

**RESEARCH REPORT REGARDING
THE CANYON AT MANRESA UPLANDS**



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**REPORT PREPARED BY
SAND DOLLAR BEACH HOMEOWNERS ASSOCIATION**

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Date: October 19, 2006

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THIS REPORT IS PREPARED FOR THE CALIFORNIA DEPARTMENT OF PARKS AND RECREATION, SANTA CRUZ DISTRICT BY THE SAND DOLLAR BEACH HOMEOWNERS ASSOCIATION

GOALS

- To find an equitable solution that will protect Manresa Uplands North Canyon from erosion.
- To prevent erosion damage to Sand Dollar Beach Homeowners' sewer system and to private homes.
- To represent the general public so that its interest is protected.
- To recommend a plan that minimizes fire hazards affecting our community and Canon Del Sol.
- To protect the privacy of Sand Dollar Lane homes. Existing trees partially screen the view from the Manresa Day-Use-Parking Lot. Conversely they help obscure the residential development from the public view as intended by Coastal Commission.

THE LAND

The 1940 Census found 6,907,387 people living in California. These people enjoyed a landscape containing few big cities, clumps of towns, forests, mountains and deserts sparsely occupied. Agriculture dominated most of the easily arable land.

Farms dotted the area we now call Manresa Uplands. To protect crops against high winds, people planted Eucalyptus Globulus extensively in California. This became a significant historical part of rural California. During World War II, the U.S. Army built Camp McQuaide on the property we now know as the Monterey Bay Academy. During the early part of the war, the fear of invasion kept coastal property from being highly desirable. After the war, other areas of our immediate coast had room for expansion. Today, Manresa Uplands campground has the look of 1940's where campers enjoy the space of yesterday.

Two major development changes of this area are Sand Dollar Beach housing (1968 pre-Coastal Commission) and the condominiums of Canon Del Sol. (1980's). The Coastal Commission's permit for Canon Del Sol required continued screening of that development from the beach by these trees. Sand Dollar Beach housing is partially screened by Eucalyptus in the Canyon.

Today camping provides a relaxing, inexpensive way for individuals and families to vacation at the beach—A special way to reconnect with nature with space to spare.

CHOICES AFFECT FUTURE RESOURCES

THE DECISIONS WE MAKE TODAY AFFECT

WATER SUPPLY—EROSION—AIR—FIRE HAZARDS— HABITAT—CALIFORNIA STATE
PARK'S BUDGET—SEWAGE DISPOSAL—HISTORY

MANRESA STATE BEACH – GENERAL PLAN 1979

The Manresa Uplands consist of 87 acres divided approximately into:

- | | | |
|---|------|-------|
| • 65 walk-in campsites | 10.5 | acres |
| • Vehicular access, parking, operations center | 7 | acres |
| • Arroyos | 8 | acres |
| • Designated native plant, wildlife habitat, south bowl | 35 | acres |
| • Trails, beach access, interpretive center, open space | 26 | acres |

Classified as State Seashore under Public Resources Code 5019.62, Manresa enjoys a purpose not only to preserve the land but to make possible the enjoyment by the public of the beach and recreational activities.

The north arroyo or canyon adjacent to Sand Dollar Beach was identified by both the Coastal Commission and State Parks as a separate area to be restricted from the public enjoyment. Because of the arroyo's sensitive nature, the State Coastal Commission required the Canon Del Sol developer to fence the entire upland perimeter to prevent public intrusion. "The Department of Parks and Recreation will have the responsibility of discouraging public access into from the beach."¹

WATER

Manresa Uplands, Canon Del Sol, and Sand Dollar Beach all depend on their water from Soquel Creek Water District. There are private wells near by but the water source for all these communities is the Aromas Red Sands Aquifer.

Bruce Daniels, President, Soquel Creek Water District, reported to the Sand Dollar Beach Homeowners at the annual meeting, 2005, that the district's demand for water exceeds supply. All of our water comes from groundwater wells. Our water deficit is about 15% and it has been increasing over the last 20 years.

"If we do nothing we will get saltwater intrusion," he said, "and we could lose our water supply." The District now uses a "Zero Impact" policy for new development.

According to Laura Brown, General Manager of the Soquel Creek Water District, aquifer recharge can be improved in small increments by better maintaining natural features where water percolates down into the soil.² In the north Arroyo, the Eucalyptus trees and the resulting duff aid in this process.

¹ Manresa State Beach General Plan, pg. 59, October 1979

² "The Mid-County Post" January 10-January 23, 2006.

EROSION

The primary threat to the Sand Dollar Beach PUD is any erosion of Park's adjacent north canyon. This could affect lift station "B" and the main sewer line (Exhibit 1).

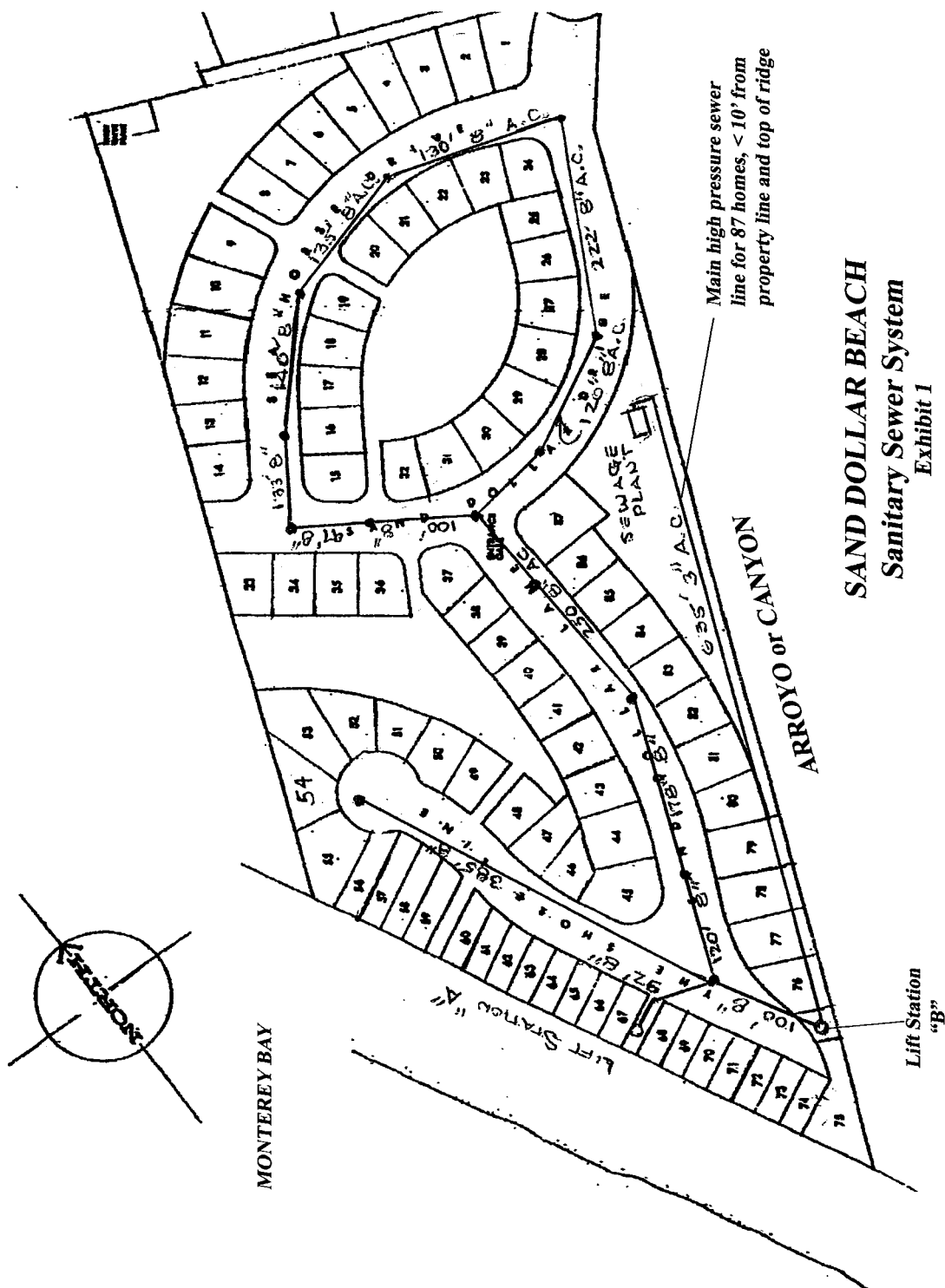
The year 1968 marked the beginning of the Sand Dollar Beach development. Rules require house gutters to drain to the street. The first sign of an erosion problem in the canyon occurred in 1981 after phase one of Canon Del Sol. Our association's newsletter reported that our sewage pumping station was being threatened by an earth slide on lot 76 which we believe was caused by excessive run-off from the Canon Del Sol development. The association retained an attorney to communicate with Burke Associates (Canon Del Sol's developer) to resolve this problem. Additionally both the Coastal Commission and Santa Cruz County addressed this issue.

At the California Coastal Commission Hearing, August 4-6, 1981 the commission approved as a condition of the permit plans for a construction of drains to control run-off into the canyon. The revised plans included provisions for dealing with run-off from the project's 300,000 gallon water tank.

The gabions and channeling in the canyon is the result of the requirements of both the County and Coastal Commission for the development to proceed (Exhibit 2).



Early Stages of Erosion



SAND DOLLAR BEACH **Sanitary Sewer System** **Exhibit 1**

SOIL

“The site (Canon Del Sol) consists entirely of sand material with variable amounts of silt and clay. Generally the upper six to twelve feet have been affected by water percolating through the soils. Fine-grained particles filtering through the sands in this manner have produced an increase in clay content with depth from a trace of clay near the surface to a clay binder which varies in depth from six to twelve feet across the site. This concentration of fines in the upper soils, along with a moderate amount of iron-oxide cementation gives these sands their ability to temporarily stand in nearly vertical cuts as evidenced by the steep-walled gully in the west central portion of the site. However, these same cemented soils are subject to erosion due to surface wash and this erosion factor is significant in developing this site. Surface water running over the edge of the gullies will continue to cause a gradual slope retreat. Predominating properties of the site soils are their low plasticity and cohesion, moderate amount of chemical cementation, and their high erodibility.”³ In drilling to depths of up to 50’ no ground water was encountered during their investigation.

The Soil Engineer’s recommendation stated, “Due to the fact that the entire parcel drains directly into the arroyo/canyon it is imperative that all surface drainage be collected in lined ditches with catch basins before encroaching closer than 50 feet to the existing arroyo/canyon slopes. The surface drainage should be collected in an underground system and discharged through an energy dissipating structure in the bottom of the natural drainage course.”⁴

On December 14, 2005 Richard Casale, District Conservationist, CPESC, USDA Natural Resources Conservation Service, met with Committee Members and Chris Spohrer, California Department of Parks and Recreation. His suggestions and comments are attached to this report (Appendix A). “Casale reinforced that this area is particularly susceptible to erosion. He commented, “Minimize soil disturbances, especially excessive cuts into slopes when doing future work in or around the arroyo to help prevent destabilization. Slopes are more susceptible to failure when soil or vegetation is disturbed and/or when drainage is altered causing increased or concentrated runoff over the slope. If cuts or changes are made in the slope for future property improvements, land and habitat restoration, then these areas should be protected, retained and/or re-vegetated as appropriate.”

In addition, Casale emphasized that it is important to monitor and maintain the gabion basket grade control check dams in the bottom of the arroyo/canyon to ensure their proper operation and function (Exhibit 2). Deficiencies should be corrected promptly. He pointed out a weakness in the system, which is a lack of an inlet control device for the underground pipe outlet in the arroyo bottom. He recommended installing this device 5-6 feet upstream of the culvert entrance to catch debris.

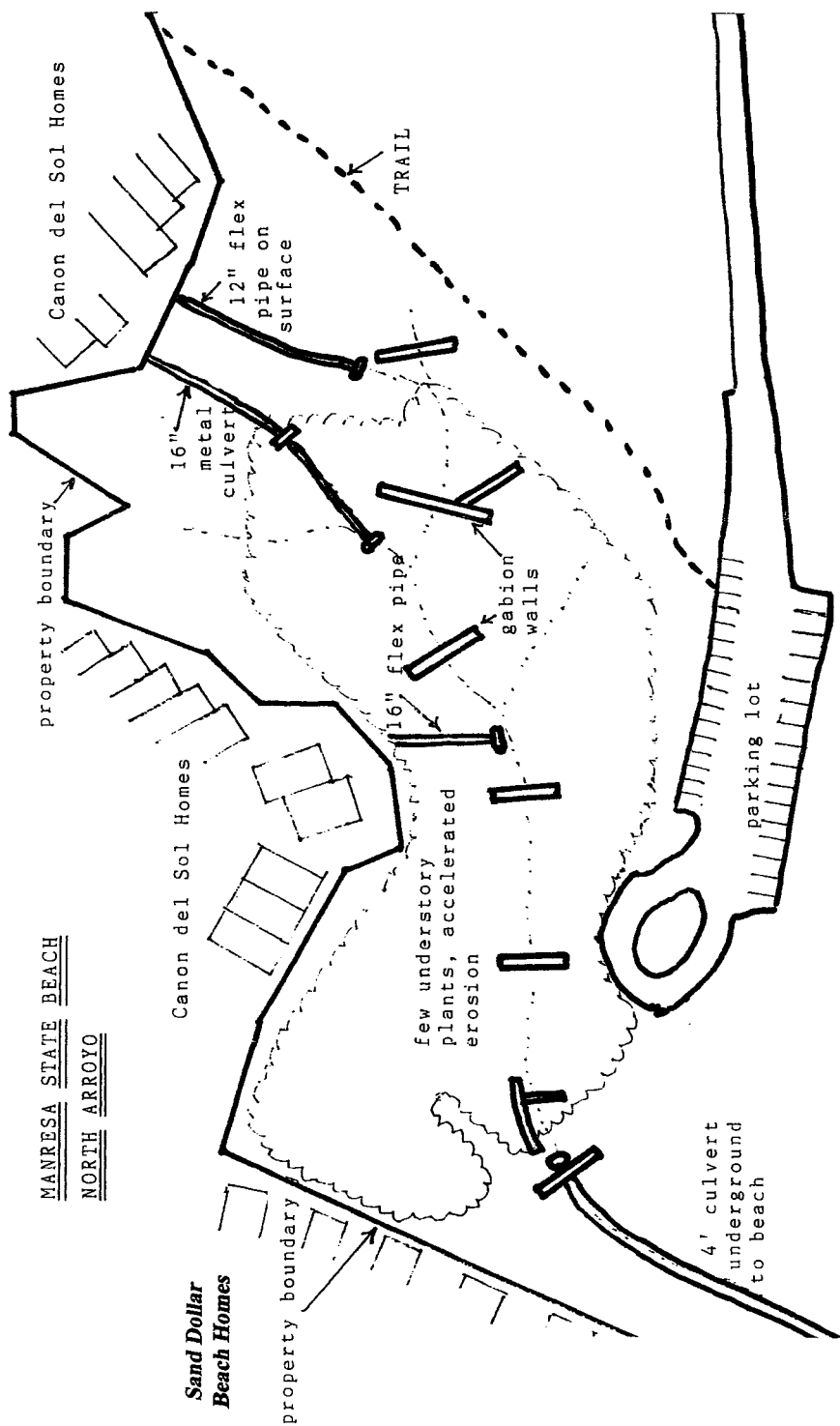
According to Casale’s comments, the difficulty in changing an area is nature. Since such a change usually takes many years, frequently a severe natural storm will interrupt the conversion. This past winter’s storms give an example. Please see the adjacent picture of a bluff landslide that occurred on the second property south of Manresa Uplands (Exhibit 3). The owner’s attempt to stabilize the cliff failed after approximately three years of successful effort to introduce Monterey Cypress

In addition to water, wind is a destructive force on the arroyo’s/canyon soils. “Fine soil particles will move easily in the wind when velocity exceeds about 13 miles per hour. Windbreaks can significantly reduce wind speeds for a downwind distance as much as 10 to 20 times the height (H) of the tallest trees.”⁵

³ Terrasearch, Inc. Soil, Foundation and Geological Engineers. Project No. 616-1, 21 June 1978

⁴ Terrasearch, Inc. Soil, Foundation and Geological Engineers. Project No. 616.1, 21 June 1978

⁵ “Conservation Trees For Your Farm, Family & Future”, The National Arbor Day Foundation



Gabion Installation
Exhibit 2



Severe Beach Bluff Erosion - South of Manresa Uplands State Park

Exhibit 3

photo by H. Lucht

On the north slope of the canyon, adjacent to Sand Dollar, Eucalyptus trees and ice plant have protected this highly fragile soil. Other than the one slide at the toe of the bank caused by Canon Del Sol's development, there has been no discernible erosion in over 35 years. As mentioned in Casale's report, "Eucalyptus trees are somewhat shallow rooted with the exception of one larger tap root (Exhibit 4). Their surface root system can spread 40-50 (feet) from the trunk. They are considered trees that can take up a lot of water out of the soil which can be a good thing on slopes with excessive subsurface moisture conditions."



Eucalyptus Globulus Root System

Exhibit 4

photo by Martin Sanchez Acosta, Intra-Concordia 2004

SEWAGE

There are two separate but contiguous sewer plants for Sand Dollar Beach homes and Canon Del Sol condominiums. Canon Del Sol's plant is adjacent to the first row of condominiums, west side, and lots 83, 84 of Sand Dollar Beach. This is a gravity flow plant and the discharge is dissipated in caisson pits (vertical leaching) in a street island inland in front of the first row of condominiums.

Sand Dollar Beach's plant is uphill from the Canon Del Sol plant (Exhibit 5 and Exhibit 6). The caisson pits are up from the plant. The sewage reaches the plant via two pump houses and this line is at the rim of the arroyo/canyon.

It is our understanding that the sewage for Manresa Uplands Day Parking and the two camp ground shower buildings is processed by septic tanks and leach fields.

The peak sewage flow for Sand Dollar Beach Wastewater Treatment Facility is highest in June, July and August. Canon Del Sol's usage does not parallel exactly, but they too have increased flows in July, August and September (Appendix B).

An interesting aspect of Eucalyptus is their trait to survive with little water. Conversely, they have the ability to absorb large amounts of water if available. This ability is compatible with utilization of high sewage flow in summer months in this particular area.

AIR

Whether there is climate change, and whether it is natural or man-made, this much is certain, trees play a very important and interesting role in the earth's carbon cycle. "On one hand, the loss of forest on a global scale to other uses (deforestation) is responsible for up to one-third of carbon emissions to the atmosphere, and ranks second only to the burning of fossil fuels as a source of CO₂ emissions. On the other hand, forest serve as a huge carbon sink: they capture CO₂ from the atmosphere through photosynthesis and store it as carbon in wood and other carbon-based compounds in soil, in understory plants, and in the litter on the forest floor."⁶

Earlier this year, Governor Arnold Schwarzenegger signed an executive order calling for the reduction of California's greenhouse gas emissions by approximately 30 percent by the year 2020. Subsequently, the California Legislature passed AB32 intending to reduce greenhouse gas emissions to 1990 levels by 2020. The Governor signed the bill on September 27, 2006.

Growing trees primarily consume solar energy, carbon dioxide, water, soil nutrients and dissolved minerals. "Trees, 'inhale' CO₂ from the air returning pure oxygen."⁷ This is photosynthesis.

According to Dr. Roland Dute, professor of Biological Sciences, Auburn University, trees not only produce oxygen but they improve our environment. "Trees absorb odors and pollutant gases (nitrogen oxides, ammonia, sulfur dioxide and ozone) and filter particulates out of the air by trapping them in their leaves and bark. Trees also absorb carbon dioxide from the atmosphere, removing and storing the carbon while releasing the oxygen back into the air. Trees also help reduce erosion – on hillsides or stream slopes, trees slow water runoff and hold soil in place.

⁶ Economics of Climate Change and Forest Carbon Sequestration, Robert J. Moulton, Southern Research Station, John M. Pye, Southern Research Station http://www.srs.fs.usda.gov/econ/research/std44_8.htm

⁷ "Water & Air Quality", California Forest Products Commission



Canon Del Sol - Sewage Treatment Plant
Exhibit 5



Exhibit 6

Current tree view for day use visitors

**Removal of trees on the right will open the view to
Canon Del Sol's sewer plant**

“One estimate indicates that a large tree whose trunk is 39 inches in diameter at breast height releases 0.67 pounds (0.31 kilograms) of oxygen per day. A smaller tree of 9-12 inches diameter at breast height releases only 0.13 lbs. (0.06 kg) per day. For comparison, according to NASA, a typical adult would use 1.85 lbs (0.84kg) of oxygen gas per day in the process of respiration. From these numbers you can see the importance of trees to oxygen production on earth.⁸ According to the web site <http://www.treepeople.org/>, in one year an acre of trees can provide enough oxygen for 18 people. One acre of trees removes up to 2.6 tons of carbon dioxide each year. Manresa Upland’s Eucalyptus grove is a component of this process.

PLANT AND WILDLIFE HABITAT

The original General Plan for Manresa Uplands called for land in the southern bowl (35 acres) to be set aside for re-vegetation with native plant species and also to serve as a wildlife habitat. This protected area would provide an educational experience as a working model of native plant and wildlife. Additionally the potential exists for this to serve as a native plant material resource or gene pool for the Monterey Bay area.

This is a similar practice that is in use now at Filoli, a National Trust Property in Woodside. In their particular case, the gene pool or germ plasma protected are many varieties of orchard trees of the 1920’s, both pome and stone, plus vitis labrusca, American grape stock, that saved Europe’s wine industry in 1863 from phylloxera.

The General Plan also pointed out that the cliffs at Manresa are subject to severe erosion. It recommended shrub planting and other erosion control methods be quickly implemented. It also stated that Article 5 of the Coastal Act requires environmentally sensitive areas to be protected from visitor use and park development.⁹

We are aware that *Chorizanthe robusta*, (robust spineflower), has been found on Manresa Uplands. It is our understanding that the area concerned is the front facing cliff opposite Sand Dollar. This plant is classified federally as endangered. We respect this concern.

From a non-scientific view, we have observed the occasional monarch butterfly, bees, other insects, owls, raptors, various birds, green tree frogs, salamanders, rabbits, voles, a bobcat, and gophers.

EUCALYPTUS-THE INVITED ÉMIGRÉ

As buildings reflect the history of California so do trees. The Eucalyptus is not a native but it is not an uninvited interloper. The Eucalyptus embodies the exuberance of an era, California’s gold rush followed by the settling of immigrants from other states and the world. Then in turn, these people turned California into farms, orchards, truck gardens, small towns and cities. Always towering in the landscape from San Diego County in the south to San Francisco’s Golden Gate Park grew the ubiquitous Eucalyptus Globulus.¹⁰

⁸ http://www.auburn.edu/communications_marketing/askaubie/101205html Dr. Roland Dute, professor of Biological Science, College of Sciences and Mathematics, Auburn University

⁹ Manresa State Beach General Plan, October 1979, Page 76

¹⁰ “Trees and Shrubs of California Gardens”, Charles Francis Saunders, New York 1926 Robert M. McBride & Company

It is surmised that the first trees in California were raised from seeds brought into San Francisco from Australia/Tasmania. "...the fact is that before the Civil War broke out, Eucalyptus trees were to be seen in many parts of California and were cherished because of their marvelous rate of growth. A hardwood tree that shot up before your eyes at the rate of a foot or more a month was worth having on the place to show callers."¹¹

This was a time when firewood for cooking and heating was important. Eucalyptus became windbreaks for the farmers' crops, shade for farmhouses before the age of air conditioning but generally failed as a source of lumber. The wood grain did not grow straight as it did in the southern hemisphere. A peak period in the planting of Eucalyptus occurred around 1870. Ellwood Cooper from the east settled in Santa Barbara and planted over 50,000 Eucalyptus. Another enthusiast, Abbott Kinney of L.A., Chairman of the State Board of Forestry from 1886-1888, published a book in 1895 "Eucalyptus" extolling their virtue.

These were not just useful trees. These were beautiful trees. The Art Nouveau era of the 20th century embraced these Eucalypti with open arms.

EUCALYPTUS GLOBULUS

Blue Gum is related to the Myrtaceae family. It is a tall (150-180 feet) aromatic, straight growing tree with bark that sheds in long strips, leaving contrasting smooth surface areas. Adult leaves are waxy blue sickle shaped and hang vertically. It reproduces by seed and resprouting. Locally, flowering occurs from November to April. Flowers are pollinated by insects, bees and humming birds. Fruit ripens from October to March, about eleven months after flowering. Seed set begins at approximately four to five years of age. Good seed crops are produced in most locations at three to five year intervals. When ripe, seeds open immediately and are dispersed by wind.¹²

PRO

- EROSION CONTROL BY ROOTS AND DUFF
- DROUGHT TOLERANT
- PHOTOSYNTHESIS – OXYGEN
- WINDBREAK
- SCREENING/PRIVACY
- IMPORTANT WINTER SOURCE OF FOOD FOR BEES, NATIVE & HONEY
- COASTAL AREA-SHAPE OF LEAVES PROVIDES FOG DRIP TO GROUND
- AROMATIC LEAVES SOURCE OF EUCALYPTUS OIL, ANTISEPTIC
- DIVERSITY IN A CHANGING CLIMATE
- BIRD HABITAT
- STORES EXCESS WATER IF AVAILABLE
- LITTER AND DUFF PREVENTS MOST UNDERSTORY PLANTS

CON

- LEAVES AND BARK STRIPS ARE FLAMMABLE
- MODERATELY INVASIVE
- NOT SUITABLE FOR SMALL LOTS

¹¹ "Trees and Shrubs of California Gardens"

¹² California Invasive Plant Council, <http://ucce.ucdavis.edu/datastore/detailreport.cfm?usernumber=48&sur>

- DEBRIS
- LITTER AND DUFF PREVENTS MOST UNDERSTORY PLANTS
- NOT SUITABLE FOR WETLANDS

FIRE RESISTANT PLANTS

In reality, there is no such thing as a fireproof plant. There are plants that are less prone to burn than others. According to the Forest Stewardship Help Line, the single most important factor in creating a relative safe fire zone is the amount of fuel load and spacing both vertical and horizontal.

The factors that influence the combustion characteristics of plants include age, moisture content, dead material, surface-to-volume ratio, geometry, total volume, chemical content and plant maintenance. "Poorly maintained landscapes can easily become fire hazards even if many of the plants are favorably recommended for fire performance."¹³ Not to be overlooked is the effect of weather, hot days and high winds.

Based on all the information garnered in this study, the canyon's best protection from fire is the extensive ice plant area (*Carpobrotus edulis*) in the ocean mouth of the canyon. Also it grows in sections of the canyon slope adjacent to Sand Dollar homes. It is out of favor as it is an introduced plant, however it has naturalized along the coast of California. In its naturalized setting it requires no care or supplemental water.

RESPONSE TO A FIRE AT MANRESA UPLANDS

1. On an initial alarm during fire season, both Aptos-La Selva Fire District and CDF would respond to an Uplands fire. Additional resources from other agencies would be requested if needed.
2. Aptos La Selva FPD would send three engines, a water tender, and a battalion chief. During fire season, CDF would also send 4 engines, and if necessary, a fire crew, a helicopter, air tankers, and a battalion chief. The canyon is officially designated a mutual threat zone. Where resources are tactically deployed is decided by the incident commander based upon fire location, and behavior variables.
3. The canyon is in a Local Responsibility Area, i.e. Aptos-La Selva FPD jurisdiction.
4. Response times for the Aptos-La Selva resources would range from about 5 minutes for the first engine to arrive to about 12 minutes for all three engines and the water tender. Normally, the first CDF engines to arrive from Corralitos will have a 15-minute travel time.
5. Two fire hydrants are located on Sand Dollar Lane.

¹³ The University of California Forest Products Laboratory. "Defensible Space Landscaping in the Urban/Wildland Interface: A compilation of fire performance ratings of residential landscape plants", July 1997.

THE REALITIES

As State Parks removes trees from the Eucalyptus grove, it has allowed the spread of pampas grass (*cortaderia jubata* or *cortaderia selloana*). The canopy and the oils from the Eucalyptus trees previously prevented this. The south side of Canon del Sol has extensive areas of pampas grass on park property (Exhibit 7). This plant is exceedingly flammable and more invasive than Eucalyptus as rated by the California Invasive Plant Council. Please see the following exhibit for the beginning of this incursion as well as the area to the south of Canon del Sol on State Park property (Exhibit 8).

The grove in the canyon grew as a community. When one tree is removed, it can affect the balance detrimentally. We understand that State Parks has experienced this in the southern bowl of the park following construction of the road to the beach.

State Park's attempt to naturalize the fragile bluffs is experiencing some success. Success cannot be achieved with the continued intrusion of people. Perhaps because of budget constraints, the fencing of this area has been in disrepair for well over two years. Obviously, the fence was cut by intruders (Exhibit 9). Unless the fence is kept in repair, the bluffs will be damaged by foot traffic. While it does not have the appearance of new fencing, repairs by "sistering" might be an economical solution.



New Area of Invasion by Pampas Grass
Exhibit 7



Manresa Uplands State Park
Extensive Pampas Grass
Exhibit 8



Fence Disrepair
Exhibit 9

THE POSSIBILITIES

This is a wonderful opportunity for State Parks to preserve and enhance a very important segment of history. It provides a feeling that most Californians will never know — the luxury of space with the beauty of the past. The 2000 Census showed there were 33,371,648 people sharing California's space.

This land when acquired by donation and purchases came in the guise of abandoned farmland not wild land. The natural condition of the land probably disappeared in the era of Spanish control. Santa Cruz, in the past, was well known for cattle and its leather industry.

Today, the park carries a designation of a state beach and is primarily used for the public's enjoyment. This gives State Parks the flexibility to retain this past rather than eliminate the Eucalyptus. Fortunately, the State Park's "Operational Manual" allows exceptions to removal "(Section 34) Except in those areas where it is perpetuated for resource management or historical reasons,..."¹⁴ In maintaining the Eucalyptus grove, it will be complying with the restrictions of the State Coastal Commission during the development of Canon Del Sol. A secondary benefit will be helping to eliminate the "Green House Effect".

SAND DOLLAR BEACH HOMEOWNERS ASSOCIATION'S RECOMMENDATIONS

1. We agree that new plantings should be natives. The fragile soil will be best protected by inserting plantings that will be interspersed amongst the existing vegetation on the slope behind several houses (Appendix C). No plants will be removed except at the new plant area. The planting will minimize any increase in fuel load. The native plants selected are fire resistant and should need no water after the first year.

Planting should be done after the first rains this fall, 2006. We can purchase the plants but would need to work cooperatively with your crew to do the planting. At this same time, the pampas grass in this area of the canyon should be removed.

2. For the significant reasons stated in this report, retain the Eucalyptus Grove with appropriate regeneration allowed.
3. To provide for fire safety this year, our Association worked with you and the fire department to prevent laddering of the fuel in the grove. The CDF crew is able to manage the ground pruning. In the spring of 2006, we paid for the high pruning of the trees that affect the fire hazard by our homes. This arrangement seems practical. We recommend that we continue the cooperative practice of pruning the grove every 3-5 years to enhance fire safety and to ensure prompt removal of the debris which can become ladder fuel.
4. To implement Richard Casale's recommendation to install an inlet control device (Appendix A, page 5, #6).
5. To improve signage on the bluffs and repair and maintain all bluff fencing.

¹⁴ Chapter 18 "Departmental Directives on Resource Management for the California State Park System", 1831, Operational Manual, May 1979

6. To consider forming a committee similar to the federally sponsored "Coordinated Resource Management Plan (CRMP)". The group's purpose would be to monitor the area, cooperate in planning, and where feasible cost-share mitigation measures. The group would be chaired by a representative from California Department of Parks and Recreation, Santa Cruz District and include other members from the neighboring communities.

We thank you for your outstanding cooperation during this project. Chris Spohrer has been a good representative of State Parks.

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Felton, Ca 95018

Charles Lester
Deputy Director of Central Coast
California Coastal Commission
725 Front Street, Suite 300
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Dave Muffly
ISA Certified Arborist
Davemuffly@yahoo.com

Kirk Lingenfelter
Pajaro Coast Superintendent
California Department of Parks and Recreation
144 School Street
Santa Cruz, Ca 95060

Tom Crosser, Chief Officer
Aptos/La Selva Fire Protection District
6934 Soquel Drive
Aptos, Ca 95003

Richard Casale
District Conservationist, CPESC
USDA Natural Resources Conservation Service
820 Bay Avenue, Suite 128
Capitola, Ca 95010

Steve Monowitz
District Manager
California Coastal Commission
725 Front Street, Suite 300
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APPENDIX A
United States Department of Agriculture



Natural Resources Conservation Service
820 Bay Avenue, Suite 128
Capitola, California 95010

(831) 475-1967; 475-3215 (Fax)

December 23, 2005

Sand Dollar Beach Homeowners Association
Mary Ann Basler, Chair
560 Sand Dollar Drive
La Selva Beach, CA 95076

SUBJECT: EROSION CONCERNS – SAND DOLLAR BEACH

Dear Mary Ann:

As a follow-up to my December 14, 2005 on-site visit to the Sand Dollar Beach neighborhood located in La Selva Beach, I am happy to provide you with the following report. *Note: Dave Mack, Sand Dollar Beach property owner, and Chris Spohrer, California State Department of Parks & Recreation, were also present during this on-site visit.*

NATURE OF REQUEST

Both the Sand Dollar Beach Homeowners Association and the California State Department of Parks & Recreation made requests for USDA Natural Resources Conservation Service (NRCS) assistance in evaluating potential soil erosion and slope instability issues in a coastal arroyo adjacent to the Sand Dollar Beach Homes Development in La Selva Beach. Of particular concern to homeowners is the effect continued removal of mature Eucalyptus trees in the arroyo will have on soil and slopes. The area is owned and managed by the California State Department of Parks & Recreation.

BACKGROUND DATA / SITE CONDITIONS

Baywood Loamy Sand (106) 15-30% slope is the predominant soil type mapped within the neighborhood and adjacent arroyo, according to the Santa Cruz County Soil Survey published by NRCS (formerly the Soil Conservation Service), 1980. Refer to enclosed soil summary for details on this mapped soil type.

Note: Erosion hazard can be very high when these soils are disturbed, especially on steeper slopes. Information contained in the Santa Cruz County Soil Survey should not be used in place of an on-site soils investigation if specific soil information is needed in the design of roads, buildings or other structural improvements. Soil survey information is intended for general planning purposes and is not a substitute for a soil engineering report or a site-specific soil evaluation.

The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment.

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The Homeowners Association provided NRCS with historical information related to previous soil investigations by Terrasearch, Inc. (June 21, 1978), Reynolds & Associates (May 1 & August 30, 1972), The Maresa General Plan (1979), and issues regarding sewage disposal by the Santa Cruz County Department of Public Works (June 21, 1978). Refer to these documents for further details.

Factors that can contribute to soil erosion and slope instability include:

1. Erosive soil types combined with steep slopes.
2. Unstable geology.
3. Fire.
4. Removal and/or disturbance of vegetation by existing and planned land use activities.
5. Intense rainfall or soil saturation conditions caused by prolonged rainfall events.
6. Over irrigated slopes and/or the concentration and diversion of surface runoff without proper velocity dissipation or outlet.
7. Excessive cuts into the slope, especially on sandy soils or soils with a subsurface clay layer.
8. Roadways and other access routes, including trails, especially on steep grades, causing water to concentrate in wheel tracks, or other depressions and erode the soil.
9. Wildlife trails and burrowing animal channels that intercept and channel runoff causing soil to erode.
10. Stream flows or wave action if area of concern is adjacent to a stream, waterway, lake shore or ocean.
11. A combination of any number of factors above.

Natural resource issues and some related impacts associated with soil loss include:

1. Loss of fertile top soil.
2. Sedimentation and degradation to down stream water quality.
3. Damage to fish and wildlife habitat.
4. Potential for invasive, non-native plant species to colonize disturbed soil areas.
5. Degraded landscape appearance.
6. Lower property values.
7. Safety hazards
8. High cost to restore eroded and disturbed slope areas.

Vegetation on site mostly consisted of Eucalyptus trees, pampas grass, ice plant, poison oak, annual grasses, coyote brush and a variety of other native and non-native species. Ice plant on slopes below homes appeared to be well established. Some areas had sparse cover due to previous disturbance by burrowing animals, and other factors contributing to erosion and bare soil conditions (see factors below). There is a system of grade control gabion check dams in the

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bottom of the arroyo that appeared to be doing an excellent job of controlling down cutting, head cutting and other related erosion. I believe the check dams were installed as part of mitigation during the upslope development of the Canon Del Sol subdivision. The channel at the bottom of the arroyo empties into an underground outlet pipe that in turn outlets directly onto the beach. At the time of this visit there was no inlet protection for this outlet pipe.

One home owner adjacent to the arroyo recently disturbed soil at the top of the slope to install new landscape plants and irrigation. It was my understanding, that most, if not all, the properties within the Sand Dollar Beach development drain toward the street and/or release collected roof runoff onto the street and not into the arroyo.

Slopes within the arroyo are quite steep and in excess of 25% over most of the area. The steepness of slope and sandy soil type make this site particularly prone to erosion. Additional conditions/factors, when present, will likely make the hazard even greater. These factors include: intense rainfall, especially following ground saturation; removal and/or disturbance to plant cover, particularly deep rooted plants like shrubs and trees; disturbance to fine cemented clay lenses in the soil; concentrated or increased volumes of runoff releasing over the tops of slopes from homes and properties above; gophers; and failures of any existing drainage and erosion control devices such as roof runoff systems on homes, the gabion grade control structures or underground pipe outlet in the bottom of the arroyo.

Chris Spohrer with the California Department of Parks & Recreation explained the Department intent in removing Eucalyptus trees from the arroyo. He said it was part of the Department long range management and restoration plan to remove invasive species within the State Park and replace with native species, some of which would re-establish on their own. He assured property owners present and NRCS that this would be done over many years and with erosion control and erosion prevention in mind. The Department also seemed to be very open to neighbor concerns, and willingness to accept input from NRCS.

Eucalyptus trees are somewhat shallow rooted with the exception of one larger tap root. Their surface root system can spread 40-50 feet from the trunk. They are considered trees that can take up a lot of water out of the soil which can be a good thing on slopes with excessive subsurface moisture conditions.

Large trees such a Eucalyptus can sometimes have a detrimental effect on soils, slopes and other natural resources from various perspectives. Depending on the condition of the trees and their location relative to the slope, trees can provide unnecessary load (weight) on steep slopes particularly if they have been compromised by erosion, disease, injury or land use activities. It is generally a good idea to remove or prune trees (as appropriate) on steep unstable slopes when one or more of the following conditions exist: A large percentage of the tree's root system is exposed; or the tree is dead, dying or diseased and/or is showing signs of falling or failure, especially if the tree failure creates a safety issue, causes severe slope damage, impairs an important water course or damages nearby property improvements, including homes and buildings. *Note: It is always a good idea to consult with a licensed arborist and/or a*

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geotechnical specialist, registered geologist and/or erosion control specialist, as appropriate, before deciding to remove trees on potentially unstable soil and slopes.

Eucalyptus trees are not native to the area and do change the ecology of an area reducing biodiversity of species. In fact, an entire grove of Eucalyptus trees can dramatically change an area over the years by out-competing almost all other vegetative species, both native and non-native with very few exceptions. The trees are prone to freezing and can be a fire hazard in certain areas especially where ladder fuels are present. Eucalyptus trees do, however, provide a substantial canopy and a thick duff/slash/leaf litter layer that does help protect the soil from direct rain drop impact and from surface runoff. The trees also provide scenic value, windbreak, and temperature control for people living nearby or in their view-shed and habitat for insects and wildlife.

RECOMMENDATIONS (For consideration by both cooperating parties where appropriate)

1. Monitor and maintain all roof and yard runoff control systems on or around homes that possibly drain into arroyo to prevent excessive runoff and infiltration of water on potentially unstable slopes, and to help prevent erosion. *Note: Roof gutters and down drains should be over-sized to minimize maintenance especially where there is dense tree cover and a high potential for leaf litter and clogging.* Properly installed gutter guards can also help reduce maintenance.
2. Any future bare or disturbed soil should be re-vegetated or seeded with an appropriate native or non-invasive erosion control grass mix and covered with a two-inch layer of weed-free straw prior to the rainy season. Plant lightweight, deep-rooted, native shrubs and/or ground covers on re-shaped soil and slopes. Refer to enclosed information for further details.

Note: Seeding and mulching should be done in the fall before November 15, unless irrigation water is available. Mulch by itself can provide some protection if it is too late in the year to plant grass. Grasses are considered to be temporary protection. Grass may only be appropriate where there is adequate sunlight. If permanent cover is desired then consider planting deeper rooted, native plants or other non-invasive erosion control vegetation.

3. Consider inter-planting ice plant with better deep-rooted, drought tolerant shrubs and groundcovers, especially in areas where ice plant begins to create load on the slope contributing to shallow slope failures and erosion. Discourage ice plant from spreading, especially on slopes. Refer to enclosed list of plants that provide better long term protection. Also, refer to the enclosed list of landscape contractors that are also Certified Professionals in Erosion and Sediment Control for a specific planting plan and installation assistance if desired.

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4. Minimize soil disturbances, especially excessive cut into slopes when doing future work in or around the arroyo to help prevent destabilization. Slopes are more susceptible to failure when soil or vegetation is disturbed and/or when drainage is altered causing increased or concentrated runoff over the slope. If cuts or changes are made in the slope for future property improvements, land and habitat restoration then these areas should be protected, retained and/or re-vegetated as appropriate. *Note: Retaining structures need to be designed by a licensed engineer.* Consult with a registered geologist, soil engineer, or other geo-technical specialists for questions and concerns related to inherit geology and slope stability.
5. Maintain as much existing native vegetation as possible (especially on steeper slopes). Remove non-native invasive species such as pampas grass and re-plant with more acceptable, native plants. Refer to enclosed list for possible plant choices.
6. Install an inlet control device (debris barrier) upstream of the underground pipe outlet in the arroyo bottom to capture larger debris (tree branches, etc.) that might be carried in runoff and plug the pipe and/or impact flows. Install two metal fence posts appropriately 5-6 feet upstream of the culvert entrance equal distance across the channel to catch debris. Contact with NRCS if further details are desired.
7. Manage Eucalyptus tree over time, removing high hazard trees when necessary and discouraging new growth particularly around the perimeter of the existing grove. If tree removal and arroyo restoration continues to the point where all trees are eventually removed, then the restoration should occur over the longest time span possible providing a slow transition. In the meantime, other native plant materials can be introduced, including inter-planting areas such as ice plant regions with deep-rooted erosion control plant materials. Trees growing at the toes of slopes and in historic slide debris tend to have a stability effect in these areas. If and when tree removal occurs on unstable slopes and soil masses then it should be done cautiously not to disturb the integrity of these critical areas.

Note: NRCS makes this recommendation in the spirit of short term erosion control and for slope stability and not necessarily because it is the most cost effective way to restore the area back to a native condition. It may, in fact, be more cost effective to clear cut and replant all at once, but the disturbance to soil, slopes, and resident wildlife may all suffer in the short term.

8. Property owners along side the arroyo need to be made aware of the potential hazard irrigation, land use and drainage changes pose at the top of the slope. Over watering and uncontrolled runoff from impervious surfaces (patios, decks, roofs, etc.) can cause ground saturation and/or surface runoff that can trigger future slope failures and soil erosion even without removing any more Eucalyptus trees. Plants that are used for landscaping at the top of the slope should be deep-rooted and drought tolerant only requiring a minimum of irrigation during establishment. The Homeowners Association

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- may want to make a list of plants available and guidelines for irrigation and drainage control to slope-side residents wishing to re-landscape their yards.
9. Monitor and maintain the gabion basket grade control check dams in the bottom of the arroyo to ensure their proper operation and function. Correct deficiencies as soon as detected. *Note: When grade control structures fail they usually fail catastrophically reactivating erosion and bank instability.*
 10. Refer to information provided on fire hazard reduction. Fire hazard is particularly serious where there is heavy fuel levels and where under brush is growing into the canopies of trees, especially where these conditions exists near homes, buildings and other property improvements.

SUMMARY

It seemed to me that both the Homeowners Association and State Parks have particular needs regarding the site but some strike me to very much the same from my discussions with both parties. I feel it is important to state some of the common ground points at least from my perspective. They are as follows:

COOPERATION. One, if not the biggest barriers to resolving practically any natural resource issue is approaching the issue on a cooperative basis, which I believe is the case in this situation, at least so far.

RESEARCH. I believe both parties are doing a good job gathering as much information as possible in order to make the best and most informed decision(s). I believe the information gathering is not only important for the decision making process but it also helps everyone's awareness and understanding of the issues.

WATERSHED MANAGEMENT. I believe that we are approaching consensus on a number of secondary issues by both parties, including the removal of pampas grass from the area, reviewing runoff from upstream properties and approaching the tree removal and restoration from an ecological and watershed perspective.

PLANNING. I believe both parties feel that any future removal of trees should be done carefully, according to a well thought out plan and over as long of a time period as possible.

VEGETATION PROTECTION. I also heard some agreement and/or at least a willingness regarding the planting and/or replanting of acceptable, native plants where appropriate to protect unprotected soils and/or slopes.

Overall, it seemed that the on-site recommendations made by NRCS (listed above) were well received by the Sand Dollars residents present. Unfortunately, the representative from State Parks was not able to stay for the entire NRCS visit and did not hear all the suggestions that were

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made, however, State Parks will also receive a copy of this letter.

IMPORTANT NOTES

The Natural Resources Conservation Service (NRCS) makes no representation on the existence or non-existence of any utilities. Contact the underground service alert office at 1-800-642-2444 for information regarding location of underground utilities. The Homeowners Association and/or individual landowners, and/or the California Department of Parks & Recreation, as applicable, are liable for any damage resulting from disturbance of utility lines when implementing any recommendation made by NRCS that involves the excavation or movement of soil.

The landowners must assume responsibility for any further necessary technical assistance, for compliance with any laws or ordinances, and for obtaining all necessary permits relating to the implementation of any recommendation made by NRCS.

NRCS is a non-regulatory federal agency under the United States Department of Agriculture. Technical assistance is made available, through a mutual agreement with the Santa Cruz County Resource Conservation District. NRCS is an equal opportunity employer and provider.

If you should have any questions regarding my field visit, this report, any of the enclosures then please do not hesitate to contact me.

Sincerely,

USDA NATURAL RESOURCES
CONSERVATION SERVICE

Richard Casale
District Conservationist
Certified Professional Erosion and Sediment Control Specialist (CPESC) #3

Enclosures

Cc: Santa Cruz County Resource Conservation District, Capitola
Chris Spohrer, California Department of Parks and Recreation

APPENDIX B

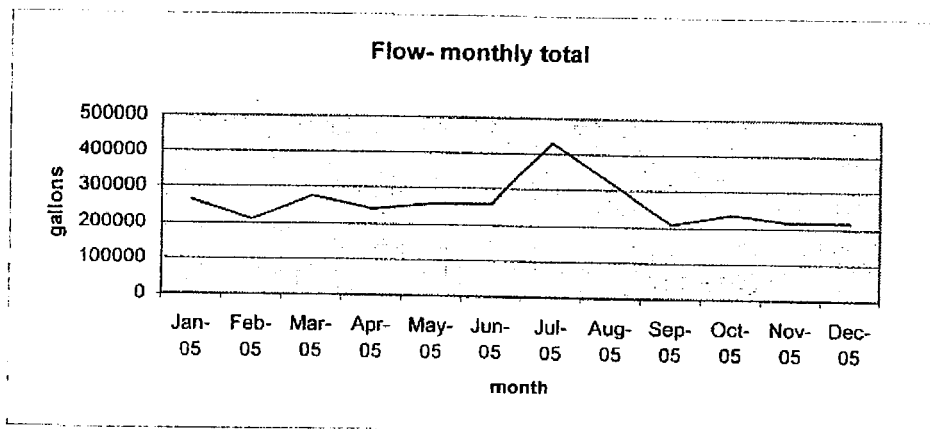
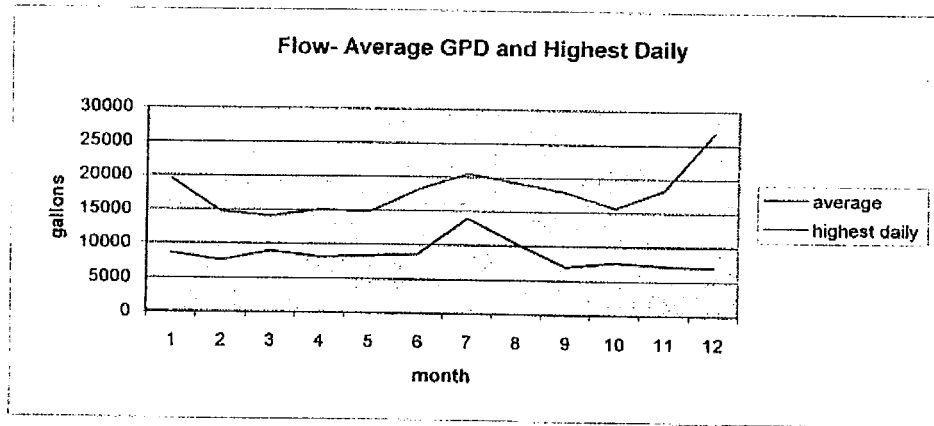
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Regional Water Quality Control Board, Central Coast Region
Second Revised Monitoring and Reporting Program No. 97-10-DWQ
WDID No. 3 440106001
Sand Dollar Beach Wastewater Treatment Facility, Santa Cruz County Service Area No. 5
Annual Report- December, 2005

Flow (measured daily, averaged monthly)

Waste Discharge Requirements- not to exceed daily average of 25000 gal. per month

	Average GPD	Total	Highest Daily
January-05	8541	264780	19490
February-05	7529	210810	14680
March-05	8932	276900	14060
April-05	8115	243450	15050
May-05	8359	259120	14800
June-05	8651	259530	18150
July-05	13924	431660	20510
August-05	10304	319410	19220
September-05	7011	210340	17900
October-05	7,703	238780	15670
November-05	7,258	217750	18360
December-05	7,051	218570	26740
Annual Flow		3151100	



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Regional Water Quality Control Board, Central Coast Region
Second Revised Monitoring and Reporting Program No. 97-10-DWQ
WDID No. 3 441010001
Canon Del Sol Wastewater Treatment Facility, Santa Cruz County Service Area No. 5
Annual Report- 2005

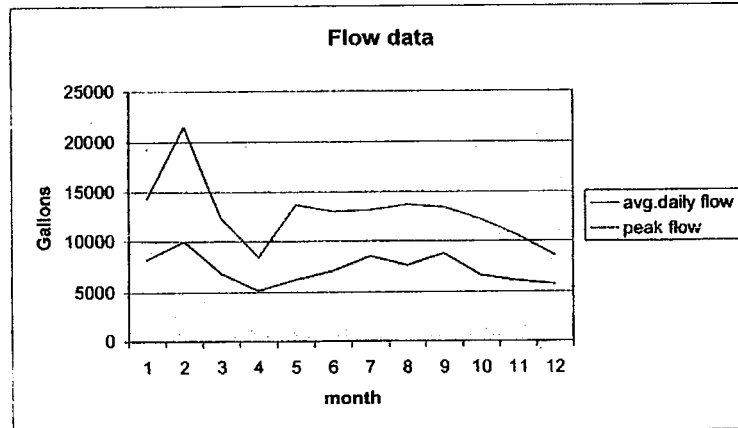
Flow (measured daily, averaged monthly)

Waste Discharge Requirements- not to exceed 30,000 gallons per day of daily flow

	Average GPD	Monthly total	Highest Daily
January-05	8183	253,680	14,280
February-05	9951	278,884	21,480
March-05	6869	212,676	12,260
April-05	5172	155,170	8390
May-05	6257	193,960	13,630
June-05	7089	212,660	12,980
July-05	8479	262,850	13,110
August-05	7586	235,170	13,640
September-05	8736	262,073	13,370
October-05	6,615	205,050	12,150
November-05	6,115	183,450	10,510
December-05	5,747	178,160	8550

Total flow
Average Flow

2,633,783 gal
7216 gal/day



FLOW TOTALS AND AVERAGES FOR CANON DEL SOL TP

	<u>Flow Totalizer</u>	<u>Weekly Ave. Flow</u>	<u>Daily Ave. Flow</u>
September 2005	1,189,440 <u>-928,590</u> 260,850 gals./4	65,213 gals./7	9,316 gpd
October 2005	1,401,390 <u>-1,189,440</u> 211,950 gals./4	52,980 gals./7	7,570 gpd
November 2005	1,593,510 <u>-1,401,390</u> 192,120 gals./4	48,030 gals./7	6,861 gpd
December 2005	1,776,620 <u>-1,593,510</u> 183,110 gals./4	45,778 gals./7	6,540 gpd
January 2006	1,961,730 <u>-1,776,620</u> 185,110 gals./4	46,278 gals./7	6,611 gpd
February 2006	2,125,820 <u>-1,961,730</u> 164,090 gals./4	41,023 gals./7	5,860 gpd

LEACH FIELD @ Cul-De Sac:

4c sump: Ground appears to have sunk about a foot on one side of manhole cover and extending out about 5 feet or so under brush.

Amount of soil required to fill in is estimated at about ½ yard or so.

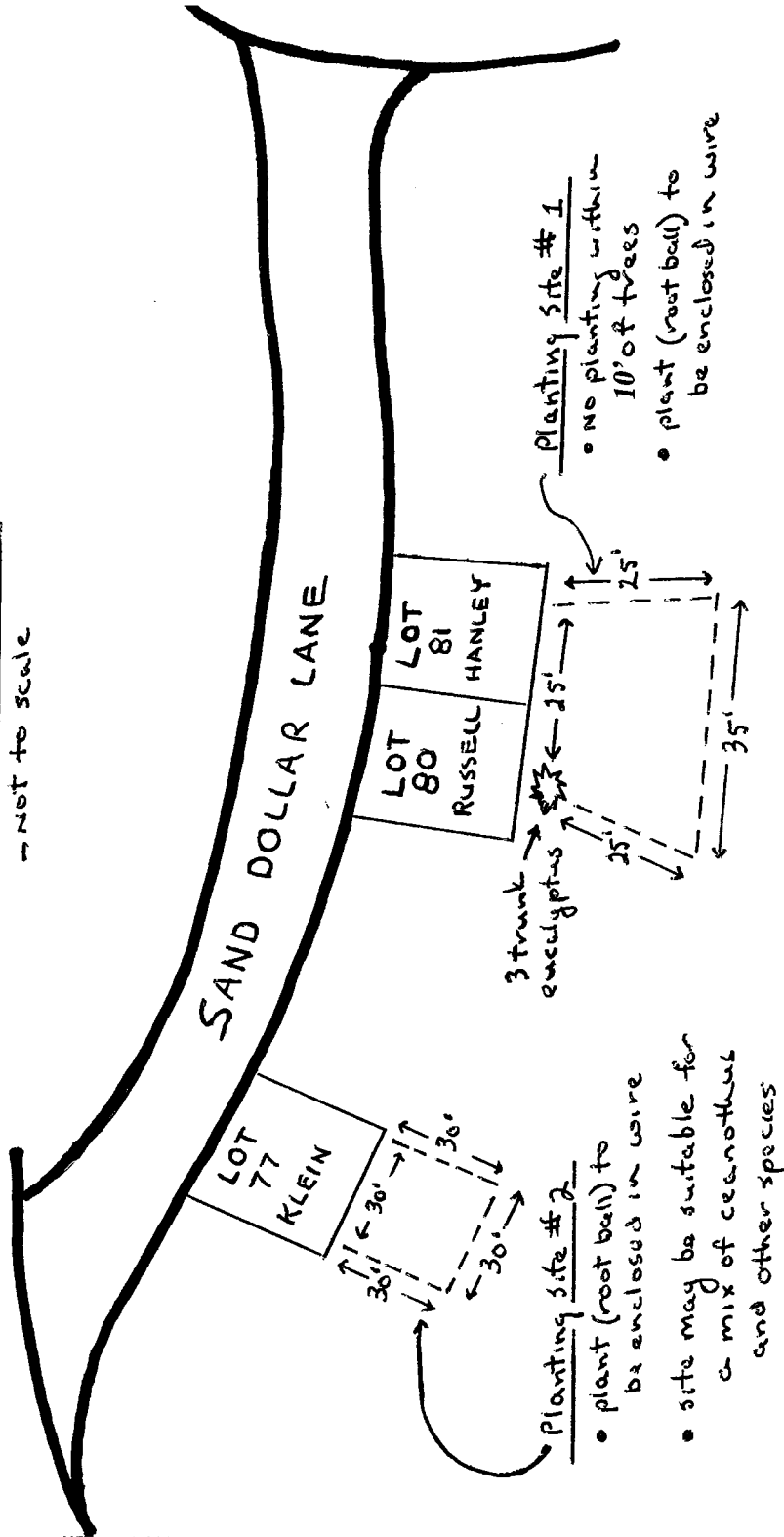
Let me know if you received this attachment.

...Erasmio, *PLANT OF.*

APPENDIX C

-2→

PLANTING SITES - not to scale



APPENDIX C

SDBHOA recommends the following plants for each of the proposed sites:

SITE 1, LOTS 80 & 81, PARK SLOPE, PARTIAL SHADE

1. Toyon (*Heteromeles arbutifolia*)
2. California coffeeberry (*Rhamnus californica*)
3. Lemonade Berry (*Rhus integrifolia*)
4. Sugar Bush (*Rhus ovata*)

SITE 2, LOT 77, PARK SLOPE, FULL SUN

1. Sugar Bush (*Rhus ovata*)
2. California coffeeberry (*Rhamnus californica*)
3. Ceanothus griseus horizontalis "Yankee Point"
4. Coyote bush (*Baccharis pilularis*) "Pigeon Point"
5. See, evening primrose (*Oenothera hookeri*)