DUNE RESTORATION PLAN
MEHDIPOUR PROPERTY

1170 Signal Hill Drive
Pebble Beach, California

Prepared for:

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1.0 INTRODUCTION

This dune restoration plan has been prepared for the 2.17-acre parcel located at 1170 Signal Hill Drive, Pebble Beach, California, known as the Mehdipour Property. The property is situated in an older (ca 1950's) residential subdivision on sandy dune substrates between two existing golf courses: Spyglass Hill & Cypress Point. The property also sits near the base of Signal Hill Dune, a protected remnant of a once more extensive dune system that historically occurred along the Monterey Peninsula shoreline. The historic dune system has been fragmented by sand mining, the construction of roads, golf courses, houses and other development over the years.

The existing house, driveway, landscaping and other residential amenities occupy approximately 0.40-acre of the site on a graded pad adjacent to Signal Hill Road. Several mature trees and shrubs, including Monterey cypress (*Hesperocyparis macrocarpa*), eucalyptus (*Eucalyptus* sp.) and tea tree (*Leptospermum* sp.) are growing as landscape elements along Signal Hill Road and at the edge of the pad near the house.[1] West of the pad, the site slopes down (southwesterly) toward 17-Mile Drive through sandy dune terraces. Most of the undeveloped areas on the property are heavily colonized by non-native European beachgrass (*Ammophila arenaria*) and iceplant (*Carpobrotus* spp.) but there are also limited areas of more native dune habitat.

1.1 Setting

Four general but overlapping and intergraded vegetation types occur on the property: European beachgrass dominant, iceplant dominant, sparsely vegetated open sand, and mixed coastal dune scrub. Figure 2 indicates the general distribution and extent of these vegetation communities and a description of each is provided below.

European beachgrass covers large areas of the lot and is especially dominant on the slopes west of the existing house. It often occurs in pure stands at the exclusion of other vegetation, but is also mixed with non-native iceplant and native coastal scrub elements such as mock heather (*Ericameria ericoides*) and coyote brush (*Baccharis pilularis*).[2] European beachgrass was originally introduced to California in the late 1800s for the purpose of stabilizing dunes but is now considered one of the most pervasive exotic plants currently threatening dune environments on the west coast, driving out native species, reducing biodiversity and altering native dune morphology. The species spreads almost exclusively by rhizomes which form extensive underground systems and can rapidly colonize large areas, especially in sandy substrates.

Iceplant-dominated areas also occur on parts of the property, mostly well downslope of the existing house and pad toward the westerly borders of the lot. Dense iceplant mats largely preclude the establishment of other vegetation, but do allow occasional scattered patches of aggressive colonizers like poison oak (*Toxicodendron diversilobum*) and a few isolated individuals of plants such as seacliff buckwheat (*Eriogonum parvifolium*) and mock heather. Iceplant is also interspersed with other vegetation types throughout the property. The species

[1]Native habitat for Monterey cypress occurs at Cypress Point, just south of the property; however, the trees on the site appear to have been planted as landscape elements.

[2] A solitary Monterey pine (*Pinus radiata*) sapling is also growing in a matrix of beachgrass and iceplant below the house and pad.

Legend

Property Boundary

1 inch equals 1,667 feet

N

Zander Associates Environmental Consultants 4460 Redwood Hwy, Suite 16-240 San Rafael, CA 94903	Site Location Mehdipour Property Pebble Beach, California Date: 6/10	Figure 1

Scale: 1" = 50'

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LEGEND:

- Open Sand
- Beach Grass Dominant
- Iceplant Dominant
- Coastal Scrub
- Existing Residence and Landscaping
- Property Boundary

Vegetation Types
Mehdipour Property
Pebble Beach, California

Date: 6/10

Figure 2

was brought to California in the early 1900s to stabilize soil along railroad tracks and roadways with thousands of acres planted until the 1970s. It has also been promoted as an ornamental plant because of its succulent foliage, bright magenta or yellow flowers and adaptability to harsh (e.g. dry, salty, windy) conditions. Iceplant grows very quickly, producing large, spreading mats. It flowers prolifically and the seeds disburse easily. The plant also reproduces vegetatively; even small pieces of the plant can root and grow easily. Consequently it has invaded foredune, dune scrub, coastal bluff scrub, coastal prairie, and maritime chaparral communities throughout coastal California. It is considered among the most invasive wildland pest plants by the California Exotic Pest Plant Council (CalEPPC), documented as aggressive invaders that displace natives and disrupt natural habitats.

Sparsely vegetated open sand occurs patchily on the property and is comprised of mostly bare white sands that support only scattered dune species, such as beach sagewort (*Artemisia pycnocephala*), mock heather, woolly lotus (*Lotus heermannii* var. *orbicularis*), sand verbena *(Abronia sp.*) and beach evening primrose (*Camissonia cheiranthifolia*). The open sandy areas with sparse native shrubs provide the best potential habitat on the property for plant species, most of which are annual and cannot tolerate much, if any, competition from other plants. The mapped open sand habitat just downslope and westerly of the existing house occurs as a small terrace on deep, loose sands that appears to have been created through sand excavation or movement relatively recently. Rhizomes of European beachgrass are already colonizing the area and other invasives including iceplant and French broom (*Genista monspessulana*) are growing nearby. The open sandy areas to the west are more compacted but are also vulnerable to colonization by non-natives.

Coastal dune scrub vegetation, characterized by native shrubby species such as coyote brush, silver lupine (*Lupinus chamissonis*), coffee berry (*Rhamnus californica*), Pacific blackberry (*Rubus ursinus*), and mock heather, occurs in some areas as the dominant cover in a matrix of iceplant, beach grass and dune sedge (*Carex pansa*). Other prevalent species include seacliff buckwheat, poison oak, Pacific reed grass (*Calamagrostis nutkatensis*) and Mexican rush (*Juncus mexicanus*). Dune sedge is the significant ground cover in large areas dominated by this vegetation type, giving way to iceplant toward the southwesterly parts of the site and beach grass to the south and east. Prominent granitic outcrops, colonized by a mix of non-native and native scrub species and open sand, are found toward the westerly property boundary.

1.2 Project Description

The project consists of demolition of the existing house, driveway, landscaping and other residential amenities and construction of a new single family home within essentially the same footprint. Approximately 0.45 acre within the parcel boundary will be subject to disturbance during construction; this includes the 0.4 acre of existing disturbed area on the property. Another 0.03 acre of existing disturbed area between the parcel boundary and Signal Hill Road will be included in the construction area. Upon completion of construction, the final extent of impervious surface will encompass approximately 0.24 acre or about 11% of the property according to the Casa Pebble Beach Site Plan, May 27, 2011, prepared by Bill Bernstein AIA. The remaining lands will be targeted for restoration as follows: 1.63 acres will be designated as Natural Habitat Area (Figure 3)[3] and will be restored and managed as dune scrub habitat

[3] Assumes that restoration activities are allowed for the easement area between the parcel boundary and Signal Hill Road.

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Scale: 1" = 50'

LEGEND:

- Proposed New Residence
- Landscape Area
- Natural Habitat Area
- Property Boundary

Restoration Areas
Mehdipour Property
Pebble Beach, California

Date: 6/11

Figure 3

according to the methods described in this plan; 0.32 acre will be designated Landscape Area and will be planted with a mixture of ornamental and native dune scrub species following completion of construction (Figure 3).

1.3 Purpose of the Plan

The purpose of this plan is to identify the areas targeted for restoration, describe the restoration techniques, outline measures for short term monitoring and long term maintenance of the restored areas, and recommend measures for protecting the habitat during and after construction. The area targeted for restoration in this plan includes approximately 1.63 acres of sandy dune terraces vegetated with a combination of native and nonnative species as described above that will not be disturbed by project construction. An additional 0.32 acre that will be temporarily disturbed during construction of the new residence will be replanted with a mixture of ornamental species and native dune scrub plants. These areas are designated Natural Habitat Area and Landscape Area, respectively, and are delineated on Figure 3. The primary goal within the 1.63 acres will be to eradicate nonnative species and reestablish native vegetation while the primary goal in the 0.32 acre area will be to re-landscape following completion of construction.

2.0 RECOMMENDED MINIMIZATION MEASURES DURING CONSTRUCTION

A qualified coastal biologist (Project Biologist) shall be retained by the property owner to guide and monitor all activities described in this restoration plan. The Project Biologist shall be selected and under contract prior to issuance of demolition/grading permits.

<u>Prior to Demolition/Grading</u>

- Prior to commencing demolition or grading, a pre-construction meeting will be held with the architect or owner, construction manager, subcontractors and the Project Biologist. The Project Biologist will make a presentation to the group on the sensitivity of the habitat and discuss protection measures for the habitat during construction activities. All sub-contracts shall include a statement that the sub-contractor shall not disturb the habitat area by grading, parking, material storage, human traffic, or any other construction activity.

- The Project Biologist shall inspect the site before construction, coordinate establishment of the construction boundary, monitor grading and periodically check construction activities for consistency with the minimization measures recommended. The construction boundary shall be delimited with a five foot construction fence to minimize impacts and avoid misinterpretation of the boundaries.

<u>During and Post Grading</u>

- No material storage or construction traffic of any kind will be allowed in the Natural Habitat Area

- All sand removed during grading shall be moved, stored, and/or taken offsite away from the Natural Habitat Area.

- If the Project Biologist determines that blowing sand from the construction site is impacting the Natural Habitat Area, one of the following methods will be used to stabilize the sand; jute netting, plastic erosion control mats with straw, straw plugs (1 foot on center), or crimped straw (rate of 4 tons/ac.)

- If deemed appropriate by the Project Biologist, areas temporarily stabilized with one of the methods above could be seeded with an appropriate erosion control mix at a rate of 10lb/acre. Species to consider include the following:
  Camissonia cheiranthifolia
  Artemisia pyncocephala
  Erigeron glaucus
  Lessingia filaginifolia var. californica

- A temporary irrigation system may be installed to establish plants in this area if deemed necessary by the Project Biologist.

3.0 RESTORATION PLAN

This section states the goals and objectives of the restoration plan and provides descriptions of specific management techniques that will be used to meet the objectives. Implementation of the restoration plan, including all activities described below, will be overseen and monitored by a qualified biologist (Project Biologist).

3.1 Goals and Objectives

The primary goal of this restoration plan is to eliminate all aggressive exotic species and restore native dune scrub habitat within the 1.63-acre Natural Habitat Area designated on Figure 3. The goal for the 0.32 acre Native Plant Landscape Area is to establish native dune scrub plants in landscaping around the development once construction is complete.

The specific objectives for accomplishing the project goals are as follows:

<u>Natural Habitat Area (NHA)</u>

- Eradicate and control exotic vegetation in areas designated for native plant restoration and landscaping.
- Plant and seed areas that are bare from the exotic plant removal with native dune scrub species.
- Stabilize drifting sand areas to be planted, as necessary.
- Use local plant sources for revegetation material. Plants shall be propagated from seed or cuttings collected within one mile of the site.
- Establish a monitoring program to track success of exotic vegetation control and establishment of native species.
- Establish an ongoing maintenance program for exotic plant control, dune stabilization and other actions noted during monitoring.
- Improve the property as habitat for wildlife.

Landscape Area (LA)

- Incorporate native dune scrub species in the landscape plant palette and exclude any invasive exotic species that could escape into the NHA, such as; French broom, pampas grass, acacia, iceplant.

3.2 Native Plant Propagation

All plants to be installed in the restoration areas will be propagated from local sources collected within five miles of the project site. Seed collection will be made at the appropriate time for each targeted species. In general, collections will be made between April and November. No seeds will be purchased from commercial seed suppliers.

3.3 Exotic Species Control

A program to remove all exotic species within the NHA will be initiated concurrent with construction activities. The target species will include European beachgrass, iceplant, and French broom. The eucalyptus tree and tea tree growing along the edge of Signal Hill Drive will be removed during construction and will be replaced with Monterey cypress trees.

Control of exotic species in the NHA will be an ongoing process but focused efforts for three years, beginning with initiation of construction (or sooner if the property owner elects to do so) should help to reduce the density of exotic species and allow for establishment of natives. Methods for controlling the identified target species are as follows:

European beachgrass: The primary control method for European beachgrass on the Mehdipour property will be manual removal. This will consist of pulling by hand or digging out the grass so as to remove as much of the root structure as possible. Removal will occur prior to flowering and/or seed-set (before July). Pulled material will either be burned or hauled away to the landfill. An intensive effort to remove all European beachgrass observed in the NHA shall be conducted for three consecutive years. After three years, new starts can be controlled with a 10% glyphosate with 0.5% added surfactant (e.g. Roundup Pro®).

Iceplant: Iceplant mats shall be sprayed with a 2% glyphosate in August/September. The dead mats shall be left in place to help with sand stabilization. Each year, new iceplant starts shall either be pulled or sprayed with the glyphosate.

French broom: French broom is not dominant on the property but removing any plants in the area will eliminate the threat of infestation. All French broom shall be removed by hand during initial control efforts and material shall be hauled offsite to the landfill. Each year, new starts shall be pulled and removed from the site. If there are particularly large specimens of broom, they can be sawed off at the base and an herbicide applied to the trunk. The detached material shall be carefully removed from the site to ensure that seed pods are not spread. Any seed pods observed around the area where plants are removed shall be collected and disposed of properly.

3.4 Sand Stabilization

Sand stabilization may be necessary where large areas of European beachgrass leave exposed bare sand. The Project Biologist will determine if stabilization is necessary once the beach grass is removed. If stabilization is recommended, it will be completed as follows.

Bundles of rice straw will be inserted 4 inches into the sand at 12" to 15" on-center. Each bundle will consist of a fistful of straw and measure approximately 10 inches long. The bundles will be placed into a 4-inch-deep hole, perpendicular to the surface, and the hole will be backfilled with sand. Note: wheat straw may be substituted for rice, but any other grain such as oats that can naturalize on the dunes shall be prohibited.

3.5 Planting Plan

3.5.1 Natural Habitat Area

Native plants will be installed where non-native species have been removed. Plant installation will be at the direction of the Project Biologist and species are to be selected from the list recommended in Table 1.

Table 1: Recommended Plant Species for Natural Habitat Area

Scientific Name	**Common Name**
Abronia umbellate	pink sand verbena
Achillea millefolium	yarrow
Artemisia pycnocephala	beach sagewort
Baccharis pilularis	coyote brush
Camissonia cheiranthifolia	beach primrose
Cardionema ramosissimum	sand mat
Castilleja latifolia	Monterey Indian paintbrush
Danthonia californica	California oat grass
Deschampsia caespitosa	hair grass
Dudleya caespitosa	sea lettuce
Ericameria ericoides	mock heather
Erigeron glaucus	seaside daisy
Eriogonum parvifolium	dune buckwheat
Eriophyllum staechadifolium	lizard tail
Lasthenia minor	wooly goldfields
Lessingia filaginifolia	California corethrogyne
Mimulus aurantiacus	sticky monkey flower

Plant installation will occur after 2-3" of rain has fallen early in the season and when more rain is projected. Seedling planting location and spacing will be determined in the field by the Project Biologist. Supplemental watering should be avoided, except immediately following installation of the plants and during the initial establishment period of any replacement plants over time.

3.5.2 Landscape Area

The LA will be more highly managed and maintained like a typical residential landscape. The only restrictions for planting in this area include non-native invasive species such as iceplant, French broom, acacia, pampas grass, and others that could escape into the adjacent NHA. To the extent feasible native species should be incorporated into the plant palette. Native species recommended for this area are listed in Table 2.

Table 2: Recommended Native Plant Species for Landscape Area

Scientific Name	**Common Name**
Abronia umbellate	pink sand verbena
Achillea millefolium	yarrow
Arctostaphylos pumilla	sandmat manzanita
Baccharis pilularis	coyote brush
Baccharis pilularis	coyote brush
Bromus carinatus	California brome
Calamagrostis nutkaensis	Pacific reed grass
Dudleya caespitosa	sea lettuce
Elymus glaucus	blue wild rye
Ericameria ericoides	mock heather
Erigeron glaucus	seaside daisy
Eriogonum parvifolium	dune buckwheat
Eriophyllum staechadifolium	lizard tail
Eschscholzia californica	California poppy
Grindelia stricta	dune gum plant
Hesperocyparis macrocarpa	Monterey cypress
Iris douglasiana	Douglas iris
Mimulus aurantiacus	sticky monkey flower
Ribes sanguineum	pink flowering currant
Rosa gymnocarpa	wood rose

Typical landscape plant maintenance activities will be conducted in this area, including removing dead or dying plants and placement of the various species to achieve certain design compositions. Irrigation is allowed as needed but should not overflow into the NHA. Overwatering can have adverse effects on native plants.

3.6 Monitoring and Maintenance Program

Quarterly monitoring of the NHA will be conducted for three years following initial weed eradication and planting of native species. The first monitoring visit will occur six months after completion of European beachgrass removal and subsequent visits will occur at 3-month intervals. Monitoring will be conducted by the Project Biologist who will visually inspect the area to evaluate the following:

- Regeneration of exotic species
- Sand stabilization and erosion control

- Health and vigor of installed plants
- Plant cover deficiencies

The results of each monitoring visit will trigger maintenance activities for the next quarter. Such activities will be recommended by the Project Biologist and could include:

- Continued removal of exotic species
- Installation of erosion control measures
- Adjustment to or installation of sand stabilization measures
- Watering of installed plantings
- Installation of replacement plantings
- Installation of additional plantings
- Installation of herbivary protection for plantings

During the first summer following completion of initial weed eradication and native species planting, quantitative data will be collected to track the progress of the restoration efforts. The Project Biologist will establish two permanent transects through the NHA in order to collect data on percent cover of non-native species. Data will be collected in one-meter plots every 10 meters along the transect line. All species within the plot will be recorded and percent cover assigned. Photographs will be taken along the transect line. This same exercise will be repeated during the following two summers. Data will be evaluated to determine percent cover of non-native species, with a goal of no more than 15% cover overall of non-natives. At the end of the 3-year monitoring period, the Project Biologist will prepare a report that describes the initial and ongoing maintenance activities, evaluates the results of the quantitative sampling, and provides recommendations for on-going management of the area.

4.0 IMPLEMENTATION SCHEDULE

Following is an estimated implementation schedule for 2011-2012, assuming that project approval is obtained prior to October, 2011.

TASKS	TIMING
Spray iceplant mats in NHA	October 2011
Remove European beach grass in NHA	January through June 2012
Stabilize bare sand, if necessary	January through June 2012
Select Project Biologist	Prior to issuance of demolition/grading permits.
Inform construction crews of sensitive habitat areas and install protective fencing	Prior to initiation of demolition or ground-disturbing activities
Monitor construction activities	Weekly during ground-disturbance activities.

TASKS	TIMING
Collect native plant seeds and cuttings	April through November 2012
Grow native plants in nursery	April to February 2012
Install nursery plants in NHA	October to December 2012 as directed by Project Biologist
Install landscaping in LA	As soon as possible following completion of site grading and construction
Monitor habitat in NHA	Quarterly for three years beginning six months after initial removal of beachgrass
Maintenance of NHA	As directed by Project Biologist for first three years following implementation of restoration plan
Quantitative data collection in NHA	Annually in the summer for three years following initial restoration activities
Prepare monitoring report for NHA	At the end of the three-year monitoring period
Long-term management of NHA	As recommended by Project Biologist in report prepared at end of monitoring period.
Maintenance of LA	As directed by homeowner to meet landscape objectives.