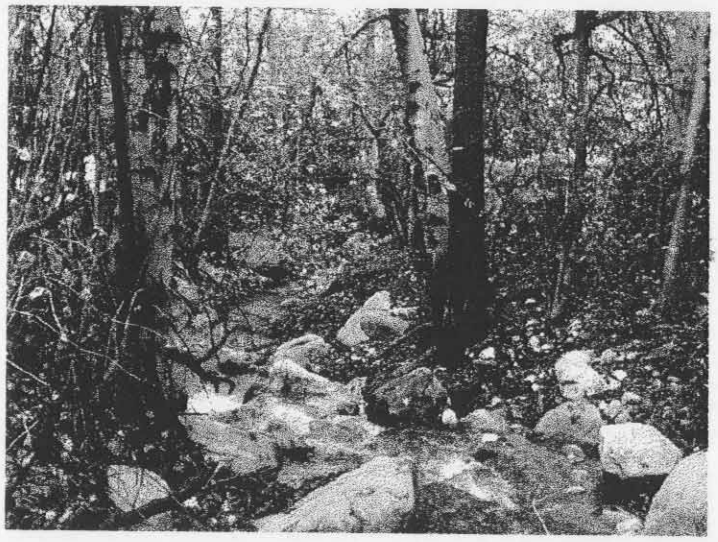
ARBORIST REPORT
MARTIN RANCH
SAN BERNARDINO COUNTY



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Executive Summary

Montecito Equities, owner of Martin Ranch, proposes to build some 350 homes on 55% of the 353-acre site. The City of San Bernardino requires an arborist to survey all existing trees on-site. This report describes Integrated Urban Forestry's (IUF) evaluation of this tree resource (about 4,000 trees) and recommendations to protect the trees and mitigate for the loss of others.

The property was divided into 29 groups of trees (2 are off-site). Similar tree characteristics and natural geographic boundaries defined these groups. This report describes each area and the trees, locates each area and tree species on a plan, recommends tree preservation, short and long-term maintenance, and tree relocation measures, and presents a tree mitigation/replacement plan.

The site consists of canyons and steep hillsides punctuate with gently sloping open space. Most of the native trees are in canyons and around natural springs. Vegetation is often thick with poison oak and native grapevine. The 3,999 trees at Martin Ranch fall into three categories:

1. **Native trees** (34%) are primarily California bay-laurel, Southern California black walnut, white alder, California sycamore and canyon live oak. There are some significant specimens and stands, mostly located in areas outside of the proposed grading. In addition to the trees, many more exist as small young trees or large, multi-trunked shrubs, below the 6-inch diameter City reporting standard.
2. **Eucalyptus trees** (64%) are remnants of a commercial fuel wood plantation.
3. **Ornamental trees** (2%) are either intentionally planted exotic and native species around roads, existing or abandoned houses, or escaped weeds in native woodlands.

Because of past eucalyptus harvesting practices, wildfires and natural growth habits, many of the trees are structurally hazardous for use within or adjacent to residential development. The proposed design will require removing about 2,391 trees. Of these, only 219 (less than 1%) are native species, mostly walnut and sycamore. The majority is remnant eucalyptus plantation trees (approximately 2,168) with the remaining 10 being ornamental exotic species.

The proposed 350± home development may indirectly impact the preserved trees by:

1. Altering the soil grade and compaction
2. Decreasing available rainwater and increasing irrigation water runoff with an unknown net water affect
3. Increasing wind speed, light and temperature and reducing humidity
4. Further encroachment of exotic species
5. Pollutants in the water and soil
6. Damages from recreation use and vandalism

Moderating the long term impacts of people on the preserved native trees while allowing recreational access may be the most challenging issue for long-term tree health.

Assignment

Integrated Urban Forestry (IUF), a division of David Evans and Associates, Inc., along with Paul Chaney of First Certified Arbor Care, evaluated the tree resourcse on the Martin Ranch project site and submit this arborist report and recommendations in conformance with the City of San Bernardino requirements. The Martin Ranch project site, tentative tract #15576, is comprised of approximately 353 acres located in an area proposed for annexation in the northwestern portion of the City of San Bernardino, San Bernardino County. Montecito Equities, landowner, proposes to build approximately 350 residential, single-family homes on site. Site development will result in grading over 193± acres (55%) of the total property. The remaining 159± acres (45%) will remain in a natural state.

The City of San Bernardino requires a tree map and arborist report identifying all existing trees on-site prior to issuance of a tree removal permit (City Development Code, Chapter 19.28.090). Arborist reporting standards include detailed identification of each tree consisting of: location, height, crown width and trunk diameter; health, vitality and structure problems; tree preservation measures; short and long-term maintenance recommendations; tree relocation plan if warranted; and tree replacement plan. The report typically covers all trees on-site, not just those within the grading envelope. The City's February 1997 summary of their requirements, *Policy and Procedure for California Certified Arborist Reports* and copy of City Code sections 19.28.090 (Removal or Destruction of Trees) and 19.17.210 (Contents of the Application) is enclosed in Appendix A.

Because there are about 4,000 trees on the Martin Ranch site, some of which are inaccessible through reasonable means, the City has granted a variance from their standard Arborist Report requirements for this project.[1] Instead of presenting detailed data on each individual trees, this study summarizes information on groups of trees by species within 28 geographic cells. Trees native to the region (naturally occurring or planted for ornamental purposes) have been identified in this report and on the attached tree location plan separately from non-native species. Preservation of all significant, viable native trees is strongly encouraged. City code (19.28.090) requires that *"unless there is a pre-approved tree replacement plan, each tree that is removed in a new subdivision and is considered to be of significant value by the department of Parks, Recreation and Community Service shall be replaced with a 36" box specimen tree in the subdivision in addition to any other required landscaping. Such a plan does not necessarily require a tree for tree replacement provision."* A tree replacement plan for mitigation is presented herein.

[1] Per a phone conversations between Karen Fraser (IUF) and Matthew Swalberg (San Bernardino Parks, Recreation and Community Services Department) on November 3rd and 23rd and with Deborah Wooldruff (San Bernardino Planning Department) on November 18th.

Methodology

During several site visits in 1998, IUF International Society of Arboriculture (ISA) Certified Arborists and Paul Chaney examined the trees or tree groups existing on and adjacent to the Martin Ranch project site to determine the extent of the tree resource. Using City of San Bernardino standards (HM 19.17.2.B) all trees with a single trunk diameter of 6 inches or greater (measured at 4½ feet above mean ground level) were counted. Multi-stemmed trees were included if one of the trunks measured 6 inches or greater. In areas where the tree trunks were not visible (e.g., inaccessible or vine covered), the trees were counted if height or canopy spread was 20 feet or greater.

We also examined the preliminary grading and construction plans for the proposed development to determine impacts the proposed improvements may have on the trees. For recording and description purposes, the property was divided into 27 cells. Cells were defined by natural geographic and/or proposed construction boundaries and are labeled A to Z1, plus L1 for a small area close to but distinct from L. Cell 'Z' and cell 'OS' (Martin Ranch Road and Myers Road, respectively) are off-site but may be impacted by construction activities. These areas have not been included in the total tree count. Refer to the *Tree Location Plan* in Appendix D for the location of each cell.

Using a combination of methods and equipment including field data collection forms, tally clickers, topographic maps, aerial photograph, all terrain motorcycle and vehicles, information on each tree, tree group and cell was collected. Photographs were also taken of individual trees, tree groups and the general area to assist in describing tree resources. Notable difficulties encountered during the surveys included steep terrain, dense underbrush, poison oak, vines obscuring canopies and trunks, rattlesnakes and other hazards. Some areas were inaccessible, notably cell S, V, X and portions of N, R, and U. In these areas, tree counts are based on observation, aerial photograph, photos taken from various vantage points and characteristics of adjacent cells.

A detailed description of each cell and photographs can be found in Appendix C.

Cell boundaries and tree locations were plotted on topographic maps using in-field triangulation, visual estimates and an aerial photograph. Using AutoCadd, this information was entered onto base maps provided by the project engineer. Determination of trees that would require removal, trees that could remain but would be impacted, and changes in drainage, among others, was accomplished with AutoCadd. Layering tree location information with grading plans allowed accurate assessment of construction impacts on trees.

Observations

General Site Conditions

The Martin Ranch site is located north of Myers Road and east of Martin Ranch Road. The San Bernardino National Forest bounds the property on the east and north. Refer to the Site Location Map, Figure 1.

Canyons and steep hillsides punctuate the terrain with gently sloping or flat, open space in between. Native vegetation on the hilltops and slopes is predominantly sage scrub and chaparral with occasional native trees. Most of the native tree population occurs in the canyons that traverse the property and around natural springs located in cells 'S' and 'D'. The vegetation in these areas is often thick and almost impenetrable with poison oak (*Rhus diversiloba*) and grapevine (*Vitus californica*) among the dominant understory plants. In riparian areas, grapevines often cover entire trees.

Much of the gentler sloping portions of the property contain Eucalyptus trees, remnants of a fuel wood plantation. These trees, often arranged in a tightly spaced grid or windrow formation, have regenerated from old stumps after harvesting or wildfires.

There is one existing home within the property boundaries, although outside of the grading area. The ornamental and native trees at this house ("Bonadiman residence") have been included in the total tree count (cell 'L'). Two other abandoned building pads were found that have some remnant ornamental landscape (cells 'A' and 'M'). Table 1 gives a summary of the general tree type found in each cell. Appendix E gives a description of each tree species.

Table 1 - Summary of Tree Type

Tree Type	Cell	# of Natives	# of Non-natives
Naturally-occurring natives	L1, O, P, S to Y	1,195	9
Mixed natives with eucalyptus	Q, R	110	75
Eucalyptus plantation	A to K, M, N, Z1	28	2,530
Ornamental	L	17	35

The trees and vegetation on-site receive water from rainfall, perennial and intermittent streams and numerous springs. The west fork of Myers Canyon flows north to south close to the eastern edge of the property. Cable Creek, along with the east and west tributaries, flow north to south near the western edge of the property. A southeastern fork of Cable Creek traverses the property east to west. A large area of natural springs is located off Myers Canyon West Fork in cell 'S'. Another spring is located in cell 'D' at the property's western edge. This abundant water produces lush riparian growth in many areas and supports vigorous tree resources.

All of the property at one time or another has been scorched by fire. The largest, most recent was the 1980 Panorama fire that burned well over 10,000 acres and much of the Martin Ranch property. Since then, they have had a few small fires on the property. These fires have kept tree canopy growth in check causing multi-stemmed sprouts from root stock, and thus few large, old specimens exist, except in the wettest areas.

The general location of each tree species was plotted on the *Tree Location Plan* in Appendix D. Details regarding each cell's location and composition as well as photographs of the trees, can be found in Appendix C.

Native Tree Resource

Of the 3,999 total trees found on the site, approximately 66% are non-native and 34% are species native to the region. In addition to the 1,350 native trees, many more exist as small young trees or large, multi-trunked shrubs. This smaller material was often found in dense clusters forming a contiguous canopy over a large area. Although they were not counted in the total, their locations are noted in *Table 2, Tree Count by Species and Cell* (Appendix B).

The native trees are primarily California bay-laurel, Southern California black walnut, white alder, California sycamore and canyon live oak. Table 3 on the following page shows a summary of native species.

Some of the most significant native trees on the property, in terms of age, size, and health, are the large canyon live oak, sycamore, and alder. Oaks and sycamore were found with trunk diameters of 3 feet or more. The largest tree was an oak measuring 5 feet in diameter. For the species, the alders were especially significant with trunk diameters up to 2 feet and heights of 60 feet or more.

Although most of the walnuts and bay-laurels were multi-trunked sprouts from fire-damaged trees (12 to 20 feet tall), a few large walnut trees, with trunks up to 2 feet in diameter, were found in cell 'W'. Large bay-laurels measuring 40 to 60 feet tall, were found in Cable Creek (cell 'T' and 'U').

Less numerous, but significant, are the mountain mahogany, great-berried manzanita and big-cone spruce (fir). Most of the mahogany and manzanita found on the site were multi-trunked shrubs, however, mahogany with 18 to 20 inch combined trunk diameters were found in the cell 'Y' cluster.

The toyon, cottonwood, holly-leaf cherry, scrub oak, elderberry and willow were all mostly multi-trunk shrubs or small trees. With the exception of the cherry, these shrubs were numerous throughout the property, often forming large masses of contiguous canopy.

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 Cyn.
Juglans californica (So.Cal. black walnut)	310	many	largest in cell 'W'; also on sides of most channels
Alnus rhombifolia (white alder)	218	some	in E. & W forks of Cable Creek
Platanus racemosa (California sycamore)	196	many	found at bottom of Myers Creek and other tributaries
Quercus chrysolepis (canyon live oak)	154	few	Largest in SE fork of Cable Cyn.
Acer macrophyllum (big-leaf maple)	30	few	in E. & W forks of Cable Creek
Populus angustifolia (narrow-leaf cottonwood)	17	many	Found next to water
Calocedrus decurrens (incense cedar)	11	few	intentionally planted at residence
Cercocarpus betuloides (mountain mahogany)	8	some	largest in cell 'Y'
Pseudotsuga macrocarpa (bigcone spruce)	8	few	on east-facing slope of Cable Cyn. near confluxof E & W 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 (great-berried 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 Bonadiman residence
Salix lasiandra (red willow)	2	some	largest in W.Myers Cyn; small in Cable Creek
Salix lasiolepis (arroyo willow)	0	many	in wet areas

Eucalyptus Plantation Trees

Two-thirds of the total trees (2,623 trees) on-site are eucalyptus, originally planted for lumber and fuel wood. In the early 1900s Eucalyptus trees were widely planted for general lumber, railroad ties and fuel wood. Many eucalyptus grow very fast, have straight trunks and easily re-sprout from lignotubers[2] after being felled in a harvest practice called coppicing.[3] These trees

[2] A lignotuber can take the form of a woody rootstock embedded in the upper layer of soil at the base of a eucalyptus tree. They occur in adult plants and are vital to species regeneration. Lignotubers store food and moisture, and acts as an organ with dormant buds. After felling, drought or fire, new stems may sprout repeatedly from buds concealed in the wood mass, thereby regenerating a new tree.

[3] Coppicing is a practice of cutting a tree just above the root collar. The root system is not disturbed and thus in trees with healthy lignotubers, new shoots will sprout from the root collar. These new shoots are usually thinned to one to three healthy stems and allowed to develop into new trunks.

were subject to repeated coppicing as well as damage from numerous fires. Thus, most eucalyptus trees on site are actually stump sprouts. The trees are generally between 30 and 60 feet in height, with average trunk diameter less than 20 inches. About half are multi-stemmed.

There are also many small seedlings naturally regenerated from fallen seeds and a few larger trees that generated naturally from seed away from the main plantation groves, thereby escaping coppiced harvesting (e.g. cells 'O', 'T' and 'U').

Three primary eucalyptus species are found on site: red gum (*E. camaldulensis*), blue gum (*E. globulus*) and flooded gum (E. rudis) with a forth species, silver-dollar gum (*E. polyanthemos*) occurring less frequently. There has been some hybridization between the eucalyptus species. This is especially true between the *E. rudis* and *E. camaldulensis*. Closely related to each other, these species exhibit varied characteristics. Hybridization or gradation in species (where one species is gradually replaced by another with the geography) is typical in native stands, especially in western Australia. Where hybridization occurred and where it was difficult to differentiate between species, the more dominant species was identified in the cell, recognizing that other species or hybrids may exist.

Other Non-native Trees

Only 2 percent of the trees are non-native and non-eucalyptus. These trees are primarily confined to Myers Road, Martin Ranch Road, the Bonadiman residence and two-abandoned house pads.

- Myers Road (off-site): The south side of Meyer's Road is lined with a row of 25 Italian cypress, a clump of 15 olives, 3 Japanese black pine, and 3 twisted juniper.
- Martin Ranch Road (off-site): Lining both sides of Martin Ranch Road are non-native cottonwoods and sweetgums. The cottonwoods are 20 feet tall with 7- to 14-inch trunk diameters; the sweetgum have 3- to 8-inch trunk diameters. All trees on the east side of the road have been pruned for utility line clearance, destroying their natural form. The trees on the west side, while in need of some corrective and structural development pruning, retain their characteristic shape.
- Bonadiman house: Incense cedar (20' height) and a mix of California and Mexican fan palms (also 20' tall) border the house with former Monterey and aleppo pine Christmas trees at the entrance of the driveway. A row of olive trees is planted south of the house. Fruit-producing apricot, peach and pomegranate trees are also present.
- Abandoned houses: Three small black locust trees and a thicket of small tree-of-heaven grow around the house ruin near Meyer's Road in the southern-most portion of cell 'A'. Two large groups of small-sized tree-of-heaven and one olive tree can be found near the old house pad in cell 'M'.
- Other areas: There are three groups of fig (8 trees total) along the bank of Cable Creek and at the spring in cell 'D'. Three olive trees can be found in the middle of the eucalyptus grove in cell 'D' as well as a lone elm tree under the powerlines that was topped for line clearance.

Construction Impact

Site Grading

Approximately 193 acres or 55% of the total property will be graded to develop 359 residential lots, streets, 3 water tanks and access roads to these tanks, parks and maintained common area. Additionally, there is a secondary access road that will be constructed off-site. Site grading will remove all trees in these areas. Table 4 on the following page summarizes the number of trees that will need to be removed because of grading. *Table 2 – Tree Count by Species and Cell* in Appendix B provides further details.

The current design of the project requires the removal of about 2,391 trees. Of these, 213 (less than 1%) are native species. Of the remaining removed trees, 2,168 are *Eucalyptus*, and 10 are other ornamental species. It should be noted that these tree counts are approximated. Actual tree counts may change once the grading areas are delimited in the field and access to dense areas is improved. Additional trees may require removal if closer inspection reveals that they are unsuitable or unsafe for the intended use.

Table 4 - Summary of Tree Removals

Cell	Number of trees removed					% of total removed	Primary type
	Grading	Weed control	Total	Native	Non-native		
A	290		290	1	289	100%	eucalyptus
B	213		213	10	203	91%	eucalyptus
C	0		0	0	0	0%	
D	357		357	0	357	64%	eucalyptus
E	102		102	0	102	100%	eucalyptus
F	177		177	0	177	100%	eucalyptus
G	201		201	0	201	100%	eucalyptus
H	201		201	0	201	100%	eucalyptus
I	65		65	0	65	100%	eucalyptus
J	115		115	0	115	100%	eucalyptus
K	90		90	0	90	100%	eucalyptus
L	30		30	5	25	58%	exotic
L1	5		5	5	0	100%	natives
M	95	16	111	4	107	100%	eucalyptus
N	208	70	278	8	270	100%	eucalyptus
O	0	4	4	0	4	5%	eucalyptus
P	0		0	0	0	0%	
Q	40	13	53	28	25	49%	eucalyptus
R	0		0	0	0	0%	
S	100		100	100	0	95%	natives
T	0	3	3	0	3	1%	exotic
U	0	2	2	0	2	0%	exotic
V	0		0	0	0	0%	
W	58		58	58	0	89%	natives
X	0		0	0	0	0%	
Y	0		0	0	0	0%	
Z1	44		44	0	44	100%	eucalyptus
Totals	2,391	108	2,499	219	2,280	57%	

Grade Changes and Compaction

Preserved trees near a grading site may also be damaged by raising or lowering the existing grade and compacting the soil. The affect is more detrimental when this type of disturbance is within the dripline of the tree or within 20 feet of the tree trunk, whichever is greater.

Most tree roots are located within the top three feet of soil, extending outward five or more times the height of the tree like the base of a wine glass. Removing as little as six inches of soil in the critical root zone may damage significant tree roots. The extent of the damage depends upon the proportion of the root system removed, how close to the tree trunk the roots are removed, and the size of the roots.

Raising the grade by adding soil on top of existing soil cuts off or reduces the diffusion of oxygen into the soil and into the root zone. The roots need oxygen for respiration, and lacking it, the roots may produce fatally toxic substances and/or die of suffocation. The resulting decay spreads back toward the trunk of the tree, eventually rotting the root crown and causing the tree to die or fall over. Some tree species tolerate soil disturbances better than others do. Sycamores are known to tolerate low soil oxygen concentrations.

Similar to filling, compacting the soil around a tree will reduce the large pore-space between soils. These spaces are critical for oxygen and water availability and movement. With reduced pore space, roots can not get as much oxygen and water drains slower. This contributes to premature death, decay, tree stress, dieback and other problems.

Surface and Groundwater Changes

On Martin Ranch, many of the trees depend on water from intermittent and perennial streams, springs and a shallow water table. Trees located in preserved open space areas may be affected by change in the movement of water. In cells 'W' and 'N', substantial grading cuts are proposed below areas where there appear to be springs or water very near the surface. The cuts may cause the water-bearing layers to drain and the areas behind these cuts to dry out. Trees dependent on the availability of this ground water may die.

In cell 'S', springs feed the small stream in West Meyer's Canyon. The proposed improvements show substantial fill, up to 25' deep. If the springs stop functioning as they currently do, or the water is diverted down a man-made drain, the trees in and directly below the fill area may die.

The net result of the proposed development on water availability and absorption has not been quantified. Rainfall runoff normally concentrates in low spots where plants and trees sprout and develop. The proposed development includes large amounts of paved and roofed areas that will reduce the land's overall permeability. Underground water reservoirs will not as recharged through rainfall, thereby potentially lowering the water table. Water runoff after a rain will be more intense. If these flows are directed into the natural drainage, erosion may result possibly undermining any trees along the stream bank. If sediments from erosion are deposited over the roots and around the trunk and root crown, the tree's long-term health may be compromised similar to that of grade filling. However, if the entire flow from roofs, driveways, and streets is diverted into storm drains, then some of the normal seasonal flows in the streams will not occur, and the trees' root environment will be affected. On the other hand, runoff of excess water

from community and privately managed landscape irrigation can provide an additional water source to the trees and underground reservoirs.

Microclimate (light, wind, humidity, temperature)

The removal of a tree changes the microclimate of the area around the tree. Hence, the removal of large numbers of trees is certain to affect the microclimate of a much greater area. The most notable effects are an increase in wind speed, light and temperature, and a reduction in humidity. Since Martin Ranch is subject to high-winds, the removal of a large number of tall trees will have a noticeable effect on areas immediately down wind. Trees and other vegetation previously protected from wind have different fiber characteristics than trees that have been exposed to wind and have adapted to that environment. Following removal of many wind-blocking trees, remaining tree will become exposed to higher wind speeds resulting in greater likelihood of damage.

Remaining trees near the edges of graded, formerly forested areas will no longer be sheltered by adjacent trees and thus, will be exposed to more heat and light. The soil will dry out sooner and the trees will experience higher stress during the hottest temperatures. The greatest degree of stress will be on the few trees that were previously protected, but will now be more exposed on the edge of the plantation. With adequate water availability, there is reason to believe the remaining trees will adjust to their new microclimate.

Exotic species

Many species of plants new to the area will be introduced with the landscaping of the proposed development. Even species that are normally considered desirable in cultivated landscapes may escape and naturalize in native plant communities. Red gum, lace-bark elm, and fig are a good examples already found on Martin Ranch. Bamboo (*Phyllostachys spp.)*, giant reed (*Arundo donax*), shamel ash (*Fraxinus uhdei*), white mulberry (*Morus alba*), privet (*Ligustrum spp.),* tamarisk (*Tamarix ramosissima*), pepper, *Schinus spp.*), goldenrain (*Koelreuteria spp.*), pistache (*Pistacia chinensis*), and black locust (*Robinia pseudoacacia*) are additional species that commonly naturalize in this area. Typically, they out-compete native plants and negatively affect habitat for other native species, including native trees. Once established, they can be difficult and costly to eradicate or control.

People-related Impacts

A wide range of human activities can affect remaining trees. Impacts will be noticed beginning after the proposed construction and extending indefinitely. The extent of impact by the following factors depends mostly on education and the control of access to the native forested areas.

Pollution - Increased pollution of the water and soil may affect the remaining trees. Pollution of soil and water in native tree areas depends largely on the details of the drainage design and the care exercised by homeowners adjacent to the open space areas. Potential pollutants include: fertilizers, herbicides, insecticides and other gardening toxins; chlorinated swimming pool water; excessive or accidental chlorine gas use; motor oil; solvents; paint and concrete rinsate; dumped trash, soil or rubble. Runoff from streets and driveways will also contain more pollutants that can be harmful to native tree stands.

Traffic - Vehicle or foot traffic, either human or animal, compacts the soil, scatters organic layers, causes erosion, and generally degrades the soil and makes a more inhospitable growing environment. Adverse affects from compaction and soil degradation are gradual and accumulative over many years.

Recreational Uses - The natural areas of Martin Ranch are attractive to people because they contain big trees, streams and wildlife. However, people also have a tendency to alter nature so they can enjoy it more. Formal or informal trails and areas for picnic and play exist or may be created or improved. Trees can be damaged by a number of activities including climbing, trail making and swinging from branches. The extent of damage will depend on the amount of control exercised in limiting human access and by the improvement planning process.

Vandalism - Vandalism rates seem to rise with greater concentrations of people. Vandalism damage to trees can range from cutting of whole mature trees, spraying graffiti on them, uprooting seedlings, carving names, and damaging the root zone.

Hazard Control Maintenance - Many of the trees remaining after construction may have defects that make them prone to failure. A tree failure hazard exists when the part of a tree likely to break or fall will cause damage to a target. Currently, there are no targets near any unsound trees on Martin Ranch. The proposed development may introduce human and property targets into the failure zones. It will be prudent then to evaluate all remaining trees in areas where public access is invited, or where disclosure to private owners is required. Some trees may need to be removed or pruned in the interest of public safety, or private liability.

Conclusions

Based on an examination of the site, the existing trees, topography and proposed grading plans, the following is concluded regarding the existing tree resource at Martin Ranch.

- Trees at Martin Ranch fall into three categories:
    1. **Native trees** include some remarkable individuals and stands, mostly located in areas outside of the proposed improvements.
    2. **Remnant agricultural trees** consisting of a cultivated eucalyptus plantation, similar in purpose to a Christmas tree farm.
    3. **Ornamental trees** that are either intentionally planted exotic and native species or escaped naturalized exotic trees that have become weeds in native woodlands.

- Most of the trees on-site are vigorous and healthy. They receive adequate water from natural rainfall runoff via five canyon tributaries, natural springs, and a high groundwater table in some areas.

- Because of coppicing practices, wildfires and natural varied growth habits, many of the trees are structurally hazardous for use within or adjacent to residential development.

- The proposed design will necessitate removing about 2,391 trees. Of these, only 219 (less than 1%) are native species, mostly walnut and sycamore. The majority is remnant eucalyptus plantation trees (approximately 2,168) with the remaining 10 being ornamental exotic species.

- Most of the rest of the native trees proposed for removal are located in cells 'W' and 'S'. Many are multi-stemmed, barely meeting the size criteria for documentation.

- Development may indirectly impact the preserved trees in the following ways:
    1. Altered grade changes and soil compaction
    2. Decreased availability of rainwater and increased availability of irrigation water runoff (net affect unknown)
    3. Increased wind speed, light and temperature; reduced humidity
    4. Encroachment of exotic species
    5. Water and soil pollution
    6. Damage from recreation use and vandalism

- Moderating the long term impacts of people on the native trees in natural may be the most challenging issue, and will require some combination of access restriction, public education, and community stewardship.

Recommendations

Proposed Improvement Plan

The following adjustments in the proposed improvement plan will reduce the number of native and significant trees that will need to be removed. These modifications are recommended purely from an arboricultural perspective, and do not consider engineering, hydrology, geology or other disciplines.

1. Adjust the design of the streets crossing the canyon in cell 'Q' to avoid damage to significant oak and walnut trees. This can be accomplished by relocating the eastern street to the west of oak tree #Q11 and moving the other street slightly to the east, between oak tree #Q1 and the large walnut cluster north of oak tree #Q10.

2. Eliminate some or all of the lots in cell 'S'. The lush native vegetative growth and important springs that support trees and other vegetation downstream complicate building on this area.

3. Move homes that impact oak tree #Q11 to the south.

4. Access the northern-most water tank by running a road directly north, just after the crossing.

Tree Removal

5. Remove all non-native trees and shrubs from natural open space areas to reduce the proliferation of exotics. This is primarily eucalyptus (102 trees) in cells 'M', 'N', 'O' and 'Q', edible figs (5 trees) in cell 'T', and tree-of-heaven saplings and an olive tree in cell 'M'. These non-native trees, located outside of the grading envelope, may proliferate into native communities and pose a threat to preserved native woodlands. Refer to Tables 2 and 4. The U.S. Forest Service recognizes these trees as invading exotics that disrupt the native plant community and habitat values. Non-native trees in cells 'B', 'C' and 'D' remaining after grading do not need to be removed since they are adjacent to off-site eucalyptus trees and these areas are almost exclusively eucalyptus.

6. Prior to performing any construction activity or tree removal, all trees to be removed and trees within 500 feet of planned construction must be inspected by a trained biologist for any active bird nests. It is especially important to inspect the eucalyptus trees between January and June, the active nesting season for bird-of-prey. If active nests are found, planned activity may be limited or restricted. This is enforced under the Migratory Bird Treaty Act of 1918 ("MBTA"). The MBTA protects all native birds, resident, vagrant and migratory through a prohibition on the taking, killing, harassing, disturbing, capturing, selling, bartering, or offering to barter, purchasing or offering to purchase, deliver or ship any listed native bird, their parts, eggs or nests. It prohibits any activity that may cause nest abandonment or loss of

reproductive activities. Courts are allowed to fine $1,000 or six months in jail for willfully violating the MBTA. Fines and imprisonment can be elevated or reduced depending on the severity of the violation. The Endangered Species Act also protects some native and migratory bird species. Furthermore, California State game department laws forbid construction work within 500 feet of any active native bird nest.

7. Utilize wood from removed trees. The large eucalyptus, oak and walnut can be used for hardwood flooring, cabinetry, and hardwood lumber. There is a sawmill within 4 miles of the site. Non-millable material can be made available as firewood or chipped and recycled on site as landscape mulch and top-dressing on non-paved access roads.

Tree Protection During Construction

Tree protection is the key to any tree preservation effort. Following these specifications will help reduce the stress placed on the trees, prevent damage, and help ensure long-term health.

8. Before construction or demolition vehicles or equipment arrive at Martin Ranch, *tree protection barriers shall be installed around all trees to be preserved that are within reach of vehicles or equipment.* Each tree should be protected until the arborist has determined otherwise. Erect 4-foot high, orange-webbing, polypropylene barricade fence and tree protection signs around all trees to be preserved. The protective fence should be installed outside of the dripline or a minimum distance of 10-feet away from the outside edge of the trees' trunk, *whichever is greater*. This will delineate the tree protection area and prevent unwanted activity in and around the trees in order to reduce soil compaction in the root zones of the trees and other damage from heavy equipment. The fence webbing shall be secured to 6-foot, 133-gage, t-bar line posts, pounded in the ground a minimum of 18-inches and spaced 8-feet on-center. Attach fence webbing to t-bar posts with minimum 14-gage wire fastened to the top, middle and bottom of each post. Tree protection signs should be attached to every fourth post. The contractor shall maintain the fence to keep it upright, taut and aligned at all times. Fencing shall be removed only after all construction activities are complete.

9. *Hold a pre-construction meeting between all contractors (including grading, tree removal, demolition, etc.) and the arborist.* The arborist will instruct contractors on tree protection practices and answer any questions. All equipment operators and spotters, assistants, or those directing operators from the ground shall provide written acknowledgment of receiving tree protection training at the Martin Ranch development. This training shall include information on the location and marking of protected trees, the necessity of preventing damage, the prevention of soil contamination and other pollution damage, and the discussion of work practices that will accomplish such.

10. *Avoid heavy equipment operation around the trees.* Operating heavy machinery around the root zones of trees will increase soil compaction, which decreases soil aeration and subsequently reduces water penetration in the soil. All heavy equipment and vehicles should, at minimum, stay out of the fenced protection zone.

11. *Avoid draining or leakage of equipment fluids near retained trees.* Fluids such as: gasoline, diesel, oils, hydraulics, brake and transmission fluids and glycol (anti-freeze) should be disposed of properly. Keep equipment parked at least 50 feet away from retained trees to avoid the possibility of leakage of equipment fluids into the soil. The effect of toxic equipment fluids on the retained trees could lead to decline and may lead to tree death.

12. *Remove excess debris.* Do not store or allow any supplies or materials within the fenced tree protection zone. This includes, but is not limited to: concrete, stucco, tar, plaster, textured coatings, adhesives, paint, solvents, residual herbicides, petroleum fuels, oils, lubricants, salt, fertilizers, plastic resins and catalysts, rinsates, or other construction waste material. Remove all foreign debris from within the fenced tree protection zone. It is important, however, to leave the duff, mulch, chips, and leaves around the retained trees for water retention and nutrients.

13. *Avoid changing grade, including adding fill, within the tree protection zone.* Lowering the grade within this area will necessitate cutting main support and feeder roots, jeopardizing the health and structural integrity of the tree(s). Adding soil, *even temporarily*, on top of the existing grade will compact the soil further, and decrease both water and air availability to the trees' roots.

14. *Avoid damaging any portion of the tree(s) trunk or crown* when moving around construction materials and working around the tree, even outside of the fenced protection zone.

15. *Irrigate trees where the natural water supply is interrupted or diminished, or where protected trees may need additional water to endure construction-related stresses, such as root pruning.* One person should be designated and responsible for irrigating (deep watering) the trees and proper functioning of the irrigation system. Records shall be kept as to the date, manner, and quantity of water applied. The trees should be deep watered to supplement rainfall and mimic the natural water patterns (riparian trees will need more frequent watering than more drought tolerant species such as oak). One irrigation period should thoroughly soak the root zones of the trees to a depth of 3 feet. Avoid runoff and achieve good infiltration by applying the water slowly. If the trees will be irrigated using flood irrigation by hose or water truck, berms will need to be constructed around the irrigated, retained trees. Watering berms shall be a minimum of 10 ft. away from the base of a trunk while not interfering with grading construction. The berms should be 12 inches in height and 18 inches across. The purpose of the berm is to create a large enough water holding basin to supply the tree with sufficient water and root stimulant hormone (if needed). Note: if construction improvements permanently disrupt the water source, then a permanent watering system shall be installed to apply water sufficient to maintain normal health and vigor.

16. If grading or trenching is to be done where tree roots are present (even outside of the fenced protection zone):
    - *First prune roots using a Dosko root pruner or equivalent.* Trenching should only be done outside of the fenced tree protection zone with the trench width as narrow as

possible. At a 28 inch depth, main support roots should be severed (or pruned); all cuts should be clean and sharp, to minimize ripping, tearing, and fracturing of the root system.

- *Promote root growth by adding the liquid root stimulant "Root Concentrate" to the irrigation water within 3 days after root pruning.* Application of this product is best achieved in a dilution state via the use of a water truck. This product helps the tree to regenerate root growth. Root Concentrate can be purchased from Target Specialty Products, Inc. located in Santa Fe Springs, CA, phone: (562) 802-2238. Follow "Root Concentrate" label instructions.

- *Prune trees after root pruning only to reduce hazards that exists such as: dense, irregular crowns, broken limbs, defects, and dieback.* Lower hanging branches (12 ft. or below) should be removed. There is no need to prune to compensate for root loss incurred during the grading process. All pruning should be performed under the supervision of an ISA Certified Arborist and according to ISA guidelines.

- *If possible, root and canopy prune trees during their slowest growing period.* For deciduous trees this is in late fall and winter, after they have lost most of their leaves. Ideally, evergreen trees should also be pruned in the winter, but pruning at other times of the year has a lesser negative effect that with deciduous trees. Avoid pruning during the hot summer months, June through August.

17. *After construction is complete, trees near development areas should be reevaluated for potential hazards, pest and disease problems and treated or pruned accordingly.* Although the native species are subject to numerous pests and disease, they usually seem to coexist without control treatments. Any chemicals used for control of pests and diseases must have current California registration, must be applied by a properly licensed California Pesticide Applicator, and be used according to the current label directions.

Relocation

Most of the trees to be removed (90%) are eucalyptus. Eucalyptus trees have a very low relocation success rate. They are very tender and have large lateral and tap roots that are difficult to sufficiently capture in a box.

The black-locust, olive, and fig trees to be removed are not of transplantable quality. They are un-maintained trees with structural defects. Likewise, most of the walnut, cottonwood and bay-laurel are small, shrubby, multi-trunked specimens not desirable for transplanting. Planting new nursery-produced trees will provide greater, long-term benefit to the property. It is possible that some of the walnut trees may be transplantable if dug during dormancy. Access and branching structure may restrict the relocation of some trees.

The medium to large-sized sycamore trees are also possible candidates for relocation. If boxed during their dormant period, sycamores will tolerate some root damage replanting into a cultivated landscape. The sycamores that will be impacted are located in cell 'S'. Because of

vines, poison oak and understory density, we were not able to examine these trees closely and determine if any of the trees are desirable and possible relocation candidates. Prior to demolition and mass-grading this area, the obstructing brush will need to be carefully removed. Such clearing must be done with out damaging the trees' trunks, branches, or major roots. When the transplant candidates are exposed sufficiently, an arborist and a tree-moving specialist shall then determine the trees' suitability and feasibility for moving. Suitability will be determined by a combination of the tree's structural and physiological health, aesthetics, soil type, size, and equipment access. Sycamore trees must only be boxed between November 15th and March 15th, with the optimum time being the months of January and February.

Evergreen oak trees are not as easily relocated as deciduous sycamore and walnut, however, it may be possible depending on size, branch and root structure, access, and time of year.

If transplanting a tree is required, appropriate boxing, relocation and planting instructions will be provided at that time.

Mitigation Planting Plan

The City of San Bernardino City code (19.28.090) requires that *"unless there is a pre-approved tree replacement plan, each tree that is removed in a new subdivision and is considered to be of significant value by the department of Parks, Recreation and Community Service shall be replaced with a 36" box specimen tree in the subdivision in addition to any other required landscaping. Such a plan does not necessarily require a tree for tree replacement provision. Commercial tree farms, ...shall be exempt from this provision."*

Guided by this code, any tree inferior in structure or health should not be considered "significant" and thus its removal would not be mitigated. Likewise, small trees should not fall within the city's definition of "significant." We propose 20 feet as a height standard to determine significance. Since the eucalyptus trees were originally planted as an agricultural crop (for fuel wood and timber), they would be considered part of a commercial tree farm and thus shall be exempt from the replacement provision.

Thus, all healthy, structurally sound, native and ornamental trees over 20 feet in height, excluding eucalyptus, shall be replaced.

Replacement Tree Size

Trees planted from larger containers are frequently slow to establish, may have root crown defects associated with container production and may suffer greater shock after planting. Moreover, many native trees are not adapted to container growing, so larger sizes may be of poor quality, or not available at all. Smaller plants establish quicker, have a better opportunity to form a strong root crown, and grow more vigorously often out-pacing the larger tree in a few years. If planted small, the trees will have a better opportunity to develop a root system and stem structure that will naturalize to the site, not require irrigation once established and withstand high winds. Therefore, we recommend planting 1, 5 and 15-gallon size replacement trees rather than the 36-inch box tree specified at the following exchange ratios:

36" box	=	5	15 gal tree
	=	10	5 gal tree
	=	15	1 gal tree

When attempting to recreate natural woodland, a mix of sizes is recommended. Using the above ratios, one possible mitigation plan is shown in Table 5.

Table 5 - Proposed Replacement Plan

	Qty. Removed*	Qty. 1 gal.	Qty. 5 gal.	Qty. 15 gal.	Replacement Species
Replacement Ratio		*15:1*	*10:1*	*5:1*	
Juglans californica (S.Cal. black walnut)	162	810	540	270	walnut & oak
Platanus racemosa (California sycamore)	30	150	100	50	sycamore
Populus angustifolia (narrow-leaf cottonwood)	1		10		cottonwood
Quercus chrysolepis (canyon live oak)	23		115	58	oak
Umbellularia californica (California bay laurel)	2		10	5	bay-laurel
Totals	218	960	775	383	
*This example assumes all are over 20 feet in height. Actual height of some removed trees may be less than 20 feet and thus, not require mitigation.					

Where possible, all replacement plant material should be propagated from seed collected from the existing trees at the Martin Ranch site. They are genetically the best adapted to the area and will ensure continuation of the local gene pool. The replacement trees should be contract grown at a local, native plant nursery and inoculated with local mycorrhizal fungi[4].

Species Selection

Native species are the best adapted to the site and are most likely to provide the greatest environmental benefits. Those found on Martin Ranch are the most ideally suited for re-planting. Non-native species should not be used since many exotic species tend to escape cultivation and compete with native species. Non-native species can be used within private yards and possibly some internal streets.

Species should only be used where they are naturally suited. Alders, sycamores, cottonwood and willow will require year-round water. Oak and walnut can be planted in drier areas. Other species such as *Sambucus* (elderberry) and *Cercocarpus* (mountain mahogany) are rarely cultivated in ornamental landscapes, but can provide food and shelter for wildlife if located in an appropriate area. Selected tree species should match that which is naturally occurring in adjacent and similar areas. Tree, shrub and understory plant species should be grouped according to their water needs

[4] Mycorrhizal fungi are microscopic organisms that live in soils and are known to attach themselves to the roots of plants, providing a mutually beneficial transfer of nutrients and chemicals. A mycorrhizal root takes up nutrients more efficiently than does an uninfected root. A very wide range of plants can form mycorrhizas of one form or another. Some plants seem incapable of normal development in the absence of their mycorrhizal fungi.

and tolerance of summer drought. Suggested replacement trees and their characteristics can be found in Appendix G.

Planting Location

To maximize mitigation benefits, trees will be first planted in disturbed areas that are adjacent to preserved areas. Examples of such are external slopes, within fuel modification zones, near where roads cross natural areas (cells 'Q' and 'S'), at the water tanks and alongside the water tank access roads, and where eucalyptus trees were removed for exotic weed control purposes (cells 'M', 'N' and 'Q'). Available water will determine exact planting locations and number of trees each location will support. Both fuel modification and erosion control will need to be addressed.

After replanting these first priority areas, trees will be planted on the internal slopes, formal parks, and alongside internal roads. Although native species are recommended, non-natives can be used sparingly if they are not highly invasive and prone to re-seed and naturalize elsewhere. Species such as: gum (*Eucalyptus)*, shamel ash (*Fraxinus uhdei*), white mulberry (*Morus alba*), pepper, *Schinus spp.*), goldenrain (*Koelreuteria spp.*), pistache (*Pistacia chinensis*), and black locust (*Robinia pseudoacacia*) should be avoided for this reason.

When planting on slopes that provide a view for up-slope residents, it is important that the trees be properly positioned to avoid view conflicts. Proper tree selection and positioning will avoid future removal or mutilation. Tall tree species should be planted near the bottom of slopes so that they will be below the line-of-sight when mature. If used at the top of slopes, position the trees at the lot lines rather than centered in a lot where the full-on view would be obscured. Smaller growing species should be placed at the middle of the slope where their mature height will not obstruct views.

Maintenance

All native trees installed in non-irrigated areas should have temporary watering systems that will be effective for the first two years. This will increase the planting success rate and produce stronger trees that more quickly reach a noticeable height. After two years, the irrigation system can be removed during the following winter.

Watering systems must be capable of scheduling multiple, short run cycles. Water must be applied at a rate that will not cause erosion or runoff.

All replacement trees should be monitored closely during the first 3 years, and annually thereafter. Tree stakes and guys should be removed once the tree can stand up on its own – two years at most. Trees should be pruned annually for the first 3 years as needed to promote good form and structure. The trees in the open preserve areas will need only minimal to no pruning. Trees outside of the open space areas should be monitored regarding pruning needs on a 3 year rotating basis thereafter.

Considerations for Planting on Graded Slopes

Elements of slope angle, aspect, and soil permeability are important factors in species selection, tree placement, irrigation system design, soil preparation, maintenance during establishment, and long-term maintenance.

The existing slopes on parts of the tract that are to be graded face south to southwest and range between 5° and 10°. The slopes in ungraded areas are up to 35°. The very steepest slopes on the foothills are 57°. The soils in gentler sloping areas appear to be deep, coarse in texture, and excessively drained, meaning that water penetrates and percolates rapidly. The soils on the steep slopes range from intermediate in depth to very shallow with exposed parent material.

Most of the proposed engineered slopes face south. A few on the external edges of the developed area face north, east or west. The angle of these slopes is generally 2:1, or 27°, which approaches the steepness of the natural hillsides. The soils on the engineered slopes will be compacted and considerably less permeable than the native soil. Slopes with southern aspect and this angle will be exposed to maximum solar irradiation. The presence of houses, the angle and direction of the slopes, their elevations with respect to surrounding terrain, will cause a wide range of exposure to wind and heat buildup.

When planting on engineered slopes compacted fill should be loosened to a depth of 24 inches. Planting pits on cut and fill slopes should be made four times as wide as the rootball, but no deeper than the rootball. Fertilizers and amendments should be applied only when recommended by a commercial soil laboratory or soil scientist. Use native soil in the backfill.

Tree Protection After Construction

Only after all construction has been completed, including private landscapes on residential lots, shall the tree protection fencing be removed.

Protecting the remaining trees and native vegetation for the long-term will require cooperation from the City, the residents and their homeowner association. Education, enforced edicts, and careful planning of any improvements will be the basis of long-term tree stewardship. Foremost, the City and local homeowner association will need to develop an access policy. Allowing free and unrestricted access to natural areas will surely cause their demise as well as create safety issues. On the other hand, complete restriction to all open space areas is unrealistic and not the intent of the developer. Policies granting limited access, by permission in advance, coupled with City or HOA sponsored walks are advisable.

Penalties for violation should be severe enough to deter and include provisions to deal with minors. It is also recommended the HOA form an open space committee to oversee enforcement, grant access and sponsor field trips. The City should work closely with the HOA in developing and enforcing common policies. Permanent signs should be placed at the entrance to sensitive areas reminding the public of the limited access restrictions and violation penalties.

Each homeowner's welcome package should contain information on protecting the native trees and vegetation and the related policies. Additional literature should be disseminated periodically to remind residents of their stewardship responsibilities.

In areas where limited access is granted, trails should be clearly delimited. A resource specialist should be retained to plan the locations of trails and other desired amenities (e.g., picnic tables, benches, interpretive overlooks, etc.). The planning, construction and maintenance of these use facilities could be accomplished cooperatively by the City, HOA, community groups, volunteers, etc.

With possible assistance from the City, the HOA will need to periodically maintain the open space areas and included fuel modification zones. Maintenance should be limited to trash pick-up, thinning vegetation in fuel modification zones where required, exotic plant removal, and trail maintenance. Native trees should not be pruned. Fallen tree and tree parts should remain as is for nutrient cycling and wildlife habitat.

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APPENDIX A
CITY OF SAN BERNARDINO CODE

19.28.070 INSTALLATION OF LANDSCAPING

All required landscaping shall be property installed, irrigated, inspected and permanently maintained prior to use inauguration or the issuance of a Certificate of Occupancy, whichever first occurs. The landscaping and irrigation shall be inspected as stated in the procedures and policy for landscaping and irrigation.

19.28.080 MAINTENANCE OF LANDSCAPING

1. Maintenance of approved landscaping shall consist of regular watering, mowing, pruning, fertilizing, clearing of debris and weeds, the removal and replacement of dead plants, and the repair and replacement of irrigation systems and integrated architectural features.

2. Prior to the issuance of a Certificate of Occupancy, the landowner shall file a maintenance agreement or covenant and easement to enter and maintain, subject to the approval of the City Attorney. The agreement or covenant and easement to enter and maintain shall ensure that if the landowner, or subsequent owners, fails to maintain the required/installed site improvements, the City will be able to file an appropriate lien(s) against the property in order to accomplish the required maintenance.

19.28.090 REMOVAL OR DESTRUCTION OF TREES

Removal of healthy, shade providing, aesthetically valuable trees shall be discouraged. In the event that more than 5 trees are to be cut down, uprooted, destroyed or removed within a 36 month period, a permit shall first be issued by the Department.

Prior to any permit issued for tree removal, all existing trees on-site shall be surveyed by the Department of Parks, Recreation and Community Services at the developer's expense. Unless there is a pre-approved tree replacement plan, each tree that is removed in a new subdivision and is considered to be on significant value by the Department of Parks, Recreation and Community Services shall be replaced with a 36 inch box specimen tree in the subdivision in addition to any other required landscaping. Such a plan does not necessarily require a tree for tree replacement provision. Commercial tree farms, City Government projects, and individual single-family residential lots less than one acre shall be exempt from this provision.

19.28.100 EROSION CONTROL LANDSCAPING

Landscaping for the purpose of erosion control shall be in compliance with the standards outlined in Chapter 15 of the Municipal Code.

19.28.110 WATER CONSERVATION REQUIREMENTS

1. APPLICABILITY

All new development, including residential subdivisions, or increases in floor area in excess of 25 percent of existing commercial or industrial buildings shall be in compliance

2. CONTENTS OF THE APPLICATION

An application for a Conditional Use Permit within the HM Overlay District shall include the following:

A. A topographic map of the project site and land and structures within 100 feet of the project boundaries. The map shall be drawn to a scale of not less than 1 inch equals 100 feet with a maximum contour interval of 10 feet. The maximum contour interval shall be 5 feet where terrain has a slope of less than 25%.

B. A tree map, drawn to the scale prescribed above, locating existing trees on the project site with a trunk diameter of 6 inches or greater or having a vertical height from ground level to tree-top level of 25 feet or greater. This map shall define the species of such trees and identify their approximate trunk diameter, base elevation, height, and condition. No such trees shall be removed without prior written approval of the Commission.

C. A site or plot plan of the proposed project, including representations of property lines and recorded and proposed easements and public rights-of-way. Existing structures within 100 feet of the site shall also be shown on the site or plot plan.

D. A preliminary grading plan for the project, drawn to the same scale as required above.

E. Colored maps of existing and final slope, based on the following slope categories: 0-15%; 15+-25%; 25+-30%; 30+% shall be shown using contrasting colors.

F. Sections or elevations of the proposed project. Plans shall indicate those residences which may be affected in terms of view obstruction.

G. A soils engineering report including data regarding the nature, distribution and strengths of existing soils, conclusions, and recommendations for grading procedures, design criteria for and identified corrective measures, and opinions and recommendations regarding existing conditions and proposed grading. This investigation and report shall be performed by a professional soils engineer experienced in the practice of soil mechanics and registered with the state of California.

CITY OF SAN BERNARDINO

DEPARTMENT OF

PARKS, RECREATION AND COMMUNITY SERVICES

POLICY

AND

PROCEDURE

FOR

CALIFORNIA CERTIFIED ARBORIST

REPORTS

FEBRUARY 1997

The City Development Code under Chapter 19.28.090 Removal or destruction of trees states.

"Removal of healthy, shade providing, aesthetically valuable trees shall be discouraged. In the event that more than 5 trees are to be cut down, uprooted, destroyed or removed within a 36 month period, a permit shall first be issued by the Public Works Department.

Prior to any permit issued for tree removal, all existing trees on-site shall be surveyed by the Parks, Recreation and Community Services Department at the developer's expense." This involves the preparation of an Arborist's Report, covering, but not limited to:

1. Identification of each tree, botanical and common names and tree locations. Tree locations are to correlate with the tree locations on tentative tract maps and grading plans.

2. Height and crown width.

3. Trunk circumference at DBH.

4. Health and vitality, including status of disease and insect problems, physiological problems and death of any tree.

5. Liability problems, current and future.

6. Measures to preserve trees on site in their existing locations. These measures are to include but are not limited to:

   A. Trimming needs using I.S.A. Standards (International Society of Arboriculture).

   B. Protecting trees during construction.

   C. Irrigation of trees pre and post construction.

   D. Insect and/or disease control.

   E. Proper supervision by the arborist to ensure measures have been taken.

7. Provide short and long term maintenance recommendations for the trees. These maintenance recommendations are to include but not limited to:

   A. Irrigation.

   B. Fertilization.

   C. Trimming.

D. Insect and disease control needs.

E. Growth characteristics and expectations.

8. Relocation of trees due to conflicts of proposed improvements must be included in the Arborist Report and cover feasibility of relocation of all items found in # 1 - # 7.

9. Unless there is a pre-approved tree replacement plan, each tree that is removed shall be replaced with a 36" box specimen tree (minimum size).

10. The Arborist Report must be on file with the Parks, Recreation and Community Services Department, City Planning Department and City Engineering Department prior to tentative tract approval and final grading plans approval.

11. Changes in project design may be required to preserve trees. These changes will be reviewed through the C.E.Q.A. and D.R.C. process.

Attached is a list of local Certified Arborists. Call the Parks, Recreation and Community Services Department at (909) 384-5217 if you have any questions.

Attachment

1/16/97 amt

arborist.passed

APPENDIX B
TABLE 2 - TREE COUNT BY SPECIES

Table 2, Tree Count by Species and Cell (Martin Ranch, San Bernardino)

		Total Trees	Remove for Buildings	Remove Paved	Preserved: Relocated	Preserved: Improved	Preserved: Undisturbed
NATIVE SPECIES	Acer macrophyllum (big-leaf maple)	30	0				
	Alnus rhombifolia (white alder)	219	0				
	Arctostaphylos glauca (great-berried manzanita)	5	0				
	Calocedrus decurrens (incense cedar)	11	1				
	Cercocarpus betuloides (mountain mahogany)	8	0				
	Heteromeles arbutifolia (toyon)	0	0				
	Juglans californica (S.Cal. black walnut)	310	102				
	Platanus racemosa (California sycamore)	106	30				
	Populus angustifolia (narrow-leaf cottonwood)	17	1				
	Prunus ilicifolia (holly-leaf cherry)	8	0				
	Pseudotsuga macrocarpa (bigcone spruce)	8	0				
	Quercus berberidifolia (scrub oak)	6	0				
	Quercus chrysolepis (canyon live oak)	154	23				
	Salix lasiandra (red willow)	2	0				
	Salix lasiolepis (arroyo willow)	0	0				
	Sambucus mexicana (Mexican elderberry)	5	0				
	Umbellularia californica (California bay laurel)	372	2				
	Washingtonia filifera (California fan palm)	2	0				
	SUB-TOTAL NATIVE	1350	219	0	0	0	0
NON-NATIVE/EXOTIC SPECIES	Allanthus glandulosa (tree of heaven)	0	0				
	Cupressus sempervirens (Italian cypress)	0	0				
	Eucalyptus camaldulensis (red gum)	1176	843	102			
	Eucalyptus globulus (blue gum)	292	178				
	Eucalyptus polyanthemos (silver-dollar gum)	98	98				
	Eucalyptus rudis (flooded gum)	1086	1086				
	Eucalyptus sideroxylon (red-iron bark)	5	5				
	Ficus carica (edible fig)	8	3	8			
	Juniperus c. torulosa (twisted juniper)	0	0				
	Liquidamber styraciflua (sweet gum)	0	0				
	Melia azedarach (Chinaberry)	0	0				
	Olea europea (European olive)	4	3	1			
	Pinus halepensis (aleppo pine)	1	0				
	Pinus radiata (Monterey pine)	1	0				
	Pinus thunbergiana (Japanese black pine)	0	0				
	Populus balsamifera (cottonwood)	0	0				
	Prunus armeniaca (apricot)	1	0				
	Prunus persica (peach)	2	0				
	Punica granatum (Pomegranate)	0	0				
	Robinia pseudoacacia (black locust)	3	3				
	Ulmus parvifolia (lace-bark elm)	1	1				
	Washingtonia robusta (Mexican fan palm)	5	0				
	SUB-TOTAL NON-	2649	2172	108	0	0	0
	GRAND TOTAL	3999	2391	108	0	0	0

Size	Condition	Notes
largest H=40', D=18"		in E. & W forks of Cable Creek
most D=12-24", largest D=36"		in E. & W forks of Cable Creek
		largest on steep, western canyon wall of Cable Creek
		intentionally planted at residence
mostly small multi-trunk; Largest D=18-		largest in cell 'Y'
mostly shrubs		shrub throughout
Ave H=12 - 18', D=1 - 6"; Largest D=16 - 20"	6 - 15 trunk sprouts from stump of fire-burned tree	largest in cell 'W'; also on sides of most channels
Ave H=12 - 20'; Largest H=up to 35'	multi-trunked, some vine-covered and inaccessible	found at bottom of Myers Creek and other tributaries
H<15'; D=4 -6"	Shrubby growth	Found next to water
Most small, shrubby	Dieback from fireblight	Tree-sized group on east side of Cable Creek, before fork
		on east-facing slope of Cable Cyn. near conflux of E & W forks
Ave H=6 - 15' D=2 - 6"; Largest H=25' D=12"	multi-trunked	some hybrid with Q.chrysolepsis
Largest H=80' D=60"		Largest in SE fork of Cable Cyn.
		largest in W.Myers Cyn; small in Cable Creek
many small in thickets; largest		in wet areas
		mostly shrubs throughout
Most H =15 - 20'	shrubby thicket	most in Cable Cyn.
		at Bonadiman residence

D=<2"; H=10-30'	thickets of small seedlings	near old home sites
most H=30 - 60'; D<20"	mostly sprouts from coppiced trees	plantation remnant
most H=30 - 60'; D<20"	mostly sprouts from coppiced trees	plantation remnant
most H=30 - 60'; D<20"	mostly sprouts from coppiced trees	plantation remnant; edge of W.Myer Cyn
most H=30 - 60'; D<20".	mostly sprouts from coppiced trees	plantation remnant
		at Bonadiman residence
	naturalized volunteer	bank of Cable Cyn and near spring
	Half has been topped for fire clearance	along Martin Ranch Rd.
		near old home site
	naturalized volunteer	
		at Bonadiman residence
		at Bonadiman residence
		along Martin Ranch Rd.
		at Bonadiman residence
		at Bonadiman residence
		at Bonadiman residence
D=4"		near old home site
	naturalized volunteers	
H=20'		at Bonadiman residence

Indicates cells where these species occur, but are all smaller than the required reporting size. Often these small trees form a dense, contiguous canopy.
These cells were inaccessible. Tree count was estimated based on observation from vantage points, photographs, and characteristics of adjacent cells.

APPENDIX C
CELL BY CELL DETAILS

APPENDIX C, CELL BY CELL DETAILS

The following is a description of the cells, the trees that grow therein and the potential construction and grading impact to the trees as a result of proposed improvement plans.

CELL 'A'

Includes all of the area bordered on the east by the west rim of West Meyer's Canyon, on the south by Meyer's Road, on the west by the property boundary, and on the north by dirt roads. One road serves as driveway access for the property to the west. The other road crosses through the windrow of trees on the canyon rim nearby.

The trees are mainly four Eucalyptus species in three windrows. Most of the trees are in a single row along the canyon rim. They do not serve as wind break trees because of the position of the row to the direction of the wind. The average is between 30 and 50 feet tall, multi-stemmed with trunk diameters between 6 and 10 inches. Seven trees have trunk diameters over 20 inches.

Most of the trees in the main north-south row have been coppiced several times and show damage from fire. The most recent cutting was probably done after the 1980 Panorama fire. Another north-south row runs along the west property boundary, straddling both sides of the property line. Some of the trees counted may actually be on the adjoining property; the property line runs to the west of the existing fence line. Some of these trees have been coppiced, but many remain uncut. There are a number of trees not growing in any particular rows, indicating they are natural sprouts of the windrow red gums.

The third row is an east-west row consisting mostly of coppiced blue gum. Other trees in this cell include one small walnut in the upper part of the cell (dbh<2"), and three black locust (dbh=4") and a thicket of small Ailanthus (dbh<2") growing around the house ruin near Meyer's Road in the southern-most portion of the cell.

IMPACT

The proposed improvements will require the removal of all trees in cell 'A'. There is a possibility, however, that a few red gum trees along the west property line may be of good enough quality and close enough to the edge of the limits of grading to justify small modifications in design to accommodate them. The locations of any candidates for preservation should be surveyed and proposed improvement locations marked in the field before making a final decision on the candidate trees.

CELL 'B'

This area is bounded on the south by cell 'A', on the east by West Meyer's Canyon, on the west by the property boundary, and on the north by the hillside.

The trees grow in a windrow along the canyon rim, in several east-west plantation rows at the base of the hill, and scattered on the lower part of the hill. The windrow on the canyon rim extends the row from cell 'A'. Most of the trees in this part of the row are coppiced E.polyanthemos and are slightly larger than the trees in cell 'A'. Only three trees have trunk diameters over 20 inches in this area. The east-west plantation rows are mostly small, slender coppiced E.rudis and E.camaldulensis. Part of cell 'B' runs along the north side of the road at the base of the hill until the road turns north. Here, there is a broken row of large and medium sized red gums (5 have a dbh>20"), followed by a dense clumps of small diameter, multi-stemmed narrow-leaf cottonwood (20 to 30' tall) and arroyo willow (20 to 30' tall). Behind these is a scattering of about 10 clumps of native walnut trees. The trees all have 4 to 8 stems varying from 3 to 10" in diameter with a 25 to 35' height.

IMPACT

The proposed improvements will require the removal of all trees except half of the northern-most windrow (red gums) and the willow/cottonwood stand. All other eucalyptus including the walnut cluster will be removed. Grading will come close to preservable trees, so tree protection measures will need to be implemented.

CELL 'C'

Continues to the west of cell 'B', bounded on the south by the property line, and on the west by a small arroyo. The north boundary is the road that transects cell 'B'.

Except for 5 native walnuts, all the trees in cell 'C' are Eucalyptus, a mix of rudis, camaldulensis and globulus. Three of the walnuts are small in a clump. The other two are medium sized. All are multi-trunked with stems ranging from 3 to 8" in diameter.

IMPACT

No trees in this cell are within the limits of the proposed grading. However, due to the close proximity, construction activities may affect trees in this cell. Tree protection measures will need to be implemented for all preserved trees.

CELL 'D'

This cell is bounded on the south and west by the property line, on the north by a line even with the dam, and on the east by open space and the road that transects cell 'B' and bounds cell 'C'.

Cell 'D' mature Eucalyptus, mostly red gum with numerous seedlings. The eucalyptus are larger in the northern end, smaller in the southern. The trees have been planted in rows across the southwest-facing slope. Many of the original trees have died. Much of this cell is closed-canopy forest where little light at the ground restricts, or even eliminates the growth of other plants. Eucalyptus seedlings have sprouted on the edges of the dense forest. Much of the area is impenetrable because of poison oak, an accumulation of fallen branches and trees, and waist-high understory plants.

A small clump of olive trees was found in the middle of the cell. There is one elm tree in the southwest portion of the cell, topped for line clearance. Small volunteer figs and cottonwood have sprouted near the spring at the northwestern boundary with an understory of ferns. Throughout the eucalyptus grove are native Shrubs (elderberry, white sage, walnut, poplar, willow) and annual grasses.

IMPACT

Most of cell 'D' lies within areas to be graded for streets and building lots. The southernmost portion, however, is designated as natural open space (lot 72) and will be preserved. Trees in this preserved area will need to be protected during construction.

CELL 'E'

Located to the east and north of cell 'D', on the western hill above the road.

This cell contain one north-south windrow with about 102 coppiced Eucalyptus rudis trees. The trees are similar in size to the eucalyptus in cells 'D' and 'C'.

IMPACT

The proposed improvements include grading, street improvements, and building lots, and will require removal of all trees.

CELL 'F'

Located north of cells 'D' and 'E', it is bounded on the west by the property line and on the east by a large open area.

This cell contains Eucalyptus rudis and camaldulensis, remnants of a coppiced plantation. The main body of the cell contains diffuse east-west rows of trees that range from light to medium density. As the rows turn north-south along the western property line, the trees become more sporadic, lighter density. There are many seedlings from the old mature trees, most are too small to be included in the tree count. Found also was one clump of shrubby manzanita, small mahogany and elderberry. The larger elderberry (15 to 25 feet tall) were on the adjacent neighbor's property.

IMPACT

The entire cell is within the limits of the proposed improvements and therefore, all of the trees will need to be removed.

CELL 'G'

The cell is north of cell 'F', bounded by the property line on the west, the road on the east, and open space on the north and south.

This cell includes a continuation cell 'F's north-south windrow along the western property line and a few east-west rows of trees. The trees are very similar to cell 'F', sporadic remnants of old plantation trees with many seedling offspring that were too small to be included in the tree count. Small, shrubby manzanita, mahogany and elderberry are also found throughout.

IMPACT

The entire cell is within the limits of the proposed improvements, therefore all of the trees will need to be removed. Some trees on the adjacent property to the west may need protection from construction activities occurring in this cell.

CELL 'H'

The area is bounded on the south by the road where it comes to a T-intersection, by the property line to the west, by a berm on the north, and by open areas and a road to the east.

This cell includes part of a north-south windrow along the western property line and several east-west rows of trees, similar to cells 'F' and 'G'. The trees are very similar to the previous two cells, containing sporadic remnants of old plantation trees with many seedling offspring that were too small to be included in the tree count. Small, shrubby manzanita are also found throughout.

IMPACT

The entire cell is within the limits of the proposed improvements and therefore, all of the trees will need to be removed. Some trees on the adjacent property to the west may need protection from construction activities occurring in this cell.

CELL 'I'

This cell is four clumps of trees northeast of cell 'H' between two large earth berms crossing the property from east to west.

Cell 'I' consists of four clumps of Eucalyptus trees, mostly camaldulensis with some rudis included. The largest of the clumps contain large diameter trees that are sprouts from coppiced trees. A smaller clump to the east and two small groupings to the southwest of the main cluster appear to be more recent volunteers and have probably not been coppiced. There are numerous seedlings too small to be included in the tree count.

IMPACT

The entire cell is within the limits of the proposed improvements and therefore, all of the trees will need to be removed.

CELL 'J'

This cell is bordered by the property line on the southwest, a berm to the northeast and open brush land on other sides. It is directly north of cell 'H'.

There are approximately 115 Eucalyptus rudis trees in this area. They are varied in size and include some larger 15 inch and greater diameter trees with many small trees. Many are sprouts of coppiced trees. Most show signs of prolonged drought in various degrees.

IMPACT

The entire area is within the limits of the proposed improvements and therefore, all of the trees will need to be removed. Some trees on the adjacent property to the south may need protection from construction activities occurring in this cell.

CELL 'K'

This cell is bordered by the property line on the southwest, a dirt road to the north, and Martin Ranch Road on the west.

Similar to cell 'J', this area contains approximately 90 eucalyptus trees, mostly coppiced, with some seedlings. Trees at the eastern portion are larger, up to 40 inches in combined stem diameter, averaging 45 feet tall. The western-most trees were closely spaced, smal (3 to 6 inch diameter) and not a vigorous.

IMPACT

The entire area is within the limits of the proposed improvements and therefore, all of the trees will need to be removed. Some trees on the adjacent property to the south may need protection from construction activities occurring in this cell.

CELL 'L'

Area around the Bonadiman house, located at the end of and northwest of Martin Ranch Road.

The trees around the Bonadiman house are a mixture of ornamental, fruit, planted natives and naturally occurring natives. Native incense cedar (6 to 18 inch trunk diameters, 5 to 35 feet tall) was planted around the house. A mix of California and Mexican fan palms (average 20' tall) are near the house entrance. Two former Christmas trees (a Monterey and aleppo pine) are located on either side of the driveway. These pine are 25 feet tall with a 12 and 14 inch trunk diameter, respectively. There are two eucalyptus groupings: a row of 10 large red gums (12" trunk, 50' height) surround an old shed south of the residence; another 10 smaller red gums is located near a flat area west of the residence. A row of olives are planted between this second eucalyptus group and the house. Small apricot, peach and pomegranate trees are also evident. The only naturally occurring native trees are a few walnuts on the southwest portion of the yard.

IMPACT

The area around the house and driveway is outside of the grading limit. The southern portion of the cell where the eucalyptus and walnut tree are will be graded. Some tree removal may be necessary.

CELL 'L1'

A small clump of trees located east of the Bonadiman residence around a water cistern, just west of the continuation of Martin Ranch Road.

This cell includes a few native trees (bay, cottonwood and walnut) growing around a water cistern. These trees are most-likely naturally occurring, attracted to the man-made water source. Since the trees exist here only because of the cistern, eliminating the cistern and pipe leaks would mostly likely kill the trees.

IMPACT

The entire cell is within the limits of the proposed improvements and therefore, all of the trees will need to be removed.

CELL 'M'

A rectangular area bordered on the north, west and south by dirt roads, and a slope on the west. Located east of where the Cable Creek forks converge.

This cell contains a U-shaped Eucalyptus windrow, opening to the southwest, around an old homesite, with a few other miscellaneous trees. One large (34" diameter, 60' tall) incense cedar grows in the western arm of the windrow. It is likely that the cedar was intentionally planted, rather than naturally occurring. The tree has been damaged by lightening, has a dead top, but continues to grow in spite of the injury. Many Ailanthus seedlings have sprouted north and south of around the old house foundation as well as along the other side of the road. This is a dense thicket and mostly multi-stemmed and sapling-size (1 to 4" diameter, 5 to 25 feet tall). Intermixed with the ailanthus are small walnut shrub/trees (3 to 6" combined diameter, 15 to 20' tall). One olive is located just southwest of the house pad.

IMPACT

Proposed improvements will require the removal of all of the trees in this cell except for the southern-most edge. These trees, however are non-native (eucalyptus, olive, ailanthus) and should be removed for exotic weed control.

CELL 'N'

Directly northeast of cell 'M', a U-shaped parcel opening to the southwest.

This cell consists of a U-shaped windrow of Eucalyptus camaldulensis trees with miscellaneous native walnut and other small native plants (cottonwood, scrub oak, willow, elderberry) interspersed. Many of the trees are partially covered with California grape and poison oak.

The eastern part of the 'U' is comprised of about 38 Eucalyptus. Some of the trees at the lower end of the row are much smaller and weaker than the rest of the trees-- probably due to a lack of water. The western windrow contains a double row of about 150 red gum trees. Many of these trees have been coppiced several times. The upper windrow contains from 60 to 80 Eucalyptus, walnut, and other native species. There is also a Eucalyptus grouping in the middle of the 'U' covered with vines. Much of the center and upper windrow were inaccessible, and thus, obtaining an actual tree count is difficult. The lush vegetation and large tree size in this area is attributable to springs and shallow ground water. The walnut and bay-laurel behind the eucalyptus row is included in cell 'W'.

IMPACT

The proposed improvements will require removing most of the windrow except about 70 trees in the eastern-most section. These eucalyptus however, should also be removed for exotic weed control.

CELL 'O'

Running north-south, consists of the lower part of West Meyer's Canyon bordered on the west by cells 'A' and 'B'.

Cell 'O' consists primarily of native sycamore growing at the bottom of the canyon. The sycamore range from 6 to 15 inches in trunk diameter and 20 to 50 feet in height. Occurring with the sycamore are medium-sized walnut trees (6 to 20" combined stem diameter, 15 to 20' tall) and other natives too small to be considered trees (willow, elderberry, scrub oak, cottonwood). All are located at the canyon bottom. A few red gum have naturalized on the western canyon slope. These are medium to large trees (15 – 22" diameter, 25 to 40' height), originally offspring from the plantation trees in cells 'A' and 'B'.

IMPACT

This canyon will be preserved and run adjacent to one of the main project entry roads. All of the native trees should be protected from spillage when grading and constructing the road above. The Eucalyptus trees in this cell should be removed as they may reseed and encroach into the native plant habitats.

CELL 'P'

Located in the upper part of West Meyer's Canyon along the eastern property boundary, midway.

Cell 'P' consists of eleven small sycamores, 15 to 20 feet tall. Scrub oak, elderberry, and walnut are also present, but not in tree size.

IMPACT

This canyon will be preserved and run adjacent to one of the main project entry roads. However, the trees' root zones may be impacted by fill and spillage when grading and constructing the road above. Protection measures will need to be closely followed.

CELL 'Q'

Includes all of the area on Martin Ranch described as Southeast Fork Cable Canyon, the oaks located on the canyon's south rim, and the adjacent hillside trees near the eastern property boundary.

This cell contains some of the most significant trees on the property, notably canyon live oak, Quercus chrysolepis. There are 13 significant, large oaks scattered throughout the cell, 6 of which are located on the south canyon rim. On the canyon's south slope near the 4 large oaks on the rim, grow a grove of 12 maturing oak trees plus a few seedlings (not counted). These oaks are likely seedlings of the larger trees, making them significant in the renewal and perpetuation of the species in the immediate area. Although they are small, they could be as much as 30 to 50 years old.

Measurements of each significant oak area as follows:

Id. #	Trunk Diameters	Height or Spread	Comments
Q1	45"	50' height 55' spread	Appears in sound structure and excellent physiological health
Q2	30", 12"	60' height	A large low branch failed leaving exposed sound but fire-damaged wood on the main trunk interior. There is a 12" secondary sprout.
Q3	19", 20"	50' height 45' spread	Sound low-branch structure and good physiological health.
Q4	18", 17", 15", 12", 11"	25' height 40' spread	Low-branched with good physiological and structural health.
Q5	20", 18", 18", 12", 12"	50' height	Low-branched with good physiological and structural health.
Q6	28", 20", 19", 18", 18"	55' height	Low-branched with good physiological and structural health.
Q7	34"	40' height	Good structure and health.
Q8	30"	45' height	Good structure and health.
Q9	24"	30' height	Good structure and health.
Q10	?	?	Possibly Q.agrifolia. Good structure and health.
Q11	29"	25' height	Good structure and health.
Q12	30"	35' height 40' spread	At western edge, adjacent to cell 'T', west of the electric lines. Good structure and health.
Q13	35"	50' height 60' spread	At western edge, adjacent to cell 'T', southwest of electric towers. Good structure and health.

In addition to the oaks, there are numerous small and medium sized walnuts. These are all multi-trunked with individual stem diameters at 2 or 3 inches. Their heights range from 10 to 25 feet. Some sycamores are also located near the western part of the cell. Eucalyptus from cells 'M' and 'N' have naturalized among the oak and walnuts. They range from 12 to 35 inches in trunk diameter and 30 to 45 feet tall. Toyon, holly-leaf cherry, elderberry and scrub oak are also present though not in sufficient size to be considered trees.

IMPACT

Much of cell 'Q' will be preserved. However, two north-south roads are proposed to cross it connecting to the upper part of the development. Construction of these roads will require the removal of six large oaks (Q1, Q2, Q3, Q7, Q8, Q10) and half of the small oaks in the regenerating grove. The proposed development plans shows the easternmost street passing through Q1 and Q2 on the rim, next to a walnut cluster, and through Q7 oak at the bottom of the canyon. Grading for this road will also impact Q3 oak.

Grading for the westernmost crossing will eliminate Q8 and Q10 oak as well as a large cluster of 10 walnut trees and a few scattered walnuts further north.

Furthermore, grading for the street near lots 166-169 will require removal of oak tree Q11. Assuming the park will not be graded and left natural, the oak and walnut in this area can remain.

If the improvement design is to be altered to avoid impacts to the oaks, the location of the alternate improvements should be marked in the field so that the impact to the trees can be clearly defined.

The two oaks growing at the largest at the western edge of cell 'Q' (Q12, Q13), as well as three at the eastern edge (Q4, Q5, Q6) do not appear to be directly impact by the proposed improvements. However, they may receive some indirect impact from grade changes over their root zone (outside of the dripline) and changes in drainage and soil compaction. Special oak protection measures should be implemented in addition to the general tree protection standards.

CELL 'R'

Located at the southeastern tip of the property, it includes a portion of Meyer's Canyon.

About half of the area was accessible; the other half being obstructed by dense vine cover, poison oak and very steep terrain. This cell contains a mix of walnut, sycamore and naturalized blue gum trees. Scrub oak and elderberry are also present but not in sufficient tree size.

IMPACT

None of the trees in this cell will be impacted by proposed construction or grading activities.

CELL 'S'

Includes a part of West Meyer's Canyon, a nearby drainage area with numerous natural springs, and adjacent land. It is bounded on the south by cell 'O', on the east and north by open land near the eastern property edge, and on the west by a steep hillside.

Majority of the trees are located in a large, natural spring area north of proposed "A" street. The main portion of the cell is a mix of sycamore trees (20 to 35 feet tall), willows and small cottonwoods not large enough to be considered trees. There is abundant, dense riparian-type growth and poison oak making the area impenetrable. Some trees were not identifiable beneath a covering of wild grapevines. Therefore, a more precise assessment of the trees and conditions was not possible.

On the western edge of the dense sycamore/walnut thicket are numerous multi-stemmed walnut trees (15 to 45 feet tall with combined trunk diameters up to 30 inches). Smaller walnuts below reporting size are located along the southwestern portion of the cell. Even the water flowing in the small brooks from this area smell and taste like walnut leaves.

The eastern edge of the spring area is a cluster of 9 canyon live oak and 1 solitary oak. The oaks range from 8 to 25 inches in trunk diameter and 15 to 40 feet tall.

Six sycamores and a few small walnut trees exist on the eastern edge of cell 'S'. Five additional sycamores are located southeast of the main riparian area.

IMPACT

Proposed improvement plans call for construction of the main entry street that will transect cell 'S' just below the large riparian spring area and west of West Meyer's Canyon. All or portions of 24 residential lots are proposed to be built on the riparian spring area after addition of 20 to 30 feet of fill and a drainage system. All trees in the main spring area (sycamore, willow, walnut and oak) and the scattered sycamores and walnuts in the cell's south and southwest sector will be removed.

About 5 sycamores in the eastern portion of the cell may not be directly impacted. These trees will need protective measures implemented during construction activity.

CELL 'T'

Includes all of Cable Creek Canyon from the southern Martin Ranch property boundary to the confluence of the east and west forks of Cable Creek, including the lower portion of West Fork Cable Creek up to the point where the vegetation density makes passage impossible.

This is a beautiful, pristine riparian habitat. All tree species known to be native to Martin Ranch can be found in this cell. Predominant species are alder, bay-laurel and sycamore with walnut, oak, cottonwood, maple and other natives scattered in various locations throughout. The magnificent alders with trunk diameters up to 24 inches and heights up to 60 feet line the canyon floor following the creek's flow-line. Sporadically intermixed with the alders along the flow line are native cottonwood, bay-laurel and sycamore. The sycamore trunks average 20 to 24 inches in diameter and heights of 50 feet or more. The bay-laurels are mostly multi-stemmed with combined trunk diameters averaging 18 to 30 inches and heights between 40 and 60 feet. The bay-laurel and sycamore trees extend beyond the flow line and mix with scrubby walnut trees. The lowest portion of cell 'T', near the Bonadiman residence, contains 20-foot tall walnut trees. Further up the sides of the wash walnut trees mix with canyon live oak and patches of small scrub oak (below reporting size). Clusters of oak trees exist on the eastern border of cell 'T', adjacent to cell 'Q'. The oaks range in combined trunk diameter between 20 and 30 inches with height and canopy spread between 30 and 40 feet.

Just before the East and West Fork split, there is a clump of ficus trees (non-native, volunteers that should be removed), scattered toyon, and some native holly-leaf cherry. The cherry are not healthy, exhibiting twig die-back. At this juncture point on the western bank, great-berried manzanita, big cone spruce and oaks can be found. Much of the western bank at this point is beyond the property line. Further up the West Fork on the eastern side of the flow-line, large bay laurel trees and big-leaf maple trees can be found. At this point the terrain and vegetation become impassable.

IMPACT

Proposed construction will not necessitate removing any trees in this cell. However, lot #335 directly borders the area and thus, posted notices and/or fencing will be necessary to insure that construction or other vehicles do not stray into this area and to prevent spillage of excess grading material.

CELL 'U'

East Fork Cable Creek, from its confluence with the West Fork to the northern property boundary, accessible by a trail on the east side of the creek.

This area is notable for many big-leaf maples, abundance of bay laurel, and large alder trees. Alders, cottonwood, and maples exist in groves along the creek flow-line. A large maple is located and a large bay can be found in the lower one-third of cell 'U'. Walnuts, sycamore and a few cherry are scattered on both sides of the creek, as well as two tree-sized elderberry (20 to 30 feet tall, multiple stem with 2 to 4 inch diameters each stem). The upper one-third of the cell is very dense with bay-laurel and oak.

IMPACT

No trees should need to be removed for grading and construction. Signs should be still posted, however, at the top of the eastern bank to deter stray activity.

CELL 'V'

The upper portion of West Fork Cable Creek, from cell 'T' on the south to the northern property boundary.

All of cell 'V' was inaccessible because of poison oak, deep cover by grapevines, and very steep slopes on either canyon wall. All the tree counts are estimates of what is expected, based on tree species found in cells 'T' and 'U', spruce cones floating down-stream, and the size of this cell. It is possible that other native tree species grow here, but without being able to enter the area safely, such thoughts remain speculative.

IMPACT

Proposed construction should not cause the removal of any trees in this cell. Tree protection measures probably will not be needed in this area.

CELL 'W'

This cell is bounded on the north by a steep hillside, on the south by the eucalyptus trees in cell 'N', on the east by open chaparral, and on the west by an access road and dense shrubs.

The significant trees are almost all black walnut located to form a boomerang shape. The trees vary in size from 2 to 24 inches in trunk diameter, and from 10 to 40 feet tall. In this area canopies are dense and intermingle. Most of the walnuts are multi-trunk sprouts originating from stumps of trees burned by fire. There are also solitary specimens located just behind the cell 'N' eucalyptus windrow with canopies as much as 50 feet across, heights up to 45 feet, and combined stem diameters up to 42 inches.

Portions of the cell contain dense brush including poison oak growing amongst scrub oak and Ceanothus. Investigation into these areas was limited and more easily viewed from the hillside above.

IMPACT

Most of this cell will be graded for construction of the high-end view homes. Only the south-easternmost tip adjacent to the eucalyptus in cell 'N' will not be graded and may be preserved. Tree protection measures will need to be implemented in cell 'W' throughout the duration of construction activity.

CELL 'X'

Contains a small canyon tributary to East Cable Canyon bordered on the north by the property boundary, on the south by dense brush, on the east by cell 'W', and on the west by cell 'U'.

The area is inaccessible due to a proliferation of poison oak. The area's tree resource was estimated from photographs taken from a hillside on the west side of Cable Canyon. The trees appear to be a mix of walnut, sycamore, oak and bay-laurel with small, shrub-sized cottonwood, willow and scrub oak.

IMPACT

Proposed construction should not cause the removal of any trees in this cell. Tree protection measures probably will not be needed in this area.

CELL 'Y'

A cluster of trees northeast of cell 'W', perched on the side of a hill in a steep, rocky ravine.

Seasonal water seeps from the rocks giving rise to canyon live oak, mountain mahogany, and scrub oak. Some of the largest scrub oaks on the property, with 12 inch or more diameter trunks and tree-like form, are located here. The mahogany have 18 to 20 inch trunk diameters. A very large canyon live oak pinpoints the northernmost portion of this cluster.

IMPACT

Proposed construction should not cause the removal of any trees in this cell. Tree protection measures probably will not be needed in this area.

CELL 'Z'

Off-site, along Martin Ranch Road, from Meyer's Road to the Martin Ranch property.

A few Eucalyptus trees, remnants of coppiced plantation trees, grow along-side the road and the northern and southern-most portions of the cell. In between, non-native cottonwoods and sweetgums line both sides of the road. The cottonwoods, located north of the sweetgum, are 20 feet tall with 7 to 14 inch trunk diameters. The sweetgum have 3 to 11 inch trunk diameters. All trees on the east side of the road has been pruned at 20 feet for utility line clearance, destroying their natural form. The trees on the west side, while needing some corrective and structural development pruning, retain their characteristic shape.

IMPACT

Proposed street improvement design is not in sufficient detail to determine if any of these trees will need to be removed. However, if a choice is made to retain only one row of trees, the trees on the west-side should be kept, and the line-cleared trees removed. If the western row of sweetgums must be removed, then the damaged trees on the east should also be removed. Street improvements can not come within a minimum of 8 feet from the trunk of any preserved tree.

CELL 'Z1'

Upper Martin Ranch Road, just before the driveway to the Bonadiman residence.

There are approximately 44 Eucalyptus trees in a divider in the upper part of Martin Ranch Road. Some, but not all, of these trees are sprouts from coppiced stumps. They have individual trunk diameters from 3 to 12 inches with combined stem measurements as much as 45 inches. They are 30 to 40 feet tall. The eucalyptus on the east side of the road has been topped at 20 feet for line clearance.

IMPACT

Proposed improvements of 'U' Street would necessitate removal of all trees. Nearby trees on the adjacent property should be protected from construction activity through appropriate fencing and signs.

CELL 'OS'

Off-site, Meyer's Road, between 'A' Street and Martin Ranch Road.

This off-site portion of the street will be improved so that it may better carry the traffic to and from the development. The south side of Meyer's Road, side opposite the proposed development, is lined with a variety of non-native ornamental trees. Two-thirds of the trees are old blue and red gums planted in a windrow. Some of these have large trunk diameters as much as 48 inches. A few closer to the Martin Ranch Road intersection have been topped for overhead line clearance. Interspersed with the eucalyptus is a row of 25 Italian cypress, a clump of 15 olives, 3 Japanese black pine, and 3 twisted juniper.

IMPACT

Proposed street improvement design is not in sufficient detail to determine if any of these trees will need to be removed. It is possible to improve Meyer's Road without damaging the trees if adequate room between the construction and the trees is provided along with protection and tree-care measures.

Figure 1 - Panorama of the Martin Ranch project site looking southwest toward the Bonadiman house. Eucalyptus in cell 'M' and 'N' and walnuts in cell 'W' in foreground.

Figure 2 - Panorama of Martin Ranch looking south over cell 'Q' toward eucalyptus in 'D'-'H'.

Figure 3 - Remnant eucalyptus plantation trees typical of what is found throughout project site.

Figure 4 -Walnut cluster in cell 'B' in front of eucalyptus and cell 'A' windrow.

Figure 5 - Dense eucalyptus in southern portion of cell 'D', to be preserved

Figure 6 - Eucalyptus in northern portion of cell 'D'.

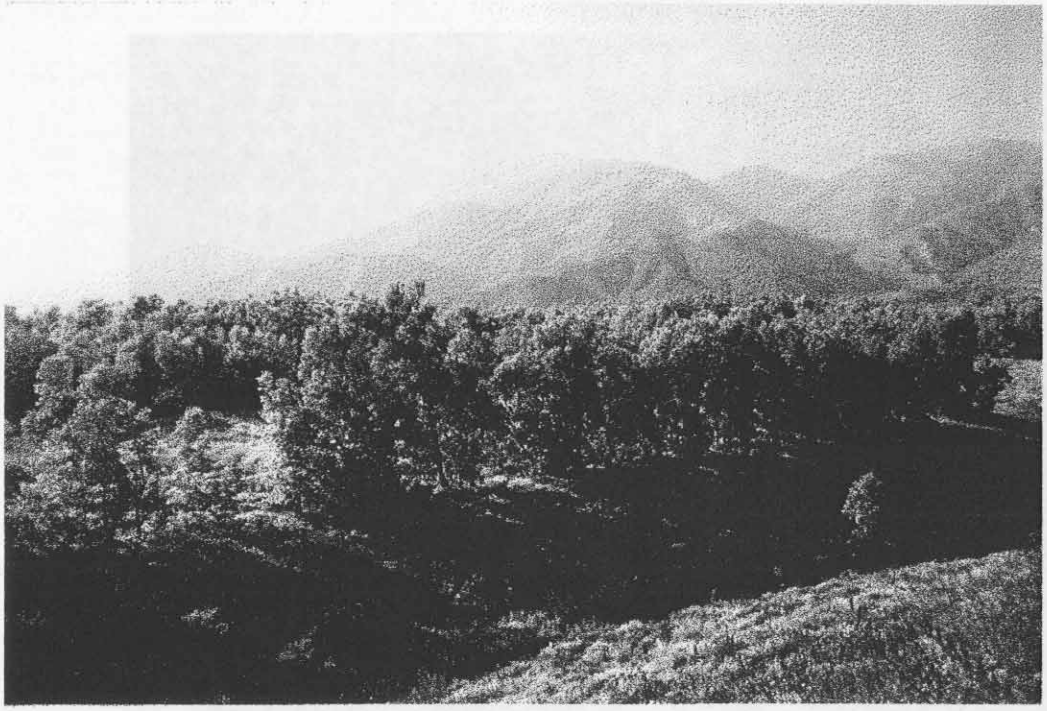


Figure 7 - Cell 'E' eucalyptus windrow in foreground with cell 'F' behind.

Figure 8 - Shrub-sized manzanita found throughout cells 'F', 'G' and 'H'.

Figure 9 - Ailanthus saplings around incense cedar in cell 'M'

Figure 10 - Sycamore woodland at bottom of channel in cell 'O'.

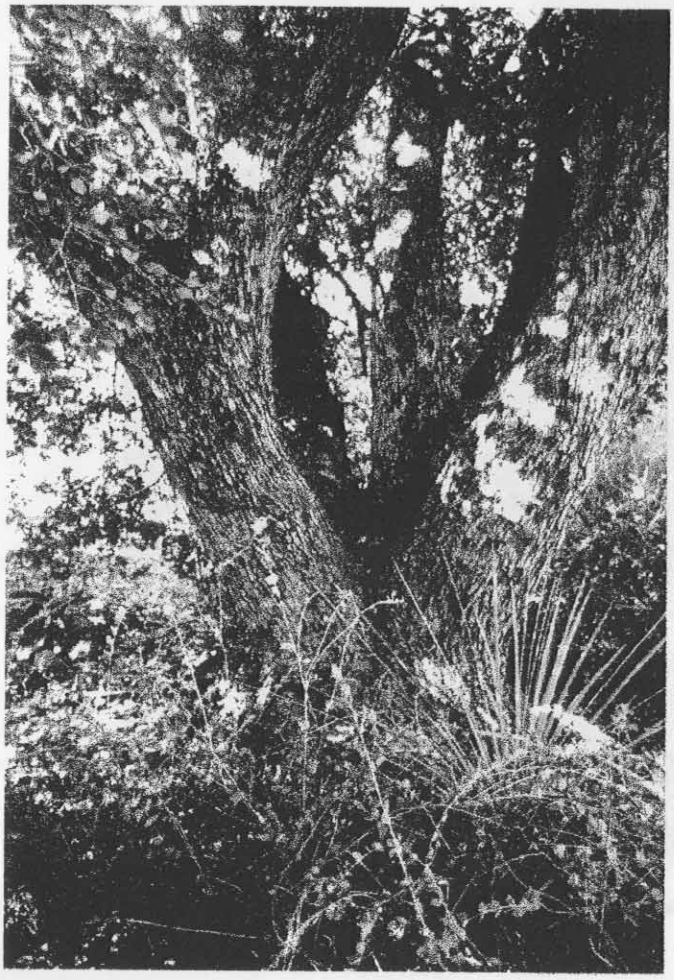


Figure 11 - Example of the size of the canyon live oaks in cell 'Q'.

Figure 12 - Two large oaks at the western border of cell 'Q' as it transitions into Cable Creek (cell 'T').

Figure 13 - Looking east across cell 'S'. Vine covered riparian area in foreground; oak trees on eastern slope and sycamores in channel on the other side of the road.

Figure 14 - Overview of Cable Creek in cell 'T'

Figure 15 - Magnificant alder woodland in Cable Creek, cell 'T'.

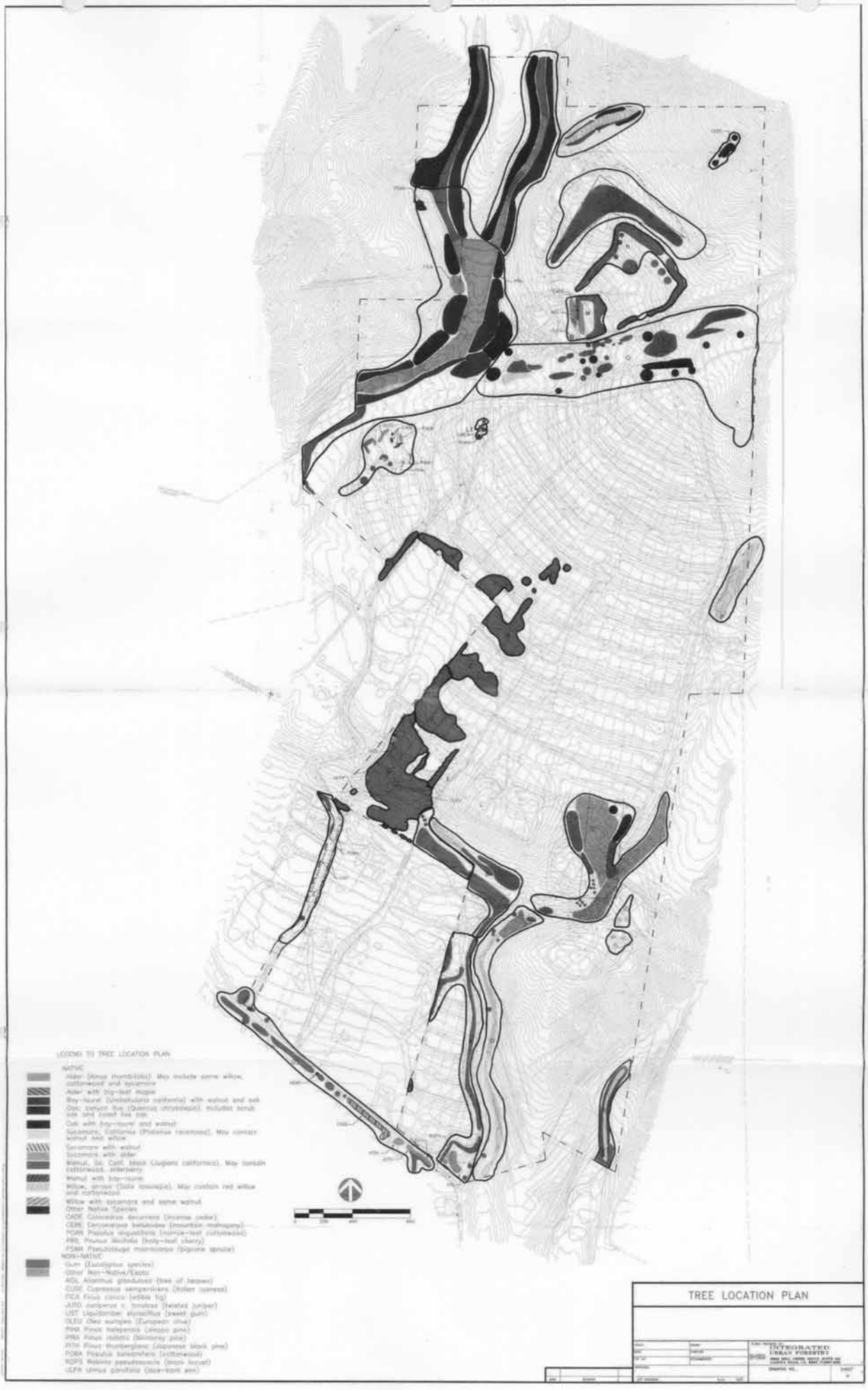
Figure 16 - Transition from alders and bay-laurels to walnut and oak in cell 'T'.

Figure 17 - Walnuts in cell 'W' in foreground with cell 'N' eucalyptus windrow behind.

Figure 18 - Liquidamber trees lining Martin Ranch Road in cell 'Z'.

APPENDIX D
TREE LOCATION PLAN

G:\Martin Ranch\Martin Ranch EIR\...cation.jpg (2055x3279x24b jpeg)



APPENDIX E
DESCRIPTION OF TREE SPECIES

APPENDIX E
DESCRIPTION OF TREE SPECIES

Thirty-seven tree species were found at Martin Ranch, San Bernardino. These include:

Species Native to the Area

Acer macrophyllum (big-leaf maple)
Alnus rhombifolia (white alder)
Arctostaphylos glauca (great-berried manzanita)
Calocedrus decurrens (incense cedar)
Cercocarpus betuloides (mountain mahogany)
Heteromeles arbutifolia (toyon)
Juglans californica (So.Calif. black walnut)
Platanus racemosa (California sycamore)
Populus angustifolia (narrow-leaf cottonwood)
Prunus illicifolia (holly-leaf cherry)
Pseudotsuga macrocarpa (bigcone spruce)
Quercus chrysolepis (canyon live oak)
Quercus berberidifolia (scrub oak)
Salix lasiandra (red willow)
Salix lasiolepis (arroyo willow)
Sambucus mexicana (Mexican elderberry)
Umbellularia californica (California bay laurel)
Washingtonia filifera (California fan palm)

Non-Native Species

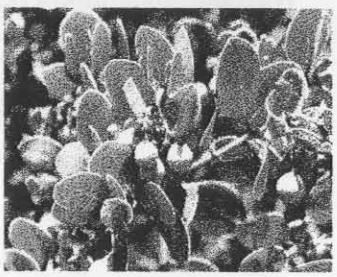
Ailanthus glandulosa (tree of heaven)
Eucalyptus camaldulensis (red gum)
Eucalyptus globulus (blue gum)
Eucalyptus polyanthomos (silver-dollar gum)
Eucalyptus rudis (flooded gum)
Eucalyptus sideroxylon (red-iron bark)
Ficus carica (edible fig)
Liquidamber styraciflua (sweet gum)
Melia azederach (Chinaberry)
Olea europea (European olive)
Pinus halepensis (aleppo pine)
Pinus radiata (Monterey pine)
Populus balsamifera (cottonwood)
Robinia pseudoacacia (black locust)
Ulmus parvifolia (lace-bark elm)
Washingtonia robusta (Mexican fan palm)

A description of these trees can be found on the next seven pages. A photograph of species native to the area is included for identification purposes.

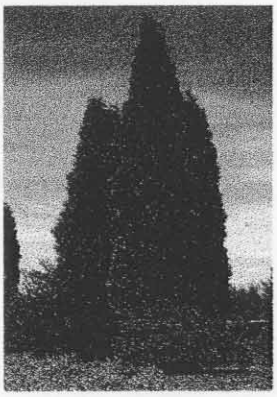
Acer macrophyllum, big-leaf maple. A native, deciduous, riparian tree that was found, on this site, exclusively in the east and west forks of Cable Creek. This tree is distinctly much more abundant in the east fork canyon, possibly because of a difference in soil or water quality. The species has a large, hand-shaped leaf with deep, finger-like divisions. The trees varied in size, the largest being 40 feet tall with trunk diameters up to 18 inches. This species only grows where there is constant moisture, so its presence indicates ample water all year, even during drought years.

Ailanthus glandulosa, tree of heaven. A deciduous tree native of China, that is tolerant of adverse conditions, thus, often naturalizing in open areas. Its large, ill-smelling, pinnately compound leaves, light colored bark with diamond patterns, and suckering habit are all quite distinctive. This tree grows in two thickets near the old home sites in cells 'A' and 'M.' Each thicket is comprised of hundreds of small suckers or seedlings which have naturalized or spread from the original plantings.

Alnus rhombifolia, white alder. A native riparian deciduous tree found growing in the east and west forks of Cable Creek, almost exclusively where the roots touch running water. This tree is fast growing to about 70 feet, and normally attains trunk diameters of up to 24 inches. Tree assumes pyramidal form with pendulous branches. Dark green 2 to 4 inch leaves coarsely toothed. Develops greenish yellow flower catkins that turn into small cones in winter. Very fragrant. This species is represented overwhelmingly by mature trees 12 to 24 inches in diameter, a very few juvenile and seedling trees, and one tree with a 36-inch trunk diameter.



Arctostaphylos glauca, great-berried manzanita. A large, woody, native evergreen shrub that occasionally attains tree size, such as on this tract. The tree-sized specimens grow on the steep slope of the western canyon wall in cells 'T' and 'V.' This species has smooth, red peeling bark, stiff grey-green leaves, and racemes of urn-shaped flowers in the spring.



Calocedrus decurrens, incense cedar. A conifer native to the area, which is easily recognized by its thick red-brown bark, dark bright-green leaves and columnar pyramidal form. The trees on-site have been cultivated and intentionally planted.

Cercocarpus betuloides, birch-leafed mountain mahogany. A large, native, open and woody evergreen shrub sometimes reaching tree size. The leaves are dull green on the upper side, lighter underneath, with straight veins from the midrib to the margins. The fruit is a seed with a long corkscrew fuzzy plume attached. The fruit cover the whole plant and give it a white halo effect. The tree-sized Cercocarpus are found in cell 'Y,' while smaller individuals grow in relatively undisturbed chaparral.

Eucalyptus species, gum. Exotic, evergreen tree species from Australia that are fast-growing and hardy, often naturalizing in local streams and river beds crowding out native trees and other vegetation. Leaves are generally rounder when young, becoming lance or sickle shaped with age. Some eucalypt species cross forming new hybrids. Where this has occurred and it was difficult to differentiate between species, the more dominant species was identified in the cell, recognizing that other species or hybrids may exist. Five dominant eucalyptus species were found on the site primarily confined to plantation and windrow remnants.

E. camaldulensis , river red gum. A commonly planted eucalypt that is wind, heat, and drought resistant, and less susceptible to the Eucalyptus longhorn borer *(Phoracantha semipunctata)*. Some naturalization has occurred in west Meyer's Canyon (cell 'O'), and in cell 'N.'

E. rudis, flooded gum. Closely related to the E.camaldulensis, these trees exhibit varied characteristics and have in some areas hybridized with the camaldulensis. This hybridization or gradation in species (where one species gradually changes into another with the geography) is typical in native stands, especially in western Australia. Flooded gum has broad, lance-shaped leaves, though sometimes almost round. It has a greener (less grey) than the silver dollar gum and protruding valves on the seed capsules.

E. globulus, Tasmanian blue gum. Used typically as an agricultural windrow tree, it is characterized by its blue-green leaves, thick trunks, abundant shedding bark, and abundance of ¾ inch seed pods, with branch and leaf litter. This species is more susceptible to longhorn borer. The blue gums at Martin Ranch are in relatively good condition following the 1997-98 above average rainfall. Four trees in cell 'B' appear to be variations of blue gum or hybrid-cross.

E. polyanthemos, silver dollar gum. Found in cells 'A' and 'B' along the edge of West Meyer's Canyon, the silver dollar gum grows to about 50 to 80 feet, and has distinctive round, silver-grey leaves, and urn-shaped seed capsules.

E. sideroxylon, red ironbark. Characterized by its dark, reddish brown bark, bluish-grey-green leaves, and showy red or pink flowers, at this site it grows only at the Bonadiman house.

Ficus carica, edible fig. An Old-World native, deciduous tree, it has naturalized in several places growing in clumps along Cable Creek and near a spring in cell 'D'. In native areas it should be considered an undesirable weed. Edible fig can be identified by its smooth light grey bark, thick twigs, and its large, 3-lobed leaves with a sandpapery texture.

Heteromeles arbutifolia, toyon. A large, native, evergreen shrub or small tree of the rose family, reaching heights between 15 and 30 feet. The leaves are 2 to 4 inches long, thick, leathery, glossy, deep green, with bristly teeth on the margins, borne on red twigs. Forms small white flowers in flat clusters at the branch tips followed by long-lasting, ¼ inch red berries. There is only 1 tree-sized specimen with the remaining dozen or so being shrubby plants in the Cable Creek area.

Juglans californica, Southern California black walnut. This native deciduous tree is found where there is ground water, although it will withstand occasional drought. Walnut occurs in almost every cell represented by at least a few seedlings. The typical tree has 6 to 15 trunks, ranging from 1 to 8 inches in diameter, sprouting from a stump of a tree that was destroyed by fire. Heights range from 10 to 30 feet with the mean being 12 to 18 feet. The largest trees are growing in cells 'W' and 'N,' and have trunk diameters of 15 to 20 inches or more. Walnut leaves are light or yellowish green, compound, with lanceolate pinnae. Seeds are 1 inch in diameter when husked. Usually, the tree has dark brown bark with silvery plates, but most of the walnuts at Martin Ranch have the light grey bark of young stems, even though they are large in diameter.

Liquidambar styraciflua, American sweet gum. This deciduous tree, native to eastern North America, has upright pyramidal growth habit, reaching 50 feet high. Leaves are 5 to 7 lobed, 3 to 7 inches wide and somewhat resemble a maple leaf. Their color is deep green turning purple-red or orange in the fall. Produces spiny, balled seed capsules. It has been planted along both sides of Martin Ranch Road. One row is beneath a power line, the clearance pruning for which has destroyed the natural form of the trees.

Melia azederach, chinaberry. A deciduous, Old World tree related to mahogany often planted for its tolerance of considerable wind, heat, aridity, and adverse soils. It has doubly compound leaves, fragrant lavender flowers, and ½" yellow berries. The bark is brown and fissured. The wood is hard, waxy and sometimes brittle. Litter from fallen leaves and fruit can be a nuisance. It is found here near the homesite at cell 'M.'

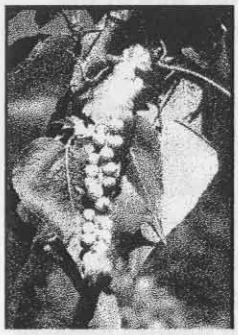
Olea europea, European olive. Found growing in cells 'D' and 'L', this is the common olive found in olive production, ornamental landscapes, and in windrows in the Verdemont area. An evergreen tree with soft gray willow-like foliage, it has a smooth gray trunk and branches that become

gnarled and picturesque in maturity. Trees grow slowly, reaching 25 to 30 feet high with equal width. Tolerates some drought.

Pinus halepensis, aleppo pine. This is a well-adapted evergreen conifer native to Asia and frequently planted in this region. Has an irregular form and a bushy crown with many short ascending branches. Its needles are usually paired, are 3 to 4 inches long and light green. Has rough, orange-brown bark. Will thrive in extreme heat, wind, poor soil and drought. It is susceptible to mite and bark beetle damage when stressed. It reaches heights of 50' to 70'. One tree grows at the Bonadiman residence.

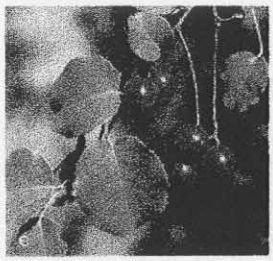
Pinus radiata, Monterey pine. This evergreen conifer is native to the Central California coast. Although frequently grown locally for Christmas tree production, it is not suited for landscape use. This beautiful, dark green, fast-growing pine does not resist heat or aridity, thereby becoming stressed and susceptible to bark beetle and mite infestation. Maximum life span in this area is 12 to 20 years. One tree grows on lot 192.

Platanus racemosa, California sycamore. This well-known, native, deciduous tree has large, fuzzy, palmate, deeply lobed leaves. It is fast growing reaching 60 feet or more. Its branches and main trunk become gnarled and twisted with age. Patchy buff colored bark peels to reveal lighter tones underneath. Produces in winter round, 1½" golden-brown seed balls. It is tolerant of heat and wind.



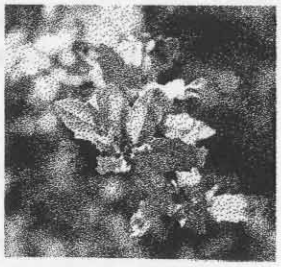
Populus angustifolia, narrow-leaf cottonwood. This native, deciduous large shrub/small tree is plentiful on Martin Ranch. Trunk diameters of 4 to 6 inches on-site are common, but the height rarely exceeds 15 feet. It is characterized by a medium green lanceolate leaf and dense shrubby growth. It can be found near springs and water courses.

Populus balsamifera, hybrid cottonwood. This species of this deciduous tree is native to the northern United Sates and to Canada. The varieties are popular everywhere for their ability to tolerate difficult conditions, their fast growth, and sometimes for their fall color. This tree often suckers from the roots, which can be invasive. The wood is weak and subject to storm damage and rapid decay. This variety is planted as a road side tree along Martin Ranch Road.

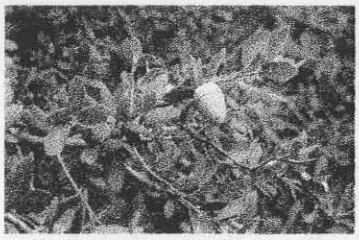


Prunus illicifolia, holly-leaf cherry. This native evergreen tree or shrub characterized by a dense crown of shiny, holly-like leaves. Although this species is common in the nearby canyons, foothills, and Shandin Hills, only a few tree-sized individuals were found here. Most appeared to be suffering from die-back caused by fire-blight.

Pseudotsuga macrocarpa, big-cone spruce. This conifer is characterized by its wide-spreading sometimes pendulous branches. Its needles are similar to the familiar Douglas fir Christmas tree. With a stout trunk and large, 4 to 8 inch cones, this tree can reach up to 60 feet tall. Its silhouette is distinctive and unmistakable in our mountains, including upper Cable Canyon and its tributary canyons. Three individuals were located on the east-facing slope of Cable Canyon near the confluence of the east and west forks. Cones of this species were found floating in the both the east and west fork streams, indicating that more trees exist a short way upstream, where the terrain and dense understory growth prevents further exploration. They can also be seen a short way up the canyon on the SW side of Monument peak.



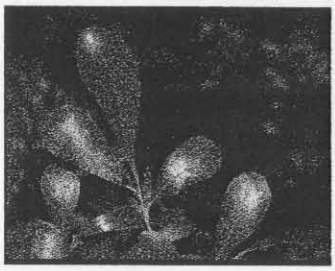
Quercus berberidifolia, scrub oak. One of the two most common shrub oaks in California and an important member of chaparral and woodland vegetation. It grows 6 to 15 feet tall, typically in extensive, dense thickets with little or no understory plants. Leaves of the Q.berberdifolia are from ¾ to 1 inch long and variable in shape. The margins can be smooth, toothed or spiny. The color of the upper surface is green with a dull, grayish green, slightly tomentose underside. Acorns are oval ½ to 1 inch long and set in a knobby cup. The scales on the cup have a spiral pattern. Oaks resembling this species at Martin Ranch, with heights up to 25 feet and trunk diameters 2 to 6 inches, are probably hybrids with Q. chrysolepsis. The largest scrub oak hybrids appear on the side of the mountain in cell 'Y' where trunk diameters exceed 12 inches and heights approach 20 feet.



Quercus chrysolepis, canyon live oak. This native evergreen tree varies considerably in form, either single or multi-trunked, round-headed, tall, or spreading trees with crowns reach 20 to 60 feet wide. Some of the largest and most impressive trees on this site have trunk diameters in excess of 60 inches and heights approaching 80 feet. Bark is whitish and smooth. The 1 to 2 inch long leaves are medium to deep bright green and glossy above with whitish beneath. Leaf margins are can be toothed, smooth or have a few soft spines and undulations. Acorns are large with very shallow caps covered with a golden fuzz up to 1½" across. Some trees have a mix of characteristics, which suggests hybridization with Q. dumosa or possibly with other oak species.

Robinia pseudoacacia, black locust. A deciduous tree native to the eastern United States and naturalized in many parts of the West. This species has odd-pinnately compound leaves from 6" to 10" long attached to thorny branches. Flowers are white, fragrant and drooping in clusters. The bark is brown and heavily fissured with heavy, hard, and decay resistant wood. It often suckers from the roots and forms thickets or clumps of trees. Black locust grows only at the bottom of cell 'A' on the south side of the old home site.

Salix lasiandra, red willow. A deciduous native small tree/large shrub. The leaves are thin, long-lanceolate, light green, and often with stipules at the base of the petiole. It can grow to 25 feet tall with equal width. On Martin Ranch contains only one tree-sized individual in West Meyer's Canyon; other small red willows are growing in Cable Creek. An excellent example, though not on the property, is in Meyer's creek downstream from the culvert under Meyer's Road.



Salix lasiolepis, arroyo willow. A large, thicket-forming, deciduous native shrub found in all wet areas of the property. None are large enough to be considered trees. It normally grows 15 to 25 feet in moist areas around streams or springs. Has yellowish to brown twigs with soft hair. The leaves are narrow, shaped like an elongated tear drop, irregularly serrate around the edges and slightly rolled under, with white or rusty felt underneath and a dark-green shiny top. Inconspicuous catkin flowers.

Sambucus mexicana, Mexican elderberry. A native evergreen, small tree that can grow to 30 feet high with equal spread. Natural growth habit is sprawling, growing large, weak branches rapidly, which break apart or dying back, and re-sprout anew from the base. Foliage is light green, succulent-like and divided into 7 to 9 leaflets on a stem. Branches are light in color and light weight with a large pith. Produces large flat, clusters of tiny, creamy yellow to white flows in spring and summer followed by colorful clusters of bluish-purple ¼ inch berries. It tolerates many types of soils and survives extended periods of drought. If planted in deeper soil and irrigated, the tree will grow larger and produce a greater abundance of flowers and berries.

Ulmus parvifolia, lace-bark elm. A semi-evergreen tree native to Asia, with very fast growth to 40 to 50 feet in height and a 50 foot spread. Variable in form but generally round-headed and spreading with long, arching, and weeping branchlets. It can be found in cells 'L' and 'D'. Leaves are deep green, leathery, 1 inch long, and oval with a "saw-toothed" edge. Bark is cream-colored and patchy like a Sycamore. This tree re-seeds freely. It will tolerate many types of soil.

APPENDIX F
GLOSSARY

APPENDIX F, GLOSSARY

CANOPY - This is the overall spread of the branches on a tree or shrub.

COLLAR - The plant collar is the transition area between the main feeder roots of the plant and the main stem(s) or trunk(s). It is the area just above the soil level. The branch collar is the transition area between trunk or main branch and the smaller attached branch.

COPPICING - The agricultural harvesting practice of cutting a tree just above the root collar. The root system is not disturbed and thus in trees with healthy lignotubers, new shoots will sprout from the root collar. These new shoots are usually thinned to one to three healthy stems and allowed to develop into new trunks. Coppiced--adj.or past tense.

CRITICAL ROOT ZONE – The area around a tree that contains most of the main root system. This zone is usually identified as the dripline or 20 feet from the outside edge of the tree trunk in all direction, whichever is greater. There should be no disturbance within the critical root zone.

DECIDUOUS - This kind of plant will lose all of it's leaves at one time, usually once a year, and will remain devoid of leaves for several months. The leaf drop means that the plant is going dormant. It is best to prune a deciduous plant when it is dormant. Most deciduous plants lose their leaves in the fall, however, there are exceptions.

DIEBACK - When a plant's stems or branches die, beginning at the tips, for a part or all of their length. Causes are numerous: not enough water, nutrient deficiency, plant is not adapted to the climate in which it is growing, severe insect or mite infestation, or disease.

DRAINAGE - Drainage includes both gravitational (underground) and nuisance or sheet (above ground) water flow.

DRIPLINE - An imaginary circle that you would draw on the soil around a tree directly under its outermost branch tips is called a drip line. Rainwater tends to drip off of the tree at this point. Once thought of as the area where most absorption by roots of water and nutrients took place.

DROUGHT TOLERANT - Describes those plants that when established, will survive with little or no water during the normal dry season. All plants generally require more water when young and not established.

FAIL, FAILURE, TREE FAILURE, TRUNK FAILURE, BRANCH FAILURE - Terms that refer to breakage of a tree's wood structure.

FOREST - A growth of trees, either naturally occurring or intentionally planted and encompassing a wide range of uses. A forest can have spaces between the trees (open canopy),

or it can completely shade the soil (closed canopy).

LIGNOTUBER - A form of a woody rootstock embedded in the upper layer of soil at the base of a tree. They occur in adult plants and are vital to species regeneration. Lignotubers store food and moisture, and acts as an organ with dormant buds. After felling, drought or fire, new stems may sprout repeatedly from buds concealed in the wood mass, thereby regenerating a new tree.

MICROFLORA / MICROFAUNA – The smallest soil organisms comprised of bacteria, fungi, algae and protozoa.

MYCORRHIZA – A close physical association between a fungus and the roots of a plant, from which both fungus and plant appear to benefit; a mycorrhizal root takes up nutrients more efficiently than does an uninfected root. A very wide range of plants can form mycorrhizas of one form or another. Some plants seem incapable of normal development in the absence of their mycorrhizal fungi.

ROOT CROWN - The part of a tree's structure where the roots converge at the base of the trunk. This area is sensitive to damage and disease; its health is essential for the structural stability of the tree.

SIGNIFICANT – Refers to a tree that is mature, with appropriate size to reflect the mature age, has good aesthetic form typical for the species, is in good health and vigorous, and has no obvious structural weaknesses that can not be corrected by proper pruning procedures.

SOUTHEAST FORK CABLE CANYON - A substantial canyon tributary to Cable Creek, cutting across Martin Ranch in an easterly direction. Surface water flow is intermitttent or seasonal. Riparian trees and vegetation are absent.

STRESS - This refers to the condition(s) under which a plant is growing with danger to its health. Stress may stem from lack of water or oxygen (in the root area), too much heat, wind or moisture, or low temperatures. The stressful condition varies according to the particular plant and its needs. Stress shows up as wilting, loss, abnormal flowering and/or fruiting, or dulling of color in foliage or browning of leaf edges.

TOPPING (POLLARDING) - In this pruning approach, main limbs are drastically cut back to short lengths. Watersprout growth results from these branch stubs just below the cut. The result is a compact, leafy dome during the growing season and a grotesque branch structure during the dormant months. In time branch ends become large and knobby and branches are weakly attached. Topping is not an appropriate pruning method.

WEST MEYER'S CANYON - A small otherwise unnamed canyon tributary to Meyer's canyon from the west. It is bordered on the west by proposed 'A' Street. All of the trees in cells 'O', 'P', and 'S', are in this canyon.

WIND THROW - The failure of a whole tree, usually with the roots attached, during a windstorm.

WINDROW - A closely planted line of trees, shrubs, or other plants. Although frequently used to describe trees planted as a windbreak, the use is not necessarily so restricted. Originally referred to hay, grain, or other material raked into low mounds to dry.

APPENDIX G
REPLACEMENT SPECIES

APPENDIX G - REPLACEMENT SPECIES

CALIFORNIA NATIVE SPECIES

	Fire-resistive list	City street list	Lawns	Slopes	Rainfall only	Constantly moist	Deciduous/Evergreen	Height (sm, med, lg)	ideal max H20	min H2O tolerance
Acer macrophyllum, big-leaf maple			Y	Y		Y	D	L	2x/wk	2x/wk
Alnus rhombifolia, white alder	Y		Y	Y		Y	D	L	2x/wk	1x/mo
Arctostaphylos glauca, great-berried manzanita				Y	Y		E	S	2x/mo	low
Cercis occidentalis, western redbud				Y	Y		D	S	1x/wk	1x/mo
Cercocarpus betuloides, birch-leafed mountain				Y	Y		E	S	1x/mo	low
Cercocarpus ledifolius, curlleaf mountain mahogany				Y	Y		E	S	1x/mo	low
Cupressus forbesii, tecate cypress				Y	Y		E	S	1x/mo	2x/sum
Fremontodendron californicum, flannelbush				Y	Y		E	S	1x/sum	low
Heteromeles arbutifolia, toyon	Y			Y	Y		E	S	1x/wk	low
Juglans californica, Southern California black walnut				Y	Y	Y	D	S	1x/mo	low
Juniperus californica, California juniper				Y	Y		E	M	1x/mo	low
Calocedrus decurrens, incense cedar				Y	Y		E	L	2x/mo	2x/sum
Lithocarpus densiflorus, tanoak				Y	Y		E	L	2x/mo	low
Pinus attenuata, knobcone pine				Y	Y		E	L	1x/mo	2x/sum
Pinus coulteri, coulter pine			Y	Y	Y		E	L	1x/mo	2x/sum
Pinus sabiniana, digger pine				Y	Y		E	M	1x/mo	low
Pinus torreyana, torrey pine	Y		Y	Y	Y		E	M	1x/mo	2x/sum
Platanus racemosa, California sycamore			Y	Y	Y	Y	D	L	2x/wk	2x/sum
Populus angustifolia, narrow-leaf cottonwood				Y		Y	D	L	2x/wk	1x/wk
Populus fremontii, fremont cottonwood				Y	Y	Y	D	M	2x/wk	low
Populus trichocarpa, black cottonwood						Y	D	L	2x/wk	2x/wk
Prunus illicifolia, holly-leaf cherry				Y	Y		E	S	2x/mo	2x/sum
Quercus agrifolia, California coast live oak	Y	Y	Y	Y	Y		E	L	1x/wk	low
Quercus berberidifolia, scrub oak				Y	Y		E	S	1x/mo	low
Quercus chrysolepis, canyon live oak				Y	Y		E	L	1x/mo	low
Quercus engelmannii, Engelmann oak				Y	Y		E	L	1x/mo	low
Quercus kelloggii, kellogg black oak				Y	Y		D	L	1x/mo	1x/sum
Quercus wislizeni, interior live oak			Y	Y	Y		E	L	1x/wk	low
Salix lasiandra, red willow				Y		Y	D	S	2x/wk	2x/wk
Salix lasiolepis, arroyo willow				Y		Y	D	S	2x/wk	2x/wk
Sambucus caerulea mexicana, Mexican blue elderberry				Y	Y	Y	D	M	1x/wk	low
Umbellularia californica, California bay laurel			Y	Y		Y	E	L	2x/wk	1x/mo

EXOTIC SPECIES

	Fire-resistive list	City street list	Lawns	Slopes	Rainfall only	Constantly moist	Deciduous/Evergreen	Height (sm, med, lg)	ideal max H20	min H2O tolerance
Acer buergerianum, trident maple	Y	Y	Y	Y		Y	D	S	1x/wk	1x/wk
Cedrus atlantica, atlas cedar	Y			Y			E	L	1x/wk	2x/mo
Cedrus deodora, deodar cedar	Y			Y			E	L	1x/wk	2x/mo
Pinus canariensis, Canary Island pine	Y	Y	Y				E	L	1x/wk	1x/wk
Pinus eldarica, mondell pine	Y	Y		Y			E	L	1x/wk	2x/mo
Pinus halepensis, aleppo pine	Y	Y	Y	Y			E	L	1x/wk	2x/mo
Platanus acerifolia, London plane tree	Y	Y	Y	Y			D	L	1x/wk	1x/wk
Prunus cerasifera, purple leaf plum		Y		Y			D	S	1x/wk	1x/wk
Quercus ilex, holly oak	Y	Y		Y			E	M	1x/wk	2x/mo
Quercus suber, cork oak	Y	Y		Y			E	L	1x/wk	2x/mo