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San Mateo County
Planning Division

ZANDER ASSOCIATES

Environmental Consultants

May 21, 2015

Owen Lawlor, Manager
Moss Beach Associates, LLC
612 Spring Street
Santa Cruz, CA 95060

Vegetation Characterization and Mapping
Moss Beach Lots
Moss Beach, California

Dear Owen:

Zander Associates biologists have visited the site of the Moss Beach Lots project twice this spring to confirm the occurrence of coast yellow leptosiphon (*Leptosiphon croceus)* on the coastal bluff promontory just west of the property line and to characterize and map the coastal prairie grasslands on the site. Following is our assessment.

The approximately 2.4 acre property is located in Moss Beach, California on coastal bluffs overlooking the Pacific Ocean just west of Highway 1. The site comprises seven currently undeveloped lots of record with access provided by Vallemar and Juliana Streets along the easterly and southerly property lines respectively.

The site can be broadly divided into two vegetation types: remnant coastal prairie grasslands on the west and disturbed/ruderal grounds, mostly under a Monterey cypress (*Hesperocyparis macrocarpa*) canopy on the east and without tree cover on the southwest corner. The promontory overlooking the ocean just offsite to the west (on public open space lands) supports a population of coast yellow leptosiphon, which is ranked by the California Native Plant Society (CNPS) as seriously threatened in California (1B.1). We have confirmed the extent of this population through a series of appropriately timed seasonal floristic surveys in both 2013 (April 2nd, April 25th & May 15th) and 2015 (April 27th, May 18th). A complete list of all plants observed on or near the site as a result of these surveys is attached. Based on this work and our understanding of property lines on the ground, we have concluded that the population of leptosiphon does not extend onto any of the existing Moss Beach lots.

For the purposes of characterizing and mapping the limits of coastal prairie grassland vegetation on the site, we conducted a systematic survey of the area on May 18, 2015. Three Zander Associates biologists recorded species occurrences, collected coverage data, flagged the limits of vegetation types and mapped them using a hand held Trimble GPS unit with sub-meter accuracy.

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We established and mapped (see attached Figure 1) three zones of vegetation on the site as follows:

Zone A - Coastal Prairie Grassland: Vegetation in this zone was clearly dominated (> 75% cover over a series of 10 meter square assessment areas) by a mix of native perennial bunchgrasses including Pacific hairgrass (*Deschampsia caespitosa* ssp. *holciformis*), California oat grass (*Danthonia californica*), California brome (*Bromus carinatus* var. *carinatus*) and native forbs including Johnny-nip (*Castilleja ambigua* ssp. *ambigua*), sea-pink (*Armeria maritima* ssp. *californica*), coastal gumplant (*Grindelia stricta* var. *platyphylla*), blue-eyed grass (*Sisyrinchium bellum*), coastal eryngo (*Eryngium armatum*) and purple cudweed (*Gamochaeta ustulata*). Pacific hairgrass was dominant (60-80% cover) over large areas with California oat grass less abundant overall, but comprising up to 70% cover in some areas. A large patch of beach strawberry (*Fragaria chiloensis*), which may have been introduced to the site since it is a common landscape plant in the area, occupied a central location in this zone (see attached Figure 1).

Zone B - Transitional Area: Non-native grasses with mostly sparse occurrences of native species (less than 5% cover except in some areas) are dominant in this zone. Introduced annual grasses include ripgut brome (*Bromus diandrus*), rattail six weeks grass (*Festuca myuros*), Italian ryegrass (*F. perennis*) and false brome (*Brachypodium distachyon*). Non-native forbs such as rough cat's ears (*Hypochaeris radicata*), English plantain (*Plantago lanceolata*), and wild radish (*Raphanus sativus*) are common associates. Some sparsely scattered native forbs including Lindley's varied lupine (*Lupinus variicolor*), dwarf checkerbloom (*Sidalcea malviflora* ssp. *malviflora*), coastal tarweed (*Madia sativa*), and blue-eyed grass can also be found within the non-native grasslands. A large mat (> 85% cover) of iceplant (*Carpobrotus edulis*) occurs toward the northerly end of this zone, and a few relatively small, but well-defined areas within this zone support a higher density of native grasses (Pacific hairgrass, California oat grass); we mapped these areas separately (see attached Figure 1).

Zone C – Non-native Area: This zone consists of a large area under a canopy of cypress with negligible understory vegetation and smaller areas dominated by non-native, mostly herbaceous species. Some non-native shrubs, probably escapes from cultivated areas nearby, such as myoporum (*Myoporum* sp.), pride of Madeira (*Echium candicans*), and Japanese pittosporum (*Pittosporum tobira*) are found on the perimeter of the cypress canopy. There are patches of ripgut brome, ice plant, panic veldt grass (*Ehrharta erecta*), pincushion flower (*Scabiosa atropurpurea* – another likely escape from cultivation), beach strawberry (probably also an escape) and other invasives typical of heavily disturbed sites. Bermuda buttercup (*Oxalis pes-caprae*), false brome, rattlesnake grass (*Briza maxima*) and other non-native herbaceous species are also common in this zone.

A manmade drainage ditch adjacent to the southern property boundary along Juliana Street carries runoff via a culvert under Vallemar Street from the east to a bluff outfall into the ocean at the southwest corner of the site. This drainage supports some wetland vegetation including water-cress (*Nasturtium officinale*), rabbit foot grass (Polypogon monspeliense), spreading rush (*Juncus patens*) and loosestrife (*Lythrum hyssopifolia*).

A roughly triangular area at the southwest corner of the property is also included in this zone with a transitional area (mapped separately as Zone B) along its northerly flank. These areas appear to be heavily disturbed by pedestrians with non-native grasses predominating in the transitional zone and ice plant, wild radish, bristly ox-tongue (*Helminthotheca echioides*), tree mallow (*Malva arborea*), and sow thistle (*Sonchus oleraceus*) concentrated toward the property corner and along Juliana Street. Patches of gumplant and tarweed have also colonized an area along the street that appears heavily undermined by pocket gophers (*Thomomys bottae*).

We trust that this assessment will assist you in your application process for site development with San Mateo County. Please contact me by email (mzander@zanderassociates.com) or telephone (415-897-8781) if you have any questions.

Sincerely,

Michael J. Zander
Principal

Attachments: Plant List
Figure 1, Vegetation Types

Plant Species Observed on Moss Beach Heights Project Site
April 2, April 25, and May 15, 2013; April 27, May 18, 2015*

Scientific Name	Common Name	Native
Achillea millefolium	Yarrow	yes
Acmispon wrangelianus	Wrange's lotus	yes
Allium triquetrum	White-flowered onion	no
Anagallis arvensis	Pimpernel	no
Armeria maritima ssp. *californica*	Sea-pink	yes
Avena barbata	Slender wild oats	no
Avena fatua	Wild oats	no
Baccharis pilularis	Coyote brush	yes
Brachypodium distachyon	False brome	no
Briza maxima	Rattlesnake grass	no
Briza minor	Little quaking grass	no
Bromus carinatus var. *carinatus*	California brome	yes
Bromus diandrus	Ripgut brome	no
Bromus hordeaceus	Soft chess	no
Calandrinia ciliata	Red maids	yes
Carduus pycnocephalus	Italian Thistle	no
Carex sp.	Sedge	yes
Carpobrotus chilensis	Sea fig	no
Carpobrotus edulis	Freeway iceplant	no
Castilleja ambigua ssp. *ambigua*	Johnny-Nip	yes
Cerastium glomeratum	Mouse-ear chickweed	no
Clarkia sp.	Clarkia	yes
Cortaderia jubata	Pampas grass	no
Danthonia californica	California oatgrass	yes
Daucus pusillus	American wild carrot	yes
Deschampsia caespitosa ssp. *holciformis*	Pacific hairgrass	yes
Delairea odorata	German ivy	no
Dudleya farinosa	Bluff lettuce	yes
Ehrharta erecta	Panic veldt grass	no
Elymus triticoides	Creeping wildrye	yes
Erigeron canadensis	Horseweeed	yes
Erigeron glaucus	Seaside daisy	yes
Eriogonum latifolium	Coast buckwheat	yes
Eryngium armatum	Coastal eryngo	yes
Euphorbia peplus	Petty spurge	no
Festuca myuros	Rattail sixweeks grass	no
Festuca perennis	Italian ryegrass	no
Fragaria chiloensis	Beach strawberry	yes
Frangula californica	California coffeeberry	yes
Fumaria parviflora	Fine-leaved fumatory	no
Galium aparine	Common bedstraw	yes
Gamochaeta ustulata	Purple cudweed	yes
Geranium dissectum	Cut-leaf geranium	no

* List compiled by Zander Associates Consulting Botanist Zoya Akulova-Barlow

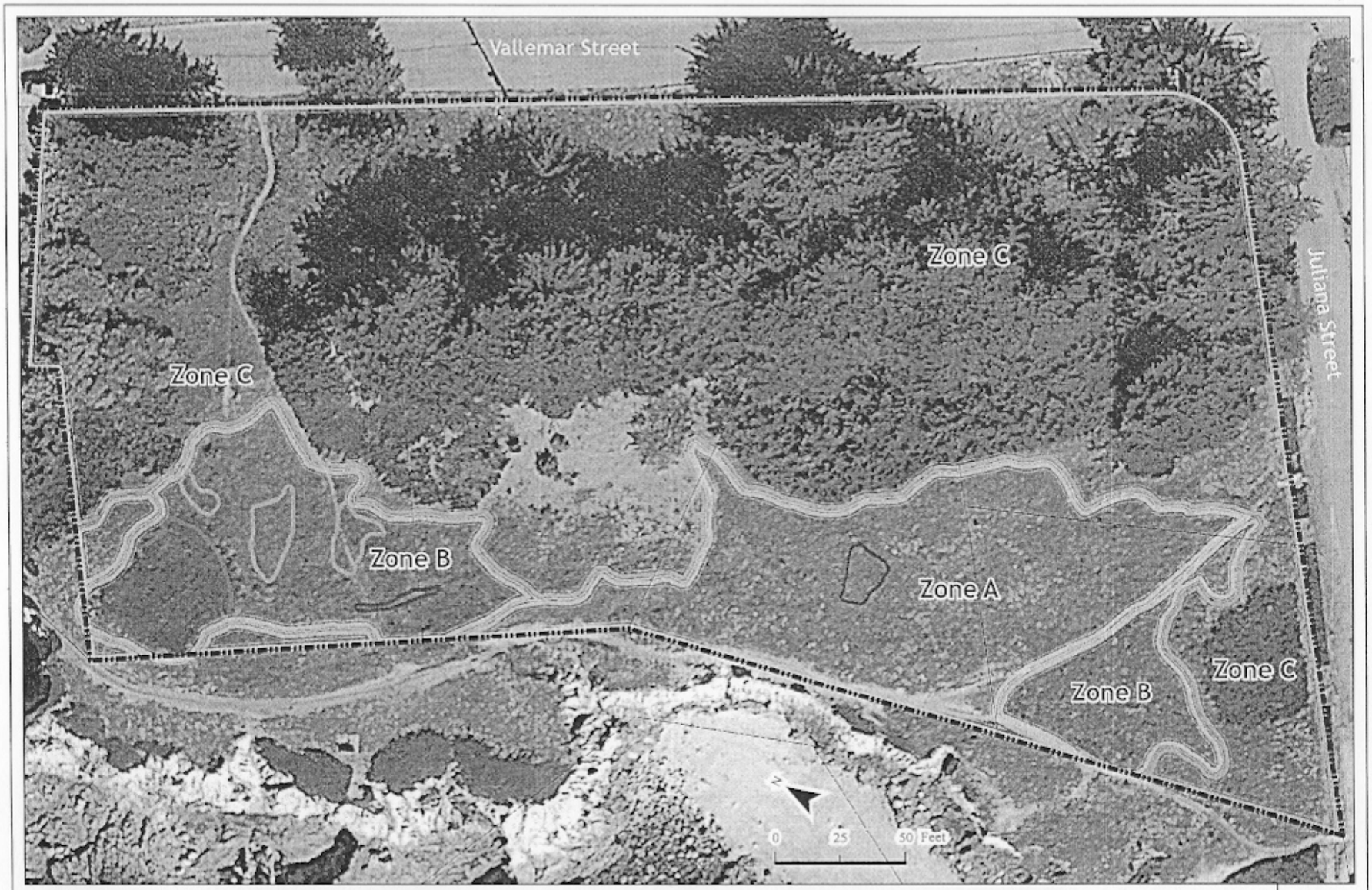
Grindellia stricta var. *platyphylla*	Coastal gumplant	yes
Helminthotheca echioides	Bristly ox-tongue	no
Hesperocyparis macrocarpa	Monterey cypress	no
Hordeum brachyantherum	Northern barley	yes
Hordeum murinum ssp. *leporinum*	Hare barley	no
Horkelia sp.	Horkelia	yes
***Hosackia gracilis* CNPS List 4.3**	Bird's foot trefoil	yes
Hypochaeris radicata	Rough cat's ears	no
Juncus bufonius	Toad rush	yes
Juncus effusus	Common rush	yes
Juncus patens	Spreading rush	yes
Kickxia elatine	Fluvellin	no
Lepidium didymum	Lesser swine cress	no
***Leptosiphon croceus* CNPS List 1B.1**	Coast yellow leptosiphon	yes
Linum bienne	Flax	no
Lotus corniculatus	Bird's foot trefoil	no
Lupinus variicolor	Lindley's varied lupine	yes
Lythrum hissopifolia	Hyssop loosestrife	no
Madia gracilis	Slender tarweed	yes
Madia sativa	Coastal madia	yes
Malva arborea	Tree mallow	no
Malva pseudolavatera	Cretan mallow	no
Medicago polymorpha	Bur-clover	no
Melilotus indicus	Sour clover	no
Nasturtium officinale	Water cress	yes
Oenothera sp.	Evening primrose	yes
Oxalis pes-caprae	Bermuda buttercup	no
Pinus radiata	Monterey pine	no
Plantago coronopus	Buckhorn plantain	no
Plantago lanceolata	English plantain	no
Poa annua	Annual blue grass	no
Poa douglasii	Sand dune blue grass	yes
Poa unilateralis ssp. *unilateralis*	San Francisco blue grass	yes
Polygonum paronychia	Beach knotweed	yes
Polypogon monspeliensis	Rabbitfoot grass	no
Pseudognaphalium stramineum	Annual cudweed	yes
Ranunculus californicus	California buttercup	yes
Raphanus sativus	Wild radish	no
Rubus ursinus	California blackberry	yes
Rumex acetosella	Common sheep sorrel	no
Rumex salicifolius	Willow dock	yes
Sagina apetala	Dwarf pearlwort	no
Scandix pecten-veneris	Venus' needle	no
Senecio vulgaris	Common groundsel	no
Sidalcea malviflora ssp. *malviflora*	Dwarf checkerbloom	yes
Silene gallica	Windmill pink	no
Silybum marianum	Milk thistle	no
Sisyrinchium bellum	Blue-eyed grass	yes
Sonchus asper	Spiny sowthistle	no

Sonchus oleraceus	Common sowthistle	no
Spergularia macrotheca var. *macrotheca*	Sticky sand spurry	yes
Stellaria media	Chickweed	no
Stipa pulchra	Purple needle grass	yes
Symphyotrichum chilense	California aster	yes
Taraxacum officinalis	Dandelion	no
Taraxia ovata	Sun cups	yes
Trifolium dubium	Little hop clover	no
Urospermum picroides	Prickly golden fleece	no
Vicia sativa ssp. *sativa*	Common vetch	no
Zeltnera davyi	Davy's centaury	yes

Nomenclature according to: The Jepson Manual, Second edition, 2012

In addition to the listed plants the following ornamental plant species were observed:

Scientific Name	Common Name
Aeonium haworthii	Houseleek tree
Aptenia cordifolia	Heartleaf iceplant
Chasmanthe floribunda	African flag
Crocosmia crocosmiiflora	Montbretia
Echium candicans	Pride of Madeira
Echium pininana	Pine echium
Myoporum sp.	Myoporum
Pittosporum tobira	Japanese pittosporum
Scabiosa atropurpurea	Pincushion flower
Sequoia sempervirens	Redwood
Zantedeshia aethiopica	Calla lily



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Vegetation Types
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Figure 1