Exhibit E

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BASELINE BIOLOGICAL ASSESSMENT and

EASEMENT DOCUMENTATION REPORT

VICTORINE RANCH PROPERTY

Monterey County, California

Image: Coastal Records Project

Prepared for:
California State Coastal Conservancy
1330 Broadway, Suite 1300
Oakland, CA 94612

Prepared by:
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June 15, 2013

BASELINE BIOLOGICAL ASSESSMENT REPORT
AND PROPERTY CONDITION CERTIFICATION
(Victorine Ranch, Monterey County)

By executing this Certification, the undersigned accepts and acknowledges that the attached Baseline Biological Assessment has been prepared pursuant to the development of a Conservation Easement and that the conditions reported herein are an accurate representation of the biological and physical status of the property described, as of the date of the report.

THE CALIFORNIA STATE COASTAL CONSERVANCY
A California State Agency

By: _____
Name: _____
Title: _____
Date: _____

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PROPERTY PROFILE

DATE: June 15, 2013

PREPARED BY: Nicole Nedeff, Consulting Ecologist. nikki@ventanaview.net
11630 McCarthy Road, Carmel Valley, CA 93924. 831.659.4252

SITE NAME: Victorine Ranch, Monterey County

APN: 243-221-019, West Parcel, 25.28 acres
243-211-025, Middle Parcel, 11.4 acres
243-211-026, East Parcel, 63.3 acres

PHYSICAL ADDRESS: Abuts Highway 1, approximately 0.75 miles south of Malpaso Creek

ACREAGE: Total acreage in property = 99.98 acres

USGS QUAD: Soberanes Point 7.5'. T17S, R1W, unsurveyed sections

OWNER: California State Coastal Conservancy, 1330 Broadway, Suite 1300, Oakland, CA 94612. Project Manager, Christopher Kroll, 510.286.4169

MONTEREY COUNTY PLANNING AREA: Big Sur

MONTEREY COUNTY ZONING and PRESENT LAND USE: WSC/40D (CZ) = Watershed and Scenic Conservation, with a maximum density of one lot per 40 acres and requiring design approval, within the Coastal Zone. The undeveloped Conservancy parcels are part of the Victorine Ranch subdivision in the Big Sur Land Use Plan Area. The parcels that comprise the State Coastal Conservancy property were previously a portion of a much larger, historic ranch that was used primarily as grazing land.

SITE LOCATION: The western margin of the Conservancy's Victorine property fronts Highway 1 approximately 0.75 miles south of Malpaso Canyon. The property extends from the highway right-of-way across marine terraces and steep hillsides over the coast ridge to upper Malpaso Canyon on the eastern boundary. The property is accessed from Highway 1 at a paved and gated private road, which serves as the entry to the Victorine Ranch subdivision. No legal access is available via Malpaso Canyon. The subject property is bordered on the north by conserved Monterey County open space land, on the northwest by developed home sites, and on the south by Garrapata State Park. Slopes vary from nearly flat to extremely steep.

PROJECT DESCRIPTION: The State Coastal Conservancy intends to market the subject property for sale and has developed a Conservation Easement to protect significant natural features and conserve potential future public access on the site. This report describes habitat and environmental conditions on the property and provides baseline environmental documentation for conservation and trail easement resources.

SITE VISITS: October 2010 through June 2013

HABITAT IN PRIMARY PROJECT AREA: Northern Coastal Scrub, Coastal Bluff Scrub, Coastal Prairie, Annual Grassland, Central Maritime Chaparral, Monterey Pine, Riparian, Wetland.

Malpaso Canyon supports Redwood Riparian habitat, however this portion of the property is outside the primary project area and not described in detail in the Baseline Biological Assessment.

SIGNIFICANT BIOLOGICAL ATTRIBUTES:

- √ Coastal Bluff Scrub
- √ Coastal Prairie
- √ Central Maritime Chaparral
- √ Central Coast Arroyo Willow Riparian
- √ Wetland
- √ Redwood Riparian (Malpaso Canyon)
- √ Seacliff buckwheat, *Eriogonum parvifolium*, host plant for Federally Endangered Smith's blue butterfly, *Euphilotes enoptes smithi*
- √ Potential habitat for the Federally Endangered Yadon's rein-orchid, *Piperia yadonii*
- √ California Rare Plant Rank* 1B plants observed:
  - Monterey pine, *Pinus radiata*
  - Hooker's manzanita, *Arctostaphylos hookeri*
  - Pine rose, *Rosa pinetorum*
- √ California Rare Plant Rank 4 plants observed:
  - Small-leaved lomatium, *Lomatium parvifolium*
  - Monterey Indian paintbrush, *Castilleja latifolia*
- √ Potential habitat for CNPS Rank 1B plants:
  - Seaside bird's beak, *Cordylanthus rigidus* ssp. *littoralis* (CA End.)
  - Compact cobwebby thistle, *Cirsium occidentale* var. *compactum*
  - Adobe sanicle, *Sanicula maritima* (CA Rare)
  - Hutchinson's larkspur, *Delphinium hutchinsoniae*
  - Jolon clarkia, *Clarkia jolonensis*
  - Pinnacles buckwheat, *Eriogonum nortonii*
  - Fragrant fritillary, *Fritillaria liliaceae*
  - California screw-moss, *Tortula californica*
- √ Foraging habitat for raptors observed: White-tailed Kite, Red-tailed Hawk, American Kestrel

* The California Rare Plant Ranking system developed by the California Native Plant Society is defined in Section 5.2.

California State Coastal Conservancy

Victorine Ranch

Baseline Biological Assessment

1. INTRODUCTION

The State Coastal Conservancy's (SCC) Victorine Ranch property is an undeveloped 99.98-acre remnant of an historic Central Coast rancho subdivided over the years into large residential lots. Located at the northwestern edge of the rugged Santa Lucia Range in Central California, the narrow SCC property is situated along the Big Sur coast near the Carmel Highlands approximately 0.75 miles south of Malpaso Creek. The SCC land abuts Highway 1 on the west, Garrapata State Park on the south and conserved Monterey County open space lands on the north. The SCC property is adjacent to two private residential lots on the northwest side and also abuts private, undeveloped property on the northeast. The SCC land extends from coastal bluffs fronting Highway 1 across gentle marine terraces, then up over steep hill slopes and down into the middle reach of Malpaso Canyon.

Vegetation on the SCC Victorine Ranch property occurs as a mosaic of coastal plant communities, some of which are considered Environmentally Sensitive Habitat Areas with protective policies under the Big Sur Local Coastal Program, Land Use Implementation Plan (please refer to Section 6 for a more detailed discussion of the Big Sur Land Use Plan). Coastal Bluff Scrub, Coastal Prairie, Central Maritime Chaparral, Riparian, Wetland, Redwood and Monterey Pine Forest natural communities are given special consideration in the Coastal Zone of California. These natural communities are considered rare and unique in the Big Sur region and generally these habitats support associated plants and wildlife species of concern. Although these special status habitats occur as a patchwork on the Victorine Ranch, much of the property is dominated by plant associations of Northern Coastal Scrub vegetation. Northern Coastal Scrub is a natural community not considered to be environmentally sensitive overall, yet it can also support sensitive plants and wildlife species.

The SCC purchased the Victorine property in 1987 with the overall programmatic goal of implementing a Transfer Development Credit Donor-Receiver Model Project (Williams 1995). Other coastal property was also acquired by the SCC at that time and conserved in the Big Sur Critical Viewshed.

1.1 Purpose of the Baseline Biological Assessment

The Victorine Ranch Baseline Biological Assessment has been prepared as background material to assist with the development of a Conservation Easement and monitoring protocol on the California State Coastal Conservancy's Victorine Ranch property. Physical and biological features are described and special status habitats, plants and animals are noted. The report describes the geographic setting, anthropogenic features and regulatory framework that characterize the property and factor in to the appropriate conservation of special areas that occur on the land.

The Baseline Biological Assessment is not a comprehensive survey of the entire State Coastal Conservancy Victorine Ranch property, but rather a reconnaissance level investigation designed to evaluate representative features and overall environmental conditions. The Baseline Biological Assessment provides sufficient information for the establishment of a Conservation

Easement designed to protect significant habitat areas and associated special status species. In accordance with Monterey County protocols, more detailed, systematic surveys will need to be completed by future property owners in advance of proposed development projects in order to determine the presence/absence of specific species potentially affected by anticipated improvements.

1.2 Purpose of Conservation Easement

The Conservation Easement established on the SCC Victorine Ranch parcels protects significant ecological, scenic and scientific values, including plant and animal resources, visual qualities and open space attributes of the property. The Conservation Easement focuses on conservation targets of local, state and federal concern which occur on the Victorine property.

The Conservation Easement Documentation Report (EDR) has been developed in tandem with the Baseline Biological Assessment and presents photographs and site-specific descriptions of significant environmental attributes at locations representative of the features conserved at the time the Conservation Easement was prepared. The EDR provides baseline information appropriate to monitor in order to guarantee the Conservation Easement goals and objectives are maintained in perpetuity.

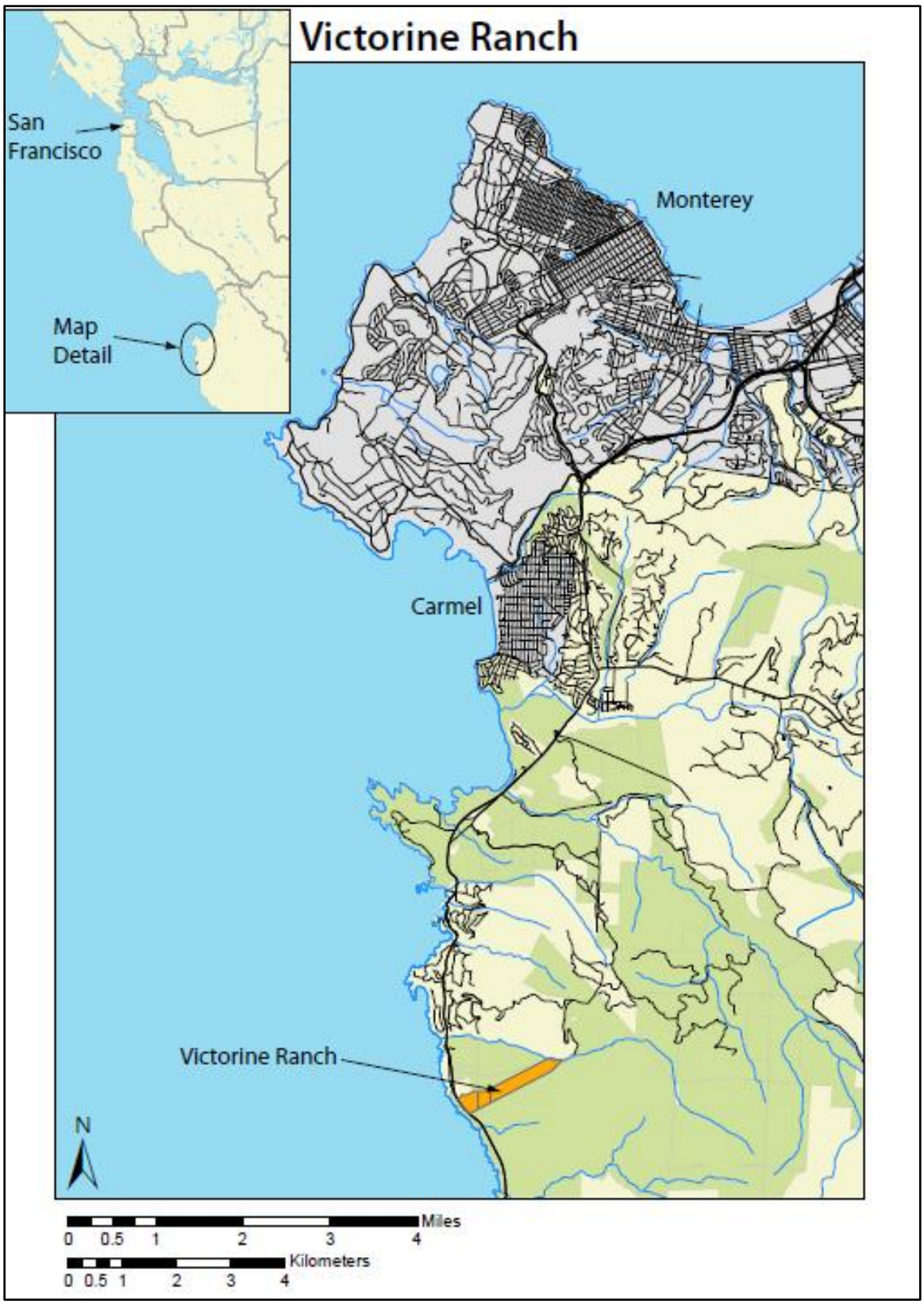

Figure 1 – Location map (source: State Coastal Conservancy).

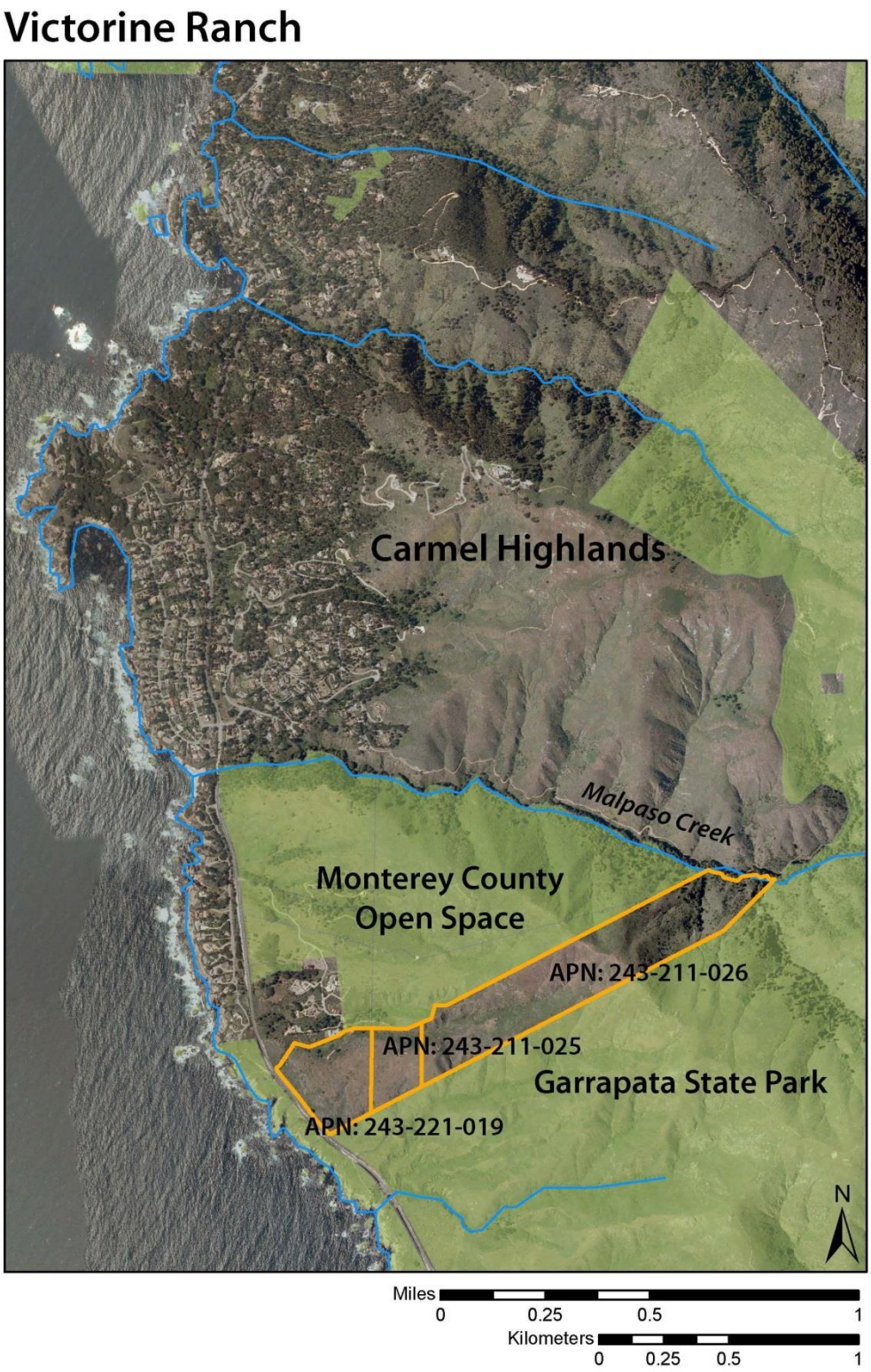

Figure 2 – Regional Context Map (source State Coastal Conservancy).

2. SURVEY METHODS

Local maps, literature references, Internet-based searches and consultations with knowledgeable individuals were used during the preparation of the Baseline Biological Assessment. In addition, reports, maps and site plans pertinent to the project were provided by the State Coastal Conservancy.

Field assessments focused on the following objectives:

- Identify and map natural communities
- Locate special status plants and wildlife species
- Note significant anthropogenic features

Botanical and habitat surveys were conducted between November 2010 and January 2011. Botanical surveys around and through natural communities were conducted on foot and boundaries of habitat areas were mapped using Global Positioning System (GPS) instrumentation operated by staff with Rasmussen Land Surveying, Inc. GPS was also used to geo-reference botanical and anthropogenic features on the site.

The 2010-2011 late fall/early winter botanical survey period was not optimal for the examination or identification of grasses, flowering annuals and perennial forbs, however general habitat conditions were readily observable. In addition to the formal habitat mapping and biological survey conducted in late 2010 and early 2011, the property was visited throughout the 2011 calendar year and supplemental botanical data were collected during spring and summer months of 2012. The rugged Malpaso Canyon is outside the primary project area and no field work was conducted from the highest ridgeline of the property downslope to Malpaso Creek. No access is available to upper Malpaso Canyon, which is gated by the Carmel Riviera Mutual Water Company.

To identify known element occurrences of special status habitats, plants and wildlife species, a records search was initiated with the California Department of Fish and Wildlife Natural Diversity Data Base (CNDDB). A CNDDB map and computer print-out for the vicinity of the subject property were prepared by Fish and Wildlife staff on November 29, 2010 and the "Full Condensed Report" and mylar overlay for the Soberanes Point USGS 7.5' quadrangle were consulted during on-site field surveys. CNDDB mapping and database information display no specific records or element occurrences of sensitive or special status species on the subject parcels, however many element occurrences are documented in similar habitat areas in the general vicinity of the SCC property. In addition, a query of the California Native Plant Society web-based "Inventory of Rare and Endangered Vascular Plant Species" was consulted to identify occurrences of special status plants in the Northern Big Sur region.

During field surveys, several special status plants and animals were observed on the subject property and potential habitat was inspected that is appropriate for additional sensitive species of concern, including the federally endangered Smith's blue butterfly and the federally endangered

Yadon's rein-orchid. Several special status natural communities occur on the property and are noted as Environmentally Sensitive Habitat Areas in the Monterey County Big Sur Coast Land Use Plan, Monterey County Local Coastal Program. Please refer to Section 5.2, Special Status Natural Communities, Plants and Animals for figures noting documented and potential occurrences of special status habitats and species.

Lists of species observed on the subject property are included in Appendix D and Appendix E.

Common names for plant and wildlife species observed on the property are noted with scientific names when they are first mentioned in the text, and thereafter only common names are used. Scientific nomenclature for plants described in this report follows protocols used in Baldwin, et al (2012).

3. PROPERTY DESCRIPTION and EXISITING CONDITIONS

3.1 Location and Geographic Setting

The SCC Victorine Ranch property is located along the scenic, largely undeveloped Big Sur coast approximately 7 air miles south of the city of Carmel-By-The-Sea in Monterey County. The property is situated along the coastline at the northwestern flank of the rugged Santa Lucia Range and includes coastal bluffs and marine terraces that reflect the young and tectonically active nature of the California coastal mountains. The SCC land is accessed off Highway 1 via a gated private entry approximately 0.25 mile south of the Highway 1 bridge over Malpaso Creek. From the private gate, a narrow, paved road winds through the Victorine Ranch subdivision and past a number of relatively new homes. The driveway access onto the undeveloped SCC land is unpaved, however the roadway is graded and improved with a culvert for a small, unnamed drainage. Appendix A is an aerial image of the Victorine Ranch property prepared by Whitson Engineers for the State Coastal Conservancy, 2007.

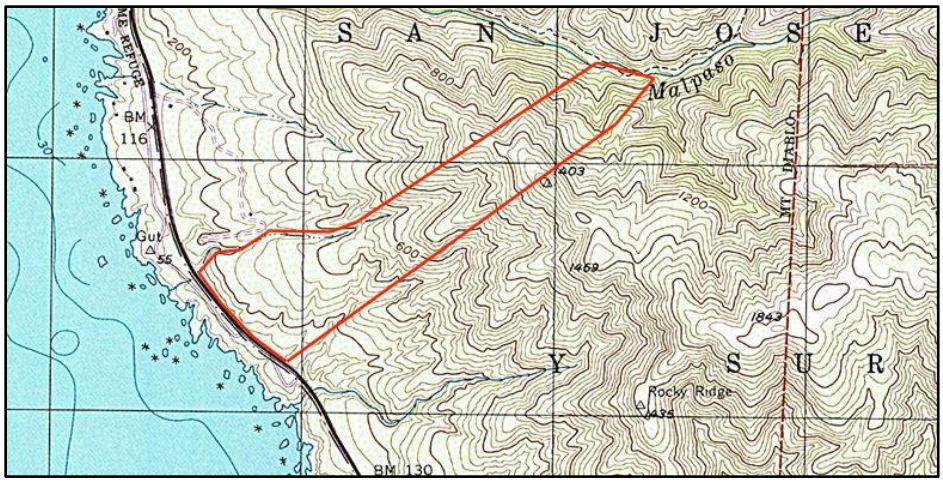

Figure 3 – Portion of the Soberanes Point USGS 7.5' topographic quadrangle, with approximate boundary for Victorine Ranch property.

The Central Coast of California experiences a Mediterranean type climate, with rainy, cool winters and warm, dry summers. In general, during the warmer months of the year, the coastal regions of Monterey County and low-lying inland areas are bathed in predictable, marine-driven advection fog that typically dissipates by mid-day. Occasionally, the marine layer persists for several days at a time and the area experiences heavy condensation and fog drip. The moderating influence of the marine layer creates environmental conditions that support habitats requiring more moisture than generally falls as precipitation during winter months. Central Maritime Chaparral, Monterey Pine Forest, Coastal Prairie and Redwood Forest communities are sustained in-part by the supplemental moisture and cool conditions provided by predictable coastal fogs.
From the edge of Highway 1, the westerly 25.28-acre parcel slopes up steeply approximately 120 feet from the roadside over sparsely vegetated coastal bluffs and granitic outcrops to a gently sloped marine terrace. The marine terrace is composed of unconsolidated Quaternary marine deposits over Mesozoic granitic bedrock, which support a habitat mosaic of Northern Coastal Scrub, Central Maritime Chaparral and Coastal Prairie-Grassland communities that intermingle across rolling terrain. The upper portion of the West Parcel reaches an elevation of approximately 360 feet. A number of Monterey pines are scattered across the lower slopes of the marine terrace and the only other tree cover occurs in shallow alluvial deposits where small thickets of arroyo willow (*Salix lasiolepis*) grow in the unnamed seasonal drainage. The existing improved driveway provides direct access to the West Parcel.

The Middle 11.4-acre and East 63.3-acre Parcels have no direct vehicular access, however a road easement has been surveyed to provide access to the westerly boundary of the Middle Parcel. The East Parcel extends in a northeasterly direction from the mid-slopes of the marine terrace across steep hillsides up to the top of the coastal ridge. The Middle and East Parcels are also composed of Quaternary marine deposits over Mesozoic granite, with prominent granitic outcrops towards the summit. The steep slopes of the East Parcel are bisected by a small, seasonal drainage that supports disconnected willow thickets along a narrow riparian corridor.

The Middle and East Parcels are predominantly vegetated with Northern Coastal Scrub, with large patches of Coastal Prairie, Annual Grassland and Central Maritime Chaparral. One small eroded depression that supports wetland features was observed at approximately 400-feet in elevation - this appears to be an old stock tank dating from times when the coastal slopes were still grazed by livestock. Coastal Prairie-Grasslands crown the summit of the East Parcel at elevations ranging between 1150 feet and 1375 feet and Northern Coastal Scrub occurs from the edge of the grassy summit down the steep southern flank of Malpaso Canyon. The narrow and extremely rugged Malpaso drainage is lined with redwood-dominated riparian habitat, which also extends for short distances upslope of the stream bottom along small, damp side canyons. Monterey Pine Forest habitat and Redwood Forest occasionally occur together in the Malpaso drainage, which has its headwaters in Garrapata State Park and Palo Corona Regional Park.

According to the Geologic Feasibility Investigation prepared by Terratech in November 1988, the Victorine property is located directly south of a short northwest trending fault approximately 1.5-miles long. This unnamed fault is thought to be potentially active and marine terrace deposits covering the central portion of the SCC land possess a moderate to high ground-shaking

hazard. The Terratech report concludes that "the property is geologically suitable for the proposed development," (Terratech 1988, page 9). This information regarding the fault is not fully substantiated by a more recent geologic report prepared for road repairs along the access driveway (D & M Consulting Engineers 2003). The 2003 geotechnical report references the Geographic Information System data compiled by the County of Monterey, which does not map any faults in the immediate vicinity. It is possible that the 1988 report was referring to traces of the San Gregorio Fault system, which is located approximately two miles southwest of the Victorine property.

In November 1988, holes were drilled at ten potential building sites to conduct soil percolation tests and results indicated that soils drained extremely slowly (Terratech 1988). Old perforated pipes still occur on the property and are presumably at locations tested for suitability of septic features.

3.1.1 Soils: Soils, combined with variations in topography and the substantial range in elevation, create a number of microclimate conditions which influence plant species composition and structure in the natural vegetation communities on the Victorine Ranch property. In general, soils on the property are highly erosive and poorly drained (D & M Consulting Engineers 2003).

- The western portion of the property and all drainage areas are underlain by dissected Xerothents. These unconsolidated alluvial soils occur on steep bluffs and along streams and gullies that have steep gradients and narrow bottoms. Composed of various textures ranging from rocky to coarse sandy loam, Xerothents are easily eroded and tend to vary considerably in depth, permeability and water holding capacity.

- The central, moderately sloped portion of the Victorine Ranch is composed of Haire loam. These moderately well-drained upland soils extend from the rolling marine terraces up to the highest elevation on the property and are derived from granodiorite and arkosic sandstones (originating from granitic bedrock).

- Junipero-Sur complex soils occur from the ridgeline down to the bank of Malpaso Creek. The Junipero and Sur soils are so intermingled that it was not feasible to map them separately in the Monterey County Soil Survey (USDA 1978, p.38). The extremely steep topography and vegetation underlain by Junipero-Sur soils are found in the mountainous Santa Lucia Range, where slopes range between 50 and 85 percent. Junipero soils are derived from granitic and schistose bedrock, while Sur series soils are formed in material underlain by schistose, gneissic or granitic bedrock, or by fractured sandstone or shale.

3.2 Land Use

The SCC property today is sandwiched between undeveloped, public, open space lands to the north and south, and private, residential development on the northwestern margin of the West Parcel. To the north, Monterey County Open Space lands have been conserved in perpetuity to protect the coastal viewshed. On the southwestern edge of the SCC property, Monterey County owns a small Open Space parcel. The remainder of the subject property is bordered on the south

by Garrapata State Park. The State Park wraps over the coastal ridge and along the boundary of SCC holdings in Malpaso Canyon.
The historic Victorine Ranch was once an active cattle ranch with barns, corrals and houses. Little remains of the ranch complex today except for the crumbling blocks of the chimneys where a dairy barn and the main house once stood. These structures were near the entry to the rancho off Highway 1 and they burned to the ground in the mid-1940's (Norman 2004). The Victorine family was noted for its hospitality and drovers herding cattle from Big Sur to markets in Monterey would often stop at the ranch before the last push into town. On the SCC land, the trace of the Old Coast Trail is still visible along the bluffs above Highway 1, and the main vehicular access to the westerly SCC parcel utilizes a portion of this historic roadway. It is not known when the old rancho or the Conservancy's holding stopped being actively grazed.

No surface evidence of potentially significant cultural resources was observed during survey work for the Baseline Biological Assessment, although a battered and rusty horseshoe was collected along the fading trace of the Old Coast Trail. A Preliminary Cultural Resources Reconnaissance of the SCC property was conducted by archeological consultants in 1988 and no evidence of cultural resources was found on the site (Archaeological Consulting 1988).

3.3 Zoning

The Victorine property is located in an unincorporated area of Monterey County and within the Coastal Zone administered by the California Coastal Commission. The SCC land is comprised of three contiguous parcels that have been confirmed with Certificates of Compliance as legal lots of record.

The 99.98-acre property currently has legal descriptions for:

- APN 243-221-019, 25.28 acres. West Parcel. Extends from the Highway 1 right-of-way to the gently sloped coastal terrace east of the highway.

- APN 243-211-025, 11.4 acres. Middle Parcel. Positioned mid-slope on the marine terrace.

- APN 243-211-026, 63.3 acres. East Parcel. Extends from the eastern boundary of the Middle parcel, up over steep hillsides of the coastal ridge, and down to the edge of Malpaso Creek.

The SCC property also may be used as a receiver site for two development credits from coastal viewshed property in the Kasler Point area. According to 1995 correspondence prepared by SCC staff, the Conservancy's overall programmatic goal for the Victorine Ranch project has been the implementation of the Transfer Development Credit Donor-Receiver Model Project (Williams 1995). CEQA review was completed in 1995 for this transfer and an Initial Study and Negative Declaration were prepared to analyze the impact of subdividing the Victorine property and adding two additional building sites to the SCC holdings. Coastal Conservancy staff ultimately did not pursue a subdivision and decided to sell the property "as is".

The property is currently zoned by Monterey County as WSC/40D(CZ) = Watershed and Scenic Conservation, with a maximum density of one lot per 40 acres, within the Coastal Zone. Proposed developments will require design approval and permitting through Monterey County. The SCC parcels are entirely within the Coastal Zone and are located in the Big Sur Land Use Plan Area. Building setbacks and design constraints for potential developments in this zoning designation are defined in the Monterey County Coastal Implementation Plan, Part 1, Title 20, Zoning Ordinance.

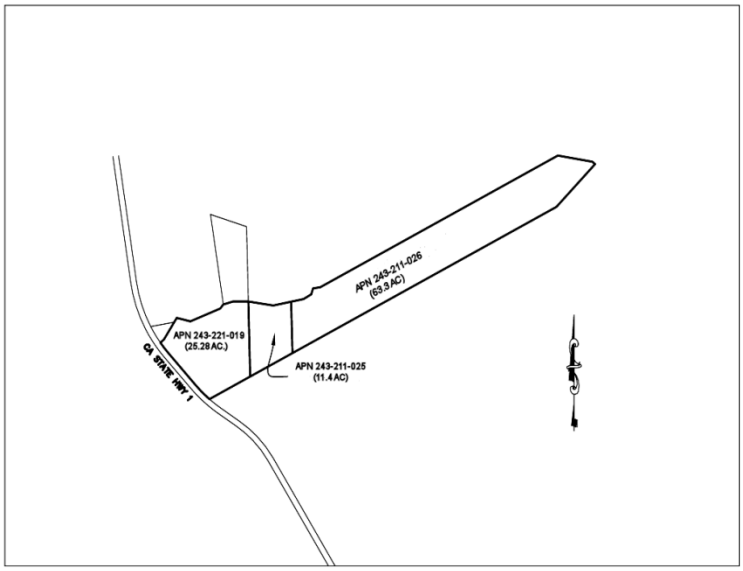

Figure 4 – Unofficial map of County Assessor's Parcels.

4. IMPROVEMENTS

Though undeveloped, the SCC Victorine Ranch has anthropogenic, or human-created elements that influence the land and how the property can be potentially developed. A primary access driveway services the West Parcel. The driveway access is one section of the historic Coastal Trail, which dates to the 1800's. Utility easements are situated along the Highway 1 right-of-way. Old fence posts on the SCC property and an abandoned stock pond (now a wetland) speak to the historic land use as livestock range. In recent decades, soil percolation tests were performed and faint road tracks and trails appear on aerial imagery available from GoogleEarth. There do not appear to be any electrical, phone or water services, nor are there any structures or remnants of historic structures on the Conservancy property.

The Conservancy property is accessed from Highway 1 via a gated, paved private road that crosses a number of private parcels before becoming an improved, dirt driveway. The dirt driveway servicing the SCC parcels crosses the adjoining private residential lot with an access easement (APN 243-221-027), as well as the southwestern corner of the adjacent Monterey

County open space land. At this point, the SCC driveway turns sharply, crosses over a culvert and proceeds several hundred feet to a small turn-around.

Figure 5 – Access driveway and culvert area over seasonal drainage. May 10, 2012.

An access route to serve the Middle SCC Parcel (APN 243-211-025) was surveyed by Rasmussen Land Surveying, Inc. in November 2011. A 20-foot wide corridor was mapped from the terminus of the driveway at the turn-around on the West Parcel (APN 243-221-019) to the western edge of the Middle Parcel (Appendix G). The route is not in the coastal viewshed visible from Highway 1 and avoids sensitive Central Maritime Chaparral habitat. The route is predominantly in Northern Coastal Scrub habitat, with a short reach in Coastal Prairie-Grasslands.

5. BIOLOGICAL CONDITIONS

The vegetation found on the SCC Victorine Ranch is a patchwork mosaic of different habitat types that reflect edaphic (soil) differences, variations in terrain, fire frequency, land use and grazing history, and microclimate conditions. Each natural community in the vegetation mosaic on the Victorine Ranch potentially provides appropriate habitat and environmental conditions for special status plants and animals. The fall/winter biological reconnaissance survey featured in this biological assessment documents what was apparent, or can be inferred during the survey time, with supplemental botanical data collected during informal surveys in spring and summer over a two-year period. In several instances, plant species identification was performed using knowledge of the regional flora and "forensic" botany techniques that depend on general plant morphological characteristics and dry plant material to aid in making a taxonomic determination. Where a positive identification could not be made, the plant taxon was simply identified to genus, if possible.

The majority of the SCC Victorine Ranch property is vegetated with Northern Coastal Scrub and Coastal Prairie natural communities. Coastal Bluff Scrub, a floristically distinct association of Northern Coastal Scrub habitat, occurs in a few very small, disjunct patches along the steep hillside fronting the Highway 1 right-of-way. Significant occurrences of uncommon Central Maritime Chaparral are scattered throughout the property in isolated and botanically interesting islands of this rare habitat. Several widely scattered Monterey pine individuals (*Pinus radiata*) are found on the property and the only other tree cover along the Pacific slope is provided by small arroyo willow (*Salix lasiolepis*) thickets found in discontinuous patches along the narrow, seasonal drainage that bisects the site.

The steep and dramatic eastern margin of the SCC property supports Redwood Riparian habitat along perennial Malpaso Creek. In the lower portion of Malpaso Canyon, Monterey pines form an interesting association with redwoods, which is a plant grouping not found in many other coastal canyons. No botanical or habitat assessment work was conducted in the Malpaso drainage, as the canyon is extremely difficult to hike into from the coastal ridge on the Victorine property and more straight-forward access along the canyon bottom is prohibited by trespass issues. The Victorine property does not extend across Malpaso Creek to the roadway situated on the northern side of the canyon, so it is doubtful whether legal access to this portion of the historic property was ever available. A map of habitat types is presented in Appendix B. Appendix C displays habitat areas mapped over aerial imagery. No habitat mapping or field survey work was conducted in the Malpaso watershed.

Biological assessments have been prepared on the SCC Victorine Ranch property in the past, including a Biological Report (1988) and Addendum (1990) by Bruce Cowan; a Biological Assessment for road repairs by Denise Duffy and Associates (2003); and a Forester's Assessment for road repairs by Stephen Staub (2003).

5.1 Natural Communities

Several of the following natural community descriptions are included by the California Department of Fish and Wildlife in a numeric classification system. A star symbol (*) is used by the Department to designate a high priority ecosystem in the Fish and Wildlife's California Natural Diversity Data Base (CNDDB). Numeric codes follow protocols in the CNDDB 2003 and 2010 lists of natural communities prepared for the State of California by the Department of Fish and Wildlife, Natural Heritage Division.

5.1.1. Northern Coastal Scrub: This natural community is distinguished by woody shrubs that often have pungent leaves and intricate flowers. Northern Coastal Scrub habitat typically occurs along the coast, but can extend inland as far as the presence of regular marine influence. Northern Coastal Scrub occurs throughout the SCC property and extends from the margin of Highway 1 across the gentle terrain of the adjoining marine terrace all the way up and over the steep hill slopes of the East Parcel. The sparse appearance of this evergreen natural community

is characteristic of much of the SCC property on the exposed, south and west-facing hills along the Pacific slope, as well as over the top of the ridge down into steep Malpaso Canyon.

Occasionally referred to as "soft chaparral" because of the flexible stems and foliage of the shrub cover, Northern Coastal Scrub on the Victorine property is mostly characterized by gray-green California sagebrush (*Artemisia californica*). Typical co-dominant species with California sagebrush on the SCC property include poison oak (*Toxicodendron diversilobum*), sticky monkey-flower (*Mimulus aurantiacus* var. *aurantiacus*), lizard-tail *(Eriophyllum staechadifolium*), black sage (*Salvia mellifera*), deerweed (*Acmispon glaber* var. *glaber*) and occasional western bracken fern (*Pteridium aquilinum* var. *pubescens*). Twining coast morning glory (*Calystegia macrostegia* ssp. *cyclostegia*) and wild cucumber (*Marah fabacea*) can often be seen draped over the shrub vegetation. Coffeeberry (*Frangula californica* ssp. *californica*), silver bush lupine (*Lupinus albifrons* var. *albifrons*), mock heather (*Ericameria ericoides*), coyotebrush (*Baccharis pilularis* ssp. *consanguinea*) and sawtooth goldenbush (*Hazardia squarrosa*) occur less frequently in the overall matrix of shrubs, however each of these species is dominant or co-dominant in particular areas.

Breaks in the shrub canopy and margins of disturbed areas support California fuchsia (*Epilobium canum*), bird's-foot fern (*Pellaea mucronata*) and sparse native needlegrass (*Stipa pulchra* and *S. lepida*). Under the thick, closed canopy of generally short shrubs (4-foot average height), yerba buena (*Clinopodium douglasii*) and infrequent bunches of California oatgrass (*Danthonia californica*) occur along the exposed edges of the scrub community, particularly where shrubs are encroaching into grassland, or where there are more open habitat conditions. Several individual lemonadeberry plants (*Rhus integrifolia*) were observed within Northern Coastal Scrub on the SCC property and it is believed these shrubs, which are native to Southern California, have become naturalized from horticultural plantings in the Carmel Highlands area (Matthews 2006).

Seacliff (also called "dune") buckwheat (*Eriogonum parvifolium*), the host plant for the federally endangered Smith's blue butterfly (*Euphilotes enoptes smithi*) occurs in scattered, discontinuous patches throughout the Northern Coastal Scrub community on the Victorine Ranch. The presence of the small, blue butterfly can only be documented during the short flight period of adult butterflies between late June and early August. Individual seacliff buckwheat plants were observed sprinkled across the SCC property from the edge of the Coast Highway to the top of the grassy ridge overlooking Malpaso Canyon. One notably large stand occurs along the shoulder of the access driveway near the culvert crossing of the seasonal stream.

Figure 6 – Northern Coastal Scrub habitat, West Parcel. June 26, 2012.

Figure 7 – Seacliff buckwheat stand along driveway access. November 24, 2010.

5.1.2. Coastal Bluff Scrub (DFW code *31.100.00): A distinctive floristic association of Northern Coastal Scrub occurs on the steep, rocky, wind-swept bluffs and road cuts overlooking the Highway 1 corridor. Characterized by some of the same shrubs as Northern Coastal Scrub, the Coastal Bluff Scrub association tends to have shorter stature, more succulent foliage and

additional salt-tolerant species not commonly found on adjacent uplands. Small, discontinuous patches of this habitat occur on the slope and road cut between the edge of Highway 1 and the topographic break at the edge of the marine terrace on the West Parcel. Coastal Bluff Scrub vegetation seems to colonize eroding, rocky slopes exposed to salt-laden winds where other plant types have difficulty becoming established.

In addition to California sagebrush, deerweed and sawtooth goldenbush, the handful of small patches of Coastal Bluff Scrub habitat on the SCC property support succulent sea lettuce (*Dudleya caespitosa*), Monterey Indian paintbrush (*Castilleja latifolia*), California beach aster (*Corethrogyne filaginifolia*) and seacliff buckwheat. Four over-mature stalks of the elegant rein-orchid (*Piperia elegans*) were found on the top of the coastal bluff and identified based on the compact nature of old flowers densely crowded on the dried racemes. Rock outcrops in this area also support mosses and lichens and several species of native, perennial bunchgrass (*Stipa pulchra, S. lepida, Danthonia californica*).

In addition to interesting Coastal Bluff Scrub patches above Highway 1, a high percentage of non-native species were also recorded on the slope above the roadway. This is likely because of the proximity of the traffic corridor and how the roadway acts as an avenue for the dispersal of exotic species. Ice plant (*Carpobrotus chilensis*), watsonia (*Watsonia* sp.) and jubata grass (*Cortaderia jubata*), among other non-native, undesirable plants, are well-established along the Highway 1 corridor.

Coastal Bluff Scrub is considered Environmentally Sensitive Habitat Area by the California Coastal Commission and has been described as a California Department of Fish and Wildlife threatened plant community (California Coastal Commission Staff Report: Appeal, Revised Findings filed 2/18/2004. Laube and Engel Residence Appeal # A-3-MCO-04-012). It is further classified as a natural community "rare and worthy of consideration" by the CNDDB (2003).

Figure 8 – Coastal Bluff Scrub above Highway 1. May 10, 2012.

Figure 9 – Looking down on the Highway 1 corridor. November 24, 2010.

5.1.3. Coastal Prairie (*Danthonia*/Oatgrass Prairie, DFW Code *41.050.00 and Purple Needlegrass *41.150.00): The SCC Victorine Ranch supports large tracts of high quality Coastal Prairie, an herbaceous natural community occasionally referred to as Coastal Terrace Prairie in the botanical literature. Several different grass species associations within the Coastal Prairie are considered by CNDDB as "rare and worthy of consideration". The Victorine coastal grasslands are characterized by a high density of native, perennial bunchgrasses and although non-native annual grasses are found throughout, the marine terrace and adjoining hillsides on the Victorine Ranch have an extremely high concentration of native perennial bunchgrass species. Extensive native grassland areas also occur on the summit ridge of the East Parcel overlooking Malpaso Canyon.

Patchy in nature, large areas of California oatgrass, needlegrass, and western ryegrass (*Elymus glaucus*) are readily discernible. Leafy bent-grass (*Agrostis pallens*) seems to occupy open areas in some of the more sloped terrain and tufted hairgrass (*Deschampsia cespitosa*) and mellica (*Mellica* sp., probably *M. californica*) were observed. Koeler's grass (*Koeleria macrantha*) and San Francisco bluegrass (*Poa unilateralis*) were noted, as well as the tangled mats and decumbent culms of red fescue (*Festuca rubra*).

Although supporting large stands of floristically diverse, native perennial bunch grasses, the Coastal Prairie on the Victorine Ranch can not necessarily be classified as "healthy" native grassland. In the absence of fire and/or livestock grazing, the herbaceous cover of non-native annual grasses and thatch from native perennial grass species has cloaked large areas of the Coastal Prairie with dry residual matter. The thatch has accumulated over time and limits the germination and flowering of other native species, particularly flowering annuals and perennial

forbs and bulbs. In addition, due to the absence of disturbance from grazing and/or fire, much of the Coastal Prairie on the Victorine Ranch is being gradually invaded by pioneering shrub species in the transitional area between Northern Coastal Scrub and grassland. The ecotone between the two natural communities is now complicated by shrub recruitment into the former grassland habitat. The "dynamic equilibrium" of the grassland ecotone likely shifts back and forth over time if disturbance factors remain a part of the natural ecological cycle. Today, these transitional, woody plant community boundaries are indistinct zones of former herbaceous Coastal Prairie, which will continue to be reduced in areal extent as shrub cover increases along a continuum of habitat succession (Ford and Hayes, 2007).

The Coastal Prairie on the Victorine Ranch has numerous associated plant species that occur as co-dominants in various locations. Non-native rattlesnake grass (*Briza maxima*), wild oats (*Avena fatua* and *A. barbata*), English plantain (*Plantago lanceolata*), curly dock (*Rumex crispus*) and mustards (*Hirschfeldia incana, Brassica nigra, B. rapa*) are found over extensive areas, as are native goldenrod (*Solidago velutina* ssp. *californica*), silver bush lupine and Fremont's star lily (*Toxicoscordion fremontii*). A few small patches of Johnny jump-ups (*Viola pedunculata*) and clumps of Douglas iris (*Iris douglasiana*) are scattered across the marine terrace along with numerous coastal gum plants (*Grindelia stricta*).

Coastal Prairie habitat on the Victorine Ranch is mapped in Appendix B, Appendix C and Appendix H as Coastal Grassland because of the complicated patchwork the native-dominated grassland creates with areas supporting more non-native, annual species. Where Coastal Prairie habitat is infused with a large percentage of non-native annual species, the mixed grassland type is referred to as Coastal Prairie-Grassland in the text of this report.

Figure 10 – Coastal Prairie-Grassland. November 24, 2010.

Figure 11 - Coastal Prairie on East Parcel near ridge-top, looking north. November 30, 2010.

5.1.4. Annual Grassland: Although much of the marine terrace and hill slopes on the Victorine Ranch are mantled with Coastal Prairie that supports high concentrations of native perennial grasses, there are large areas of non-native annual grassland and weedy vegetation that suggest long periods of harsh disturbance, likely from the concentration of cattle. One roundish-shaped area in particular stands out as a haven for non-native, invasive species. Situated mid-way up the coastal slope on the East Parcel at an elevation of approximately 400 feet, the relatively flat grassy area is dominated by wild oats and fringed with poison hemlock (*Conium maculatum*) and dense stands of an unidentified thistle (observed when dead, probably Italian thistle *Carduus pycnocephalus*). The dominance of annual grasses is otherwise patchy throughout Coastal Prairie areas.

Figure 12 – Weed-dominated bench, East Parcel. December 2, 2010.

5.1.5. Central Maritime Chaparral (DFW code *37.308.02): Central Maritime Chaparral is considered Environmentally Sensitive Habitat Area by the Coastal Commission and is also identified as a natural community "rare and worthy of consideration" by the CNDDB. This interesting plant type is characterized by low, dense shrubs, many of which are endemic manzanita (*Arctostaphylos*) and ceanothus (*Ceanothus*) species that occur in narrowly restricted distributional ranges. Found in isolated patches along the immediate coastline, Maritime Chaparral occurs on extremely nutrient-poor soils in areas of persistent marine influence. The presence of numerous endemic plants and special status species makes Maritime Chaparral habitat a storehouse of ecological biodiversity.

Central Maritime Chaparral on the SCC Victorine Ranch is dominated by heavily deer-browsed chamise (*Adenostoma fasciculatum*), which gives the natural community a distinctive rounded and readily recognizable, sort of "mounded" appearance. Patches of this plant community are small and disjunct, and occur from the margin of the coastal bluff overlooking Highway 1 up to the steep slopes of the East Parcel. Several of the Maritime Chaparral patches on the SCC land are monocultures of chamise, however other patches contain shaggy-barked manzanita (*Arctostaphylos tomentosa* subsp. *tomentosa*), Carmel ceanothus (*Ceanothus thyrsiflorus* var. *griseus*), toyon (*Heteromeles arbutifolia*), pitcher sage (*Lepechinia calycina*), silk-tassel (*Garrya elliptica*) and occasional coyotebrush. The highly restricted Monterey ceanothus (*Ceanothus rigidus*), an indicator of Maritime Chaparral in the Monterey region, is found immediately adjacent to the northern boundary of the SCC property on the neighboring property (APN 243-221-027) and on adjoining Monterey County Open Space land. Although growing merely 30 feet from the SCC property boundary in an area with a relatively high density of plants, Monterey ceanothus was not observed in Maritime Chaparral on the SCC parcels.

Figure 13 – Deer-browsed chamise in Central Maritime Chaparral habitat, West Parcel. October 14, 2010.

Several special status plants were noted growing in and adjacent to Maritime Chaparral on the SCC property. Of special note is a small patch of Hooker's manzanita (*Arctostaphylos hookeri*), which is found adjacent to the entry driveway under the canopy of several Monterey pines. This small grouping of Hooker's manzanita seems to be the only occurrence of this Monterey endemic Maritime Chaparral indicator on the SCC property. It has been tentatively identified as the southern-most occurrence of this uncommon plant in the entire state (Vassey 2011).

Figure 14 – Solitary occurrence of Hooker's manzanita under Monterey pine along access driveway, West Parcel. This is the southern-most location of this rare plant in the state. November 24, 2010.

Figure 15 – Close-up of Hooker's manzanita foliage. November 24, 2010.

Figure 16 – Pine rose with persisting sepals, straight prickles, 5-7 leaflets, numerous pistils, and uncommonly pale flowers, Middle Parcel. June 20, 2011.

The uncommon pine rose (*Rosa pinetorum)* was observed on the northern edge of the Middle Parcel in an open area adjacent to a stand of Maritime Chaparral. Both Hooker's manzanita and the pine rose, as well as the Monterey pine are listed by the California Native Plant Society (CNPS) as Rank 1B plants considered rare, threatened or endangered in California and elsewhere. Small-leaved lomatium (*Lomatium parvifolium*), a CNPS Rank 4 plant, is particularly abundant in the Maritime Chaparral understory on the lower slopes of the SCC East Parcel.

Several of the Central Maritime Chaparral stands located on the East Parcel support plants of a native rein-orchid in the *Piperia* genus. These orchids send out short, strap-shaped leaves in the winter months and produce a raceme with identifiable flowers in early summer. One of the local *Piperia* species, the Yadon's rein-orchid (*Piperia yadonii*) is found only growing in association with Central Maritime Chaparral or Monterey Pine Forest around Monterey Bay. This species is listed as federally endangered and populations are known from Maritime Chaparral stands north of Malpaso Creek. Unfortunately, orchid species do not predictably send out leaves and flowers every year and a positive identification of the dry orchid racemes on the SCC East Parcel could not be verified.

Figure 17 – Ecotones between Central Maritime Chaparral, Northern Coastal Scrub and Coastal Prairie, West and Middle Parcels. January 28, 2011.

5.1.6. Central Coast Arroyo Willow Riparian (DFW Code *61.201.01): Riparian habitat is identified in the Big Sur Land Use Plan as Environmentally Sensitive Habitat Area and is also identified as a natural community "rare and worthy of consideration" by the CNDDB. Found in discontinuous thickets along the seasonal drainage on the SCC property, the Arroyo Willow Riparian habitat is marked by clumps of shrubby arroyo willow (*Salix lasiolepis*), which generally grow where watertable levels remain high enough throughout the year to provide moisture in the root zone for these phreatophytic plants. The largest willow thicket occurs immediately upstream of the culvert under the driveway to the SCC West Parcel. Discontinuous and smaller thickets occur upstream, until the seasonal drainage becomes too small to support any tree cover at all. In many portions of the narrow drainage bottom, no distinctive riparian vegetation occurs and Northern Coastal Scrub species predominate.

Near the SCC driveway, the willow thicket shades an open understory of wood mint (*Stachys bullata*), coffeeberry, poison oak, mugwort (*Artemisia douglasiana*), Nuttall's locoweed (*Astragalus nuttallii* var. *nuttallii*) and white nightshade (*Solanum douglasii*). Douglas iris, several species of fern (*Dryopteris arguta, Pentagramma triangularis, Pellaea andromedaefolia*), and rushes (*Juncus patens, J. effusus*) also occur and a few individual plants of sticky monkey-flower and bee plant (*Scrophularia californica*) were observed. Although a reference in SCC correspondence (Grove 2000) refers to "yellow Mimulus-equisetum" (Common monkey-flower, *Mimulus guttatus* and *Equisetum* sp., horsetail) populations along the seasonal creek, neither of these plants were observed during field survey pursuant to this Assessment.

Figure 18 – Central Coast Arroyo Willow Riparian thicket upstream of driveway, West Parcel. January 28, 2011.

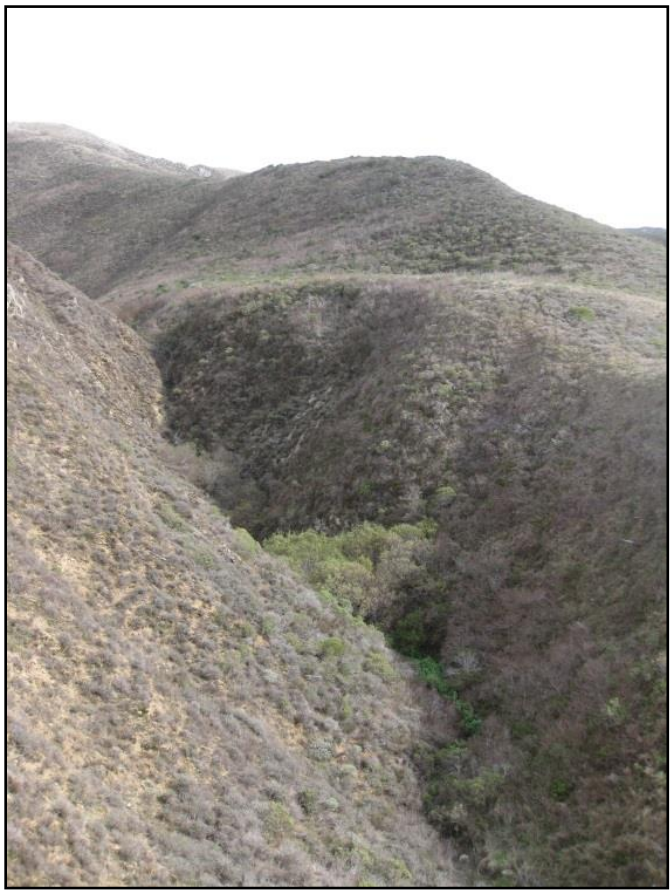

Figure 19 – Small thicket of willow growth along seasonal drainage, East Parcel. December 2, 2010.

5.1.7. Wetland: Wetland habitats are varied and complex on the Big Sur coast and are specifically called out in the Big Sur LUP as Environmentally Sensitive Habitat Areas. Also regulated by the Army Corps of Engineers, Wetland habitats are defined by the presence of indicator species, evidence of saturated soils, and hydrological conditions that inundate the habitat area for certain periods of time.

Wetland conditions, with indicator species and seasonally damp soils, occur upstream of the road culvert, as well as on the SCC driveway at the margin of Central Maritime Chaparral habitat. The depth of coarse alluvium deposited at the head of the culvert does not permit the appropriate soil development and saturation necessary for extensive wetland habitat beyond the area immediately upstream of the pipe, however the flat driveway access supports numerous wetland species that have recruited since the road was improved.

Rushes (*Juncus patens, J. effusus, J. buffonius, J. occidentalis, J. phaeocephalus and J. xiphiodes*) occur on the wetter areas of the roadway, along with goldenrod and several sticky cinquefoil plants (*Potentilla glandulosa*), which prefer moist soils. Soil seepage along the road probably occurs where shallow soil layers (and perhaps aquatards or perched watertables) under adjacent Maritime Chaparral have been truncated by the roadcut. The flat roadway creates a long, narrow, linear area that does not drain adequately, thus creating saturated soil conditions during the rainy season. These conditions are seasonal and roadway soils become hardened and brick-like until sufficient precipitation occurs.

Figure 20 – Driveway wetland vegetation, West Parcel. May 10, 2012.

Spreading rush densely covers the shallow basin and outlet of a small depression found at approximately 400-feet in elevation on the western side of the SCC East Parcel. Most likely an old stock pond developed to collect water for grazing livestock, the depression has eroded and

filled with sediment creating a seasonally damp wetland feature. Fill material originally excavated to construct the pond was placed on the downstream edge of the depression and now is thickly vegetated with spreading rush. The wetland feature in the old stock pond is situated at the ecotone between Coastal Prairie-Grassland and Northern Coastal Scrub habitat.

5.1.8. Monterey Pine: A few scattered Monterey pine trees are found on the Victorine property and although it is possible these trees are planted or have recruited from other planted trees in the adjoining subdivision, native Monterey Pine Forest habitat (DFW code *87.110.00) extends through the nearby Carmel Highlands and across Malpaso Creek only a short distance to the north. It is entirely possible that the pines found on the Victorine property are individual recruits at the southern-most extension of their natural range in this region. Monterey Pine Forest is generally considered Environmentally Sensitive Habitat Area by the Coastal Commission and is also a natural community identified as "rare and worthy of consideration" by the CNDDB. The California Native Plant Society lists Monterey pine as Rank 1B.

The pines are concentrated at the northern boundary of the SCC property along the driveway. A few individuals are scattered across the marine terrace and no pines were observed on the steeper hill slopes below the summit ridge. As described by Staub in his June 26, 2003 letter report "there is a real question as to whether the scattered groups of pines, some of which are clustered in locations that suggest they may have been planted, are of natural origin or even native genetic origin." He further notes that young trees are clearly naturalized seedlings. However, because Monterey pine typically recruits easily in disturbed soils, the presence of individual trees along the roadway may also be due to soil disturbances associated with road maintenance creating appropriate sites for natural germination.

In its native setting, Monterey Pine Forest habitat supports numerous special status plant species, for example, on the Monterey Peninsula where more than a dozen special plants are associated with pine forest associations. On the Victorine Ranch, the trees on site do not occur in a forest setting and are often solitary individuals surrounded by Northern Coastal Scrub, Coastal Prairie or Central Maritime Chaparral habitat. As such, these trees provide valuable cover for birds and other wildlife, and may imply a range extension of Monterey Pine Forest in response to changing environmental conditions (lack of fire and grazing, climate warming). Along the access driveway, individual Monterey pines provide shade and acidic leaf litter for patches of Central Maritime Chaparral, including the notable cluster of Hooker's manzanita.

Figure 21 – Scattered Monterey pine and Central Maritime Chaparral, West Parcel. May 10, 2012.

5.1.9. Malpaso Redwood Riparian: Redwood Riparian Forest (*Sequoia sempervirens*) is a phase of Redwood Forest habitat (DFW code *86.100.00) restricted to the perennial stream reaches of Malpaso Creek. The riparian phase of Redwood Forest occurs where the canyon bottom narrows and stream gradients increase in steepness. Shaded by a dense canopy, the Redwood Riparian community in Malpaso Canyon likely includes many species typically found in similar habitat areas along the Big Sur coast. The steep walls of Malpaso Canyon are vegetated with differing associations of Northern Coastal Scrub and the linear corridor of tall, uncut redwood is restricted to the incised canyon bottom and shady, damp side canyons.

Redwood, tanbark oak (*Notholithocarpus densiflorus*), big-leaved maple (*Acer macrophyllum*) and California bay (*Umbellularia californica*) usually provide the overstory above redwood sorrel and widely scattered shrubs in a Redwood Riparian setting. Vegetation lining the banks of Malpaso Creek likely is discontinuous and is either confined to areas above steep banks, or floodplain terraces immediately adjacent to the active channel in this narrow canyon. The shrub component of the Redwood Riparian Forest can include coffeeberry, thimbleberry (*Rubus parviflorus*), sticky monkey flower, canyon gooseberry (*Ribes menziesii*), Santa Lucia gooseberry (*R. sericeum*), creambush (*Holodiscus discolor*), elk clover (*Aralia californica*) and osoberry (*Oemleria cerasiformis*).

As previously noted, field assessment was not conducted in the Malpaso drainage due to inaccessibility and trespass issues.

Figure 22 – Looking down into Malpaso Canyon from ridge-top, East Parcel.

Figure 23 – View across East Parcel towards Garrapata State Park, November 24, 2010.

5.2. Special Status Plants, Animals and Natural Communities

Special status natural communities, plants and animals include habitats and species that have been defined as being biologically noteworthy and deserving of special protection under federal, state or local laws and guidelines.

The following table figure (Figure 24) notes the special status species that are either present, or may occur on the SCC Victorine Ranch property.

FIGURE 24

FEDERAL, STATE AND CALIFORNIA NATIVE PLANT SOCIETY STATUS FOR SIGNIFICANT PLANTS AND WILDLIFE
IN THE VICINITY OF APN 243-221-019, 243-211-025 and 026

Scientific Name	Common Name	Federal	State	CNPS	Habitat	Found/Not Found
PLANTS						
Arctostaphylos edmundsii	Little Sur manzanita			1B.2	MC	NOT FOUND
Arctostaphylos hookeri	Hooker's manzanita			1B.2	MC	FOUND
Castilleja latifolia	Monterey Indian paintbrush			4.3	CBS, NCS	FOUND
Ceanothus rigidus	Monterey ceanothus			4.2	MC	NOT FOUND potential
Cirsium occidentale var. *compactum*	Compact cobwebby thistle			1B.2	NCS, CP	NOT FOUND potential
Clarkia jolonensis	Jolon clarkia			1B.2	NCS, CP, G	NOT FOUND potential
Cordylanthus rigidus ssp. littoralis	Seaside bird's beak		E	1B.1	C,MC,NCS,OW	NOT FOUND potential
Delphinium hutchinsoniae	Hutchinson's larkspur			1B.2	C,CP,NCS	NOT FOUND potential
Delphinium umbraculorum	Umbrella larkspur			1B.3	OW	NOT FOUND
Eriogonum nortonii	Pinnacles buckwheat			1B.3	C, G, MC	NOT FOUND potential
Fritillaria liliacea	Fragrant fritillary			1B.2	CP, RF	NOT FOUND potential
Lomatium parvifolium	small-leaved lomatium			4.2	MC, MPF	FOUND
Malacothamnus palmeri var. *lucianus*	Arroyo Seco bush mallow			1B.2	C, NCS	NOT FOUND
Pedicularis dudleyi	Dudley's lousewort		R	1B.2	RF	NOT FOUND
Pinus radiata	Monterey pine			1B.1	MPF	FOUND
Piperia michaeli	Michael's rein-orchid			4.2	MC, NCS	NOT FOUND potential
Piperia yadonii	Yadon's rein orchid	E		1B.1	MC, MPF	NOT FOUND potential
Rosa pinetorum	Pine rose			1B.2	MC, MPF	FOUND
Sanicula maritima	Adobe sanicle		R	1B.1	CP,NCS	NOT FOUND potential
Sidalcea malachroides	Maple-leaved checkerbloom			4.2	RF, MEF	NOT FOUND
Tortula californica	California screw moss			1B.2	G, NCS, sandy sites	NOT FOUND
ANIMALS						
Reptiles/Fish/Amphibians						
Ambystoma californiense	California tiger salamander	T	T		ponds, grasslands	NOT FOUND
Anniella pulchra pulchra	California legless lizard		SC		sandy soil	NOT FOUND
Emys marmorota	Western pond turtle	SC	CP,SC		creeks, ponds	NOT FOUND
Oncorhynchus mykiss irideus	Steelhead	T	SC		creeks, rivers	NOT FOUND
Phrynosoma coronatum frontale	California horned lizard	SC	CP,SC		G,C,CS,MC	NOT FOUND

FIGURE 24 - continued

Scientific Name	Common Name	Federal	State	CNPS	Habitat	Found/Not Found
Rana aurora draytonii	California red-legged frog	T	FP,SC		ponds, creeks with pools	NOT FOUND
Rana boylii	Foothill yellow-legged frog	SC,FSS	CP,SC		creeks with pools creeks	NOT FOUND
Taricha torosa torosa	Coast Range newt		SC		with pools, ponds	NOT FOUND
Thamnophis hammondii	Two-striped garter snake	FSS	SC		riparian	NOT FOUND
Mammals						
Neotoma fuscipes luciana	Monterey dusky-footed woodrat	SC	SC*		CS,OW, riparian,MEF	FOUND
Taxidea taxus	American badger		SC		G, CP	NOT FOUND
Birds						
Cypseloides niger	Black swift		SC		cliffs	NOT FOUND
Falco mexicanus	Prairie falcon		SC		G,OW,CP, CS, MC	NOT FOUND
Falco peregrinus anatum	Peregrine falcon		E		clilffs,bridges	NOT FOUND
Invertebrates						
Coelus globosus	Globose dune beetle	SC			dunes	NOT FOUND
Danus plexippus	Monarch butterfly winter roost				euc.,pine, RW groves	NOT FOUND
Euphilotes enoptes smithi	Smith's blue butterfly	E			CS	POTENTIAL

Abbreviations for Status Codes:

E = Endangered
T = Threatened
R = Rare
SC = Species of Special Concern, * indicates potential status change
CP = Protected under California Code of Regulations
FP = Protected under California Fish and Wildlife Codes
FSS = Forest Service Sensitive Species
1B = Plants rare, threatened or endangered in CA and elsewhere
1B.1 = Seriously endangered in California
1B.2 = Fairly endangered in California
1B.3 = Not very endangered in California
4 = Plants of limited distribution in California - A Watch List
4.2 = Fairly Endangered in California
4.3 = Not very endangered in California

Habitat Abbreviations:
C = Chaparral
G = Foothill and Valley Grassland
OW = Oak Woodland
CP = Coastal Prairie
NCS = Northern Coastal Scrub
MC = Maritime Chaparral
MPF = Monterey Pine Forest
RW = Redwood Forest
MEF = Mixed Evergreen Forest
MCF = Mixed Coniferous Forest
MPF = Monterey Pine Forest
CBS = Coastal Bluff Scrub

6. REGULATORY FRAMEWORK

6.1 Special Status Plant and Animal Species

Species formally listed, or proposed for listing as endangered or threatened, or are candidates for such listing under either the federal Endangered Species Act or the California Endangered Species Act, are given legal protection by federal or state laws.

Although not protected by either the federal or state endangered species laws, the plants and animals listed by the California Department of Fish and Wildlife, the federal Fish and Wildlife Service, Monterey County policies, and under the federal Migratory Bird Act as either Species of Special Concern or Fully Protected Species, are given protection against potential impacts and habitat loss by the California Environmental Quality Act (CEQA). CEQA provides management consideration for special status species, as well as natural communities, even though these biological entities are not legally protected by either the federal or state endangered species laws. The Species of Special Concern are classified as those fish, mammals, amphibians, reptiles and invertebrates that may face extirpation if current population trends continue. These species have no legal status, however the Department of Fish and Wildlife requires that they be analyzed during review of proposed development project impacts. Efforts must be incorporated into development proposals to conserve declining populations and avoid the need to list them as endangered or threatened in the future.

CEQA also recognizes plants listed by the California Native Plant Society (CNPS) as Rank 1B (plants rare, threatened or endangered in California) as special status species. The CNPS website states that, "Plants with a California Rare Plant Rank of 1B are rare throughout their range with the majority of them endemic to California. Most of the plants that are ranked 1B have declined significantly over the last century. California Rare Plant Rank 1B plants constitute the majority of taxa in the CNPS *Inventory*, with more than 1,000 plants assigned to this category of rarity. All of the plants constituting California Rare Plant Rank 1B meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Wildlife Code, and are eligible for state listing. It is mandatory that they be fully considered during preparation of environmental documents relating to CEQA."

6.2 Special Status Natural Communities

Habitat types considered uncommon or important for legally protected plants and animals are safeguarded under federal, state and local laws. Wetlands, riparian corridors, areas of high biological diversity, unusual or restricted vegetation types, and areas supporting legally protected species are considered special status habitats. These habitats are noted on the Department of Fish and Wildlife's California Natural Diversity Data Base (CNDDB) "Natural Communities List" (CNDDB 2003 and 2010). These habitat types are also considered by the California Coastal Commission as potentially constituting Environmentally Sensitive Habitat Areas (ESHA) in the state Coastal Zone. In addition to federal and state regulations affecting wetlands, riparian corridors and special status communities, local jurisdictional ordinances and policies also identify specific natural areas or taxa as worthy of protection. In the case of Monterey

County for example, policies outlined in local zoning ordinances dictate that oak trees over 6-inches in diameter require special permits before removal – these permits generally have conditions that offset the removal of trees with requirements for planting and stewardship of commensurate habitat.

6.3 Summary

6.3.1. Environmentally Sensitive Habitat: The Victorine Ranch occurs in the Coastal Zone and Big Sur Planning Area of Monterey County and land use proposals are subject to provisions set forth by CEQA, the Coastal Act and the Monterey County General Plan. Under CEQA, all development proposals that have to potential to impact environmental features are subject to review. If development proposals have the potential to disturb special habitat areas or special status species, permitting through federal, state or local protocols is required.

Development policies and regulations specific to the Big Sur Land Use Area are outlined in the Big Sur Coast Land Use Plan (LUP), Local Coastal Program (LCP), which was adopted by the Monterey County Board of Supervisors in November of 1985 and certified by the Coastal Commission in April 1986. The Monterey County Board of Supervisors adopted a revised General Plan on October 26, 2010 and each local planning area, including Big Sur, will soon embark on revisions and updates to the Land Use Plans and Implementation Plans currently in place.

The California Coastal Act provides that the Coastal Commission periodically review the implementation of Local Coastal Programs to determine whether the LCP's are effectively carrying out the goals and policies of the Coastal Act. The California Coastal Commission, in cooperation with Monterey County, conducted a periodic review of Monterey County's Local Coastal Program during 2002 and early 2003. The review was focused on implementation of the LCP and resource changes occurring in Monterey County's Coastal Zone since the Coastal Commission certified the LCP and the County began issuing coastal development permits.

In September 2004, the Coastal Commission prepared revised Findings regarding Monterey County's Local Coastal Program and new policies regarding the protection of Environmentally Sensitive Habitat Areas (ESHA) were proposed. These Findings have not been formally adopted by the Commission, however they guide the agency's review of proposed development in the County's Coastal Zone.

The Coastal Act language pertaining to ESHA is very broad. It defines ESHA in Section 30107.5, which states that ESHA is:

Any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments.

Historically, the California Coastal Commission has considered these habitats potentially as ESHA:

- Coastal Bluff Scrub
- Central Maritime Chaparral
- Coastal Prairie
- Riparian - Arroyo Willow Riparian
- Wetland
- Redwood Forest - Riparian
- Monterey Pine
- Any habitat area supporting seacliff buckwheat and potential Smith's blue butterfly
- Any habitat area supporting a CNPS Rank 1B plant

Policies pertaining to Riparian habitat are detailed in chapter 3.3.3, page 20 of the 1985 LUP and Section 20.145.040.C.1 (Specific Development Standards, Terrestrial Plant, Riparian and Wildlife Habitats), in the 1988 Coastal Implementation Plan.

6.2. Critical Viewshed: Also described in the original 1985 Big Sur Area Land Use Plan are definitions and policies regarding the "Critical Viewshed" (Chapter 3.2 under Section 3.2.2.1), which states:

Critical viewshed: everything within sight of Highway 1 and major public viewing areas including turnouts, beaches and the following specific locations, Soberanes Point, Garrapata Beach, Abalone Cove Vista Point, Bixby Creek Turnout, Hurricane Point Overlook, upper Sycamore Canyon Road (Highway 1 to Pais Road), Pfeiffer Beach/Cooper Beach, and specific views from Old Coast Road as defined by policy 3.8.4.4.

Policy 3.2.3.B.1 further states, *The critical viewshed does not include areas visible only from the hiking trails shown on the Trails Plan (Figure 3).* Figure 3 of the Big Sur Area LUP depicts existing and proposed trails on public, as well as private lands.

Most of the subject property on the western coastal slope of the Victorine Ranch is within the Critical Viewshed, since the property is visible from Highway 1, Soberanes Point, Garrapata State Beach and the vista point at Abalone Cove. Care was taken during the placement of the vehicular access easement servicing the SCC middle parcel so that development of a future roadway along that alignment will remain outside of the Critical Viewshed.

6.3.3. Monterey County 30-percent Slope Constraints: Monterey County zoning ordinances specify that proposed development and vegetation removal be prohibited on steep slopes in excess of 30%. The SCC Victorine property includes significant land that falls in this category and therefore would not be developable without special waivers of the County's planning protocols. The map figure in Appendix F presents the slope areas greater than 30% on the SCC parcels.

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8. CONSERVATION EASEMENT DOCUMENTATION REPORT

BIOLOGICAL ASSESSMENT

OF

RAJAGOPALAN PROPERTY
APN: 243-221-019

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January 24, 2017

I. INTRODUCTION

This twenty-four page report has been authorized by Jay Auburn (property representative) on October 5, 2016.

This Biological Assessment has been prepared to evaluate potential impacts to plants, habitats, and wildlife that would be generated from a proposed residential development construction project for parcel APN 243-221-019 located at 31613 Highway 1 in Carmel, CA 93923. The report also recommends mitigations needed to reduce potential impacts, maps native plant communities and identifies sensitive biotic resources throughout the subject property.

Field surveys of the subject 25.28-acre parcel and proposed development area were conducted during several site visits in March, May, June, October and December 2016 and January 2017.

II. SUMMARY

The vegetation and habitat descriptions prepared in the June 2013 Baseline Biological Assessment by Consulting Biologist, Nicole Nedeff, developed for the California State Coastal Conservancy were reviewed and site-verified. The species list prepared for the original report was also reviewed and site-verified. Listed species including those not identified on the original Baseline Biological Assessment are included in this Biological Assessment. No significant biological changes to the parcel were identified from the original Baseline Biological Assessment (2013). The residential development locations were not specifically addressed in the Nedeff report and subsequently current biological resource conditions in relation to the proposed residential development are documented in this report. Impact assessments were analyzed based on the proposed development plan and cross-referenced with the original biological assessment submittal. Findings are included in Section V below describing natural communities in the development zone. Impact assessments and mitigation measures are included below in Section VII for the development.

The Rajagopalan parcel supports several sensitive biological elements including populations of seacliff buckwheat (*Eriogonum parvifolium*) the host plant for the Federally-listed endangered Smith's blue butterfly (*Euphilotes enoptes smithi*), small-leaved lomatium (*Lomatium parvifolium*) and Monterey Indian paintbrush (*Castilleja latifolia*) listed by the California Native Plant Society (CNPS) as List 4 species (plants of limited distribution), and pine rose (*Rosa pinetorium*) listed by CNPS as a List 1.B species (rare, threatened or endangered in California and is eligible for State listing). Hooker's manzanita (*Arctostaphylos hookeri*) and Monterey pine (*Pinus radiata*) are listed by the CNPS as a List 1 species (considered rare, threatened or endangered in California and elsewhere). Sensitive habitats on the parcel include Coastal Bluff Scrub, Central Maritime Chaparral, Arroyo Willow Riparian, Coastal Prairie Grassland, Wetland, and Monterey Pine. The predominant plant community of the project site that will experience impacts is Coastal Prairie Grassland. Special status sensitive species and habitats outside the development area are protected in perpetuity through the establishment of a Conservation Easement.

Elements of the project that are situated near sensitive elements have been minimized, and will be mitigated to the degree necessary to allow for the long-term maintenance of those habitats (see Big Sur Coast LUP, Ref. Policies 3.3.2.4 and 3.3.2.7). If the mitigations contained in this report are implemented, the impacts of the proposed project will be reduced to levels that sustain the biotic resources supported at the subject property.

III. REGIONAL SETTING

The subject parcel is located at the northern most delineation within the boundaries of the Big Sur coastal planning area, approximately 0.25 miles south of Mal Paso Creek. The property extends

from its western edge aligning Hwy 1 eastward across a marine terrace with steepening topography further east toward the coast ridge of the Santa Lucia Mountains. Monterey County open space land borders the north of the property and Garrapata State Park borders the southern boundary. The northwestern boundary is home to residential development lots. The subject parcel is accessed from a gated private road off Highway 1.

IV. METHODS

Field methods included walking the entire proposed development areas while surveying the previously identified special plant status areas, inventorying observed plant and animal species, and photographing existing vegetation zones and sensitive elements. Five (5) reconnaissance site visits were conducted between March 2016 and December 2016. Weather conditions were mostly clear and full access to the site allowed for careful site and resource observations. The proposed construction development area was surveyed and staked.

Local maps, consultations with personnel familiar with the project, and the referenced original Baseline Biological Assessment report were utilized during the preparation of this Biological Assessment. The California Natural Diversity Data Base (CNDDB) maintained by the State of California Depart of Fish and Wildlife (DFW) and the California Native Plant Society Inventory of Rare and Endangered Plants (website, 2010), were consulted for the identification of known populations of Federal and State listed rare, threatened and endangered plant species on or in the vicinity of the Rajagopalan project site. Survey methods included utilizing The Jepson Manual (Hickman 1993), Invasive Plants of California's Wildlands (Bossard, Randall, and Hoshovsky 2000), A Manual of California Vegetation (Sawyer and Keeler-Wolf 1995), An Illustrated Field Key to the Flowering Plants of Monterey County (Matthews 2006), Big Sur Land Use Plan (Monterey County and certified by the CA Coastal Commission 1986), The Natural History of Big Sur (Henson and Usner 1993), and Coastal Implementation Plan, Part 3 (Monterey County – Regulations for Development in the Big Sur Coast Land Use Plan 1988).

V. NATURAL COMMUNITIES

The undeveloped parcel consists of many distinct diverse plant communities detailed within this report and mapped on the attached edited Vegetation Map from the June 2013 Baseline Biological Assessment report by consulting biologist, Nicole Nedeff. The previously identified and mapped plant communities (Ref. attached Vegetation Map, 2012 with current added sensitive elements in relation to proposed development) remain consistent with current conditions as outlined below in detail for the specific development areas.

The parcel is accessed from Highway 1 through a gated paved road crossing several residential properties then transitioning to an a dirt driveway along the northwest portion of the subject parcel. Prior to entering the parcel, just north of crossing over a culvert over an unnamed seasonal drainage corridor, a stand of seacliff buckwheat (*Eriogonum parvifolium*) is present along a south-facing slope along northeast side of the dirt road. This stand of buckwheat is not within the subject parcel boundaries but is in close proximity to the ingress and egress point of the parcel and in close proximity to potential parking or staging during construction development activities. Seacliff buckwheat is a food and host plant for the Federally-listed endangered Smith's blue butterfly (*Euphilotes enoptes smithi*). As such, the seacliff buckwheat plants are considered sensitive elements and subject to protection. The potential exists that the Smith's blue butterfly is present on site. *Northern Coastal Scrub* habitat is found in this area near the entry point with the dominant species California sagebrush (*Artemisia californica*). Other co-dominant constituents within this area include coyote brush (*Bacharris pilularis* ssp. *consanguinea*), lizard tail (*Eriophyllum staechadifolium*), sticky monkeyflower (*Mimulus aurantiacus* var. *aurantiacus*), and poison oak (*Toxicodendron diversilobum*). Other less dominant shrub species include mock heather

(*Ericameria ericoides*), coffeeberry (*Frangula californica* ssp. *californica*), and black sage (*Salvia mellifera*). Understory plants are varied and found dispersed throughout the habitat including bent grass (*Agrostis pallens*), twining morning glory (*Calystegia macrostegia* var. cyclostegia), purple needlegrass (*Stipa pulchrum*), yerba buena (*Clinopodium douglasii*), and many other forb species.

Seacliff buckwheat plants on cut slope at entry of property.

Crossing the seasonal drainage and entering the boundaries of the parcel, the habitat types transition into intermixed communities and create complex and diverse converging ecotones. This zone near at the entry road is the most diverse and species rich area of the parcel. The drainage corridor is comprised of *Northern Coastal Scrub* at the upper reaches, blending into *Central Coast Arroyo Willow Riparian* along the drainage channel. Overlapping ecotones of *Central Maritime Chaparral* and *Coastal Prairie Grassland* are found further south at the entry driveway. *Wetland* habitat is also present in this area along the driveway with *Coastal Bluff Scrub* located to the south and west well outside of the development area.

Central Coast Arroyo Willow Riparian habitat is identified in the Big Sur Land Use Plan (Big Sur LUP) as Environmentally Sensitive Habitat and also recognized by the CNDDB as a natural community "rare and worthy of consideration". This habitat extends up (east) and down (west) the drainage corridor on either side of the culvert that crosses the driveway with clumping thickets of arroyo willow (*Salix lasiolepis*) growing in the corridor channel. Associated riparian habitat is varied due to soil moisture availability and slope aspect, with *Wetland* and *Northern Coastal Scrub* habitat species intermingling throughout the corridor immediately adjacent to the culvert crossing. Shady areas support bent grass (*Agrostis pallens*), California mugwort (*Artemisia douglasiana*), wood mint (*Stachys bullata*), mixed ferns, and other forb understory species. The sun-exposed locations in the habitat exhibit sticky monkey flower, bee plant (*Scrophularia californica*), coyote brush, and others including mixed rushes and mixed *Northern Coastal Scrub* species.

After crossing the culvert, further along the driveway toward the south, the habitat transitions from *Northern Coastal Scrub* to *Central Maritime Chaparral*, flanking both sides (east and west) of the driveway access. The California Coastal Commission recognizes the *Central Maritime Chaparral* as an Environmentally Sensitive Habitat Area and this habitat is also considered a natural community "rare and worthy of consideration" by the CNDDB. This community occurs in restricted distribution ranges growing along the immediate coastline. This diverse and species-rich habitat is dominated by chamise (*Adenostoma fasciculatum*) and contains several shrub species including shaggy-barked manzanita (*Arctostaphylos tomentosa* ssp. *tomentosa*), the southern most

occurrence of the endemic species Hooker's manzanita (*Arctostaphylos hookeri*). Hooker's manzanita is included as a List 1B.2 species with the California Native Plant Society Inventory of Rare and Endangered Plant list, meaning it is rare, threatened or endangered in California and is eligible for State listing. Additional shrub components include Carmel ceanothus (*Ceanothus thyrsiflorus* var. *griseus*), silk-tassel (*Garrya elliptica*), toyon (*Heteromeles arbutifolia*), and coffeeberry. Associated understory plants such as bent grass, yerba buena, wood mint and several spring flowering forb taxa including soap plant (*Chorogalum pomeridianum*) and Fremont's star lily (*Toxicoscordion fremontii*) are also present.

Central Maritime Chaparral shown growing on the east and west side of the entry driveway.

Vegetation clearance activities conducted by Cal Fire during the Soberanes Fire adversely impacted areas containing *Central Maritime Chaparral* along the driveway including a section of vegetation from a dozer leading from Hwy 1 eastward up the slope to the driveway continuing eastward through grassland habitat. Along the driveway on either side of the dirt road, manzanita, ceanothus, chamise and other shrub species were cut back to ground level to accommodate fire fighting equipment and personnel for safety. Brush material was cast to the western side of the driveway where it lies today on top of established *Central Maritime Chaparral*.

Impacts to sensitive *Coastal Bluff Scrub* also occurred by firefighting activities on the parcel from bulldozer fire break clearance along the west facing slopes above Hwy 1. *Coastal Bluff Scrub* is considered an Environmentally Sensitive Habitat Area by the California Coastal Commission, recognized as a threatened plant community by the California Department of Fish and Wildlife, and classified as a natural community "rare and worthy of consideration" by the CNDDB. Proposed development is situated eastward, well beyond areas containing *Coastal Bluff Scrub.*

Fire clearance cut brush in Central Maritime Chaparral habitat along entry driveway.

Dozer line from fire clearance activities during the Soberanes Fire. Dozer line crossed through Central Maritime Chaparral, Northern Coastal Scrub, Coastal Prairie Grassland and Coastal Bluff Scrub habitats.

Along the man-made entrance driveway (a remnant ranch road) aligning the edges of the *Central Maritime Chaparral*, seasonally damp soils from the road cut support *Wetland* species. *Wetland*

habitat is recognized in the Big Sur LUP as an Environmentally Sensitive Habitat Area (Ref. Policy 3.3). The *Wetland* habitat along the driveway supports a number of rush species including the dominant spreading rush (*Juncus patens*) as well as other wetland indicator rush species; common toad rush (*Juncus* bufonius), common rush (*Juncus effusus*), and others. The entry road was likely improved during the ranching era, though this historic section at the entry is documented as a remnant portion of the Old Coast Trail (Ref. *Baseline Biological Assessment,* Nicole Nedeff, 2013). The flat roadway does not have adequate drainage in a few areas along the entry and as a result wetland species likely recruited to the road after it was originally graded for access or later improved in the ranching era. This road is the primary access to the parcel and will be used for the ingress and egress for the proposed development. Several Monterey pines (*Pinus radiata*) of varying age and diameter are found flanking the entry road area. The Monterey Pine is a CNPS Listed 1B.1 rare species (Threat Rank 0.1 is defined as "seriously threatened in California – high degree/immediacy of threat"). All plants constituting List 1B meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and are eligible for state listing. Monterey pines are located along the driveway and are positioned in areas that are not anticipated to have any construction impacts. Also in this area the highly invasive exotic species sticky eupatorium (*Ageratina adenophora*) is present in small and manageable patches along the road.

Wetland rush species growing along existing entry road.

Approximately 500-feet along the driveway south of the culvert, the access driveway turns east heading uphill along a gently sloped marine terrace and gradually meanders northeast to the

proposed development site. The well-head is positioned at the turn, south of the driveway before the drive turns upslope. Highly invasive French broom (*Genista monspessulana*) is found at the turn at the edge of the *Central Maritime Chaparral*, northwest of the newly proposed road uphill of the drive past the turn. Proposed water and hydrant lines to the residence will be located south of the residence in a nearly direct line west to the well head. The proposed infrastructure and residential development lie almost exclusively within degraded *Coastal Prairie Grassland.* The grassland exhibits varying degrees of species diversity throughout the terrace and is intermixed with scatterings of colonizing species from the *Northern Coastal Scrub* complex primarily from coyote brush. Non-native annual grassland species are pervasive and the dominant species in the grasslands found throughout the development area. Without the management tool of grazing cattle or annual mowing, the annual grasses are adversely impacting the ecology of the *Coastal Prairie Grassland*. The CNDDB recognizes *Coastal Prairie Grassland* (with *Danthonia californica* and *Stipa pulchra* constituents) as a grassland habitat that is "rare and worthy of consideration". The provisions of the Big Sur Coast LUP, Policy 3.3.3.A.7, states "*Land uses in areas where natural grassland is found shall be compatible with the maintenance of the habitat. Development shall be sited and designed to avoid disturbance or destruction of* ***grasslands****. Compatible uses include managed grazing and low-intensity recreational and residential uses."* California coastal prairies are home to the most diverse flora of North American grasslands, which can include up to 80 endemic species whose populations are found only in California's coastal prairies and are noted to support as many as 250 species of native wildflowers. These grasslands also provide forage and habitat for many wildlife species.

Overview of proposed residential development location within Coastal Prairie Grassland.

The *Coastal Prairie Grassland* within the proposed development area is degraded from the overwhelming colonization of exotic annual grasses including wild oat (*Avena fatua*), slender oat (*Avena barbata*), and big quaking grass (*Briza maxima*); all classified by the California Invasive Plant Council (Cal-IPC) as invasive plants having adverse impacts on native ecosystems. The dominance of these invasive grasses in this lower, gently sloped area of the old Victorine Ranch is likely due to high concentrations of cattle and long periods of intensive disturbance from overgrazing. Other non-native annual grasses and forb species inhabit the site including English

plantain (*Plantago lanceolata*), wild mustard (*Hirschfeldia incana*), red stemmed filaree (*Erodium cicutarium*) and others. To a much lesser degree, native bunch grasses are found in the development area consisting of the dominant California oatgrass (*Danthonia californica*), co-dominated with purple needlegrass (*Stipa pulchra*) with an associated herbaceous alliance scattered across the grassland that includes checkerbloom (*Sidalcea malviflora*), California buttercup (*Ranunculus californicus*), soap plant (*Chlorogalum pomeridianum*), blue-eyed grass (*Sisyrinchium bellum*) and other spring flowering annual taxa. Coyote brush and other *Northern Coastal Scrub* shrubs are encroaching into the grasslands of the parcel and without management would eventually result in a change of the ecological dynamic of the grasslands, as it would likely revert to a scrub natural community. The grassland community extends uphill and eastward on the adjacent parcel for additional estimated 8 (eight) acres.

The *Coastal Prairie Grassland* on the subject parcel encompasses approximately 392,000-square feet of which the residential development portion of the project (including pool and hardscape) proposes the impact of approximately 14,400-square feet within the grassland. In addition, approximately 7,500-square feet of impact will occur for the driveway development along the grassland terrace. In an effort to eliminate off-hauling of an estimated 7,000-cybic yards of excavated soil materials required for the residential development, additional impacts are proposed to distribute the excavated soils onto the degraded areas of the grassland along the terrace below the residence and restore those impacted areas back to native *Coastal Prairie Grassland*. The estimated impact to the grassland for the soil distribution is approximately 77,800-square feet. This proposed area of soil distribution is located in an area of degraded *Coastal Prairie Grassland* exhibiting a similar nature of quality and species composition as described earlier for the development area. Total area of the proposed grassland impact is estimated at 99,700-square feet of which 77,800-square feet is proposed for grassland restoration. Excluding the proposed restored grassland areas, the total area of grassland lost to the development is estimated at 21,900-square feet. To offset the grassland impact, mitigation recommendations are included to expand the existing grassland by mowing the encroaching coyote brush in areas where it is pioneering into the fringes of the ecotones along the grassland to coastal scrub habitats (see Mitigation 7.5). In addition, 2,409-square feet of green roof is proposed for the residence in which *Coastal Prairie Grassland* species will be used to plant the living roof in a manner that mimics the surrounding grassland habitat.

The areas along the fringes of the ecotones outside of the development zone between *Northern Coastal Scrub* and the *Coastal Prairie Grassland* exhibit the highest degree of native grassland elements, likely due to less intensive disturbance in those areas when the parcel was a working cattle ranch. The highest degree of native biodiversity in the grassland is located outside the development area south and southwest of the driveway before the driveway turns eastward uphill. The grassland in this area is dominant in native grasses including California oatgrass, purple needlegrass, and red fescue (*Festuca rubra*). Associated native forb constituents are diverse in this area, though pioneering shrub species, primarily coyote brush, are advancing into the grassland. Several rush and sedge species including iris-leaved rush (*Juncus xiphiodes*) and field-clustered sedge (*Carex praegracilis*) demonstrate portions of this area to be a seasonally wet terrace with high soil moisture characteristics during the winter and spring seasons. The old ranch road currently leading up to the development, but slated for decommissioning, also is an area with a higher degree of native California oatgrass, likely due to the compaction of soils, tire track impacts from vehicles and lack of opportunity for invasive annuals to get a foothold.

No listed rare or endangered plant species were noted in the proposed development area within the *Coastal Prairie Grassland*, however rare listed species and habitat were noted along the north and northeast borders of the development and driveway area on the edges of the grassland near the edge of the ravine that overlooks the seasonal drainage corridor (see attached *Vegetation Map* for specific locations). These sensitive elements will require protection measures to avoid any

adverse construction impacts including equipment staging, parking, landscaping, or fire clearance activities. The following six listed elements were noted to occur outside, but in close proximity, of the project area north and northeast of the proposed new driveway leading to the residence:

1. Small-leaved lomatium (***Lomatium parvifolium***) were observed within the parcel along the top edge of the ravine. This species is a List 4.2 (Plants of Limited Distribution) of the California Native Plant Society Inventory of Rare, Threatened, and Endangered Plants of California, 8th Edition, 2010. "List 4.2 plants are not 'rare' from a statewide perspective, but are uncommon enough that their status should be monitored regularly". The CNPS Threat Rank is an extension added onto the CNPS List and designates the level of endangerment by a 0.1 to 0.3 ranking. Threat Rank 0.2 is defined as "fairly threatened in California (20-80% of occurrences threatened / moderate degree and immediacy of threat". CNPS also ranks this plant with a State Ranking of S3, "vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation". More than 40 small leaved lomatium plants were identified along the creek bank north of the development area.

Small-leaved lomatium growing along edge of drainage corridor north of proposed development area.

2. **Central Maritime Chaparral** is recognized by the California Department of Fish and Wildlife as a sensitive element within the Soberanes Quadrangle, identified as a natural community "rare and worth of consideration". This ecologically diverse shrubby habitat type is found in small groupings in close proximity to the development area (though outside of the flagged zones), containing

several locally endemic and special status plant species. This community is noted along the entry driveway as noted previously and also is present northeast of the parcel on the adjacent parcel.

3. Along the northern boundaries of the building envelope, *Northern Coastal Scrub* habitat is found in isolated stands overlapping into the grasslands. Extensions of this community expand eastward upslope from the development area. This habitat community also supports seacliff buckwheat (***Eriogonum parvifolium***), observed at the edge of the ravine leading down to the seasonal drainage corridor at the north boundary of the flagged development area. Seacliff buckwheat is a food and host plant for the Federally-listed *endangered* Smith's blue butterfly (***Euphilotes enoptes smithi***). As such, the seacliff buckwheat plants are considered sensitive elements and subject to protection. The potential exists that the Smith's blue butterfly is present on site.

Seacliff buckwheat plants growing north and northeast of proposed development area.

4. Another sensitive plant identified in this area is the Monterey Indian paintbrush (***Castilleja latifolia***). This hemiparasitic species, found in limited numbers in the adjacent lot to the northeast but in close proximity to the development area, is a List 4.3 species (Plants of Limited Distribution) of the California Native Plant Society Inventory of Rare, Threatened, and Endangered Plants of California. List 4.3 plants have a low degree and immediacy of threat from a statewide perspective, but are uncommon enough that their status should be monitored regularly. This species should not be affected by the project as it occurs in areas outside the proposed development.

Monterey Indian paintbrush growing north and northeast of proposed development area.

5. Pine rose *(**Rosa pinetorum***) is also found in close proximity to the development. Pine rose is a List 1.B species with the California Native Plant Society Inventory of Rare and Endangered Plant list, meaning it is rare, threatened or endangered in California and is eligible for State listing. This species should not be affected by the project as it occurs in areas outside the proposed development.

6. The seasonal drainage running parallel (east to west) of the proposed driveway up to the residence contains elements of ***Wetland*** and ***Central Coast Arroyo Willow Riparian*** habitats along the drainage channel. These areas were not surveyed as they are well outside the area of development but were noted for the vegetation type. The proposed development does not extend into these areas located down a ravine to the north of the proposed residence and upper reaches of the driveway but the boundaries of the habitats should be fenced with protective fencing to prevent unwarranted impacts during the construction period.

VI. RARE, THREATENED, AND ENDANGERED SPECIES AND HABITAT

The proposed development site was surveyed for occurrences of potential habitat and impacts to rare, threatened, and endangered plant and wildlife species. The site was also surveyed for current sensitive elements listed by the California Department of Fish and Game Natural Diversity Data Base (CNDDB) for the Soberanes Point Quadrangle and adjacent quadrangles. Observations were cross-referenced with the original biological resource findings identified in 2013 Nedeff, *Baseline Biological Assessment* report. The current field research findings indicate consistency with referenced sensitive elements listed and mapped in the 2013 *Baseline Biological Assessment*. The potential for listed special-status wildlife species for the Soberanes Point Quandrangle within the development area was determined to be low, based on the surveys, presence of micro-habitat characteristics, and biological knowledge of the target species.

State Listing is pursuant to Section 1904 (Native Plant Protection Act of 1977) and Section 2074.2 and 2075.5 (California Endangered Species Act of 1984) of the Fish and Game Code, relating to

listing Endangered, Threatened, and Rare species of plants and animals. Federal Listing is pursuant with the Federal Endangered Species Act of 1973.

VII. IMPACT ASSESSMENT, MITIGATION MEASURES, AND RECOMMENDATIONS

Impact 1: Seacliff Buckwheat Protection

Clusters of seacliff buckwheat (the host food source of the Federally-listed endangered Smith's blue butterfly) occur on adjacent property on the driveway road cut just north of the entrance to the property. Other seacliff buckwheat plants in small isolated numbers occur to the north and northeast outside of the proposed residential development (see attached Vegetation Map). Although no Smith's blue butterfly adults or larvae were seen on the subject stands of seacliff buckwheat, populations of the butterfly are documented to exist nearby in the Carmel Highlands, just north of the property.

Mitigation 1:

All identified seacliff buckwheat plants are to be protected from personnel and equipment during grading and construction activities with temporarily protection fencing to be installed prior to any land disturbance or mobilization activities.

Impact 2: Central Maritime Chaparral Protection

Environmentally sensitive *Central Maritime Chaparral* habitat is located in very close proximity to the driveway entrance flanking the entry road with additional clumped stands of the habitat along the northeastern locations of the grassland near the proposed residence. The rare Hooker's manzanita is located growing at the road edges within the area of *Central Maritime Chaparral* along the entry driveway as noted on the attached Vegetation Map. These sensitive elements, though not within the designated area of impacts, could experience adverse affects from road grading or construction activities. Cut brush material from pervious fire clearance actions during the Soberanes Fire is piled on top of the canopy of the *Central Maritime Chaparral* along the west side of the entry driveway.

Mitigation 2:

1. All identified *Central Maritime Chaparral* habitat is to be protected during grading and construction activities with temporarily protection fencing to be installed prior to any land disturbance or mobilization activities. Hooker's manzanita shall also be protected with habitat fencing.

2. Existing staged, cut fire clearance shrub debris along the west side of the entry road should be removed from the canopy of the *Central Maritime Chaparral* habitat and chipped on site or hauled to a green waste facility.

Impact 3: Entry Road Wetland

The Big Sur Land Use Plan Policy 3.3 *Environmentally Sensitive Habitats* states "*Essential roads are permitted in environmentally sensitive habitats provided that in each case there be a finding that no reasonable alternative exists, that no significant adverse impacts will result, and that such uses are in conformance with all other Plan policies. Essential roads are those which are unavoidably necessary to provide a minimum level of access to an existing parcel, where no access road presently exists and no reasonable economic use of the property is possible without such road. Reasonable alternatives are those which would have less impact on sensitive habitats and the critical viewshed…".* There are several wetland constituents located along a few sections of the existing entry road. Biological resource analysis of the area indicates there are no viable alternatives to reroute the road without impacting intact environmentally sensitive *Central Maritime Habitat*, as such it is recommended to continue with the use of the existing entry road as currently

designed. Environmentally sensitive riparian habitat is in close proximity (within 150') of the entry road and could experience impacts from road improvement activities. Per Big Sur LUP Policy 3.3.3.A.4., "a setback of 150' on each side of the streambank shall be required…unless a narrower corridor can be demonstrated to be sufficient to protect existing vegetation…" Any road improvement grading could result in the deposition of excavated material into the seasonal drainage causing reduction of the sensitive habitat found in the corridor. Environmentally sensitive *Central Maritime Chaparral* flanks the entry road and could also experience adverse impacts.

Mitigation 3:
1. It is unclear how the driveway runoff will be diverted, but recommended that impacts to the existing environmentally sensitive *Central Coast Arroyo Willow Riparian* (north and west, topographically downhill of the driveway) habitat be reduced by the installation of a bio-retention swale to be located along the east side of the driveway to allow all road runoff to flow through the manufactured wetland using site collected plants from the existing entry road. The biological degradation of automotive chemicals and other potential contaminants (heavy metals, etc.) will be accomplished by the planted wetland vegetation and no direct runoff is expected to enter the riparian area without first migrating through the planted constructed wetland drainage.

2. All disturbed soil must be stabilized prior to rainfall events and grading activities will avoid deposition of any excavated material or overburden beyond the edge of the road into sensitive habitats.

3. Permeable paving materials will reduce storm water runoff and are encouraged for use.

4. Prior to grading or road improvement activities, plant salvaging is required to remove existing rushes from the entry area of the driveway. These plants will be propagated and replanted into restoration sites of the property.

Impact 4: Coastal Prairie Grassland Habitat Protection and Restoration
To comply with the Big Sur LUP Policy 3.3.2.1 and 3.3.3.A.7 stating "*Land uses in areas where natural grassland is found shall be compatible with the maintenance of the habitat. Development shall be sited and designed to avoid disturbance or destruction of* ***grasslands****. Compatible uses include managed grazing and low-intensity recreational and residential uses"*, the *Coastal Prairie Grassland* outside of the development area shall be protected to the fullest extent in order to retain continuous areas of undisturbed land. Careless human or vehicular traffic during grading and construction phases through the *Coastal Prairie Grassland* beyond the immediate development area is unnecessary and can be detrimental to the habitat ecology. Removal of coastal prairie grassland outside of the development zone and impacts from parking, overflow staging, stockpiling of materials, etc., should be absolutely minimized to only the areas slated for development and restoration.

To accommodate the development, it is estimated in the project civil drawings that over 7,000-cubic feet of soil will be cut from the site. In an effort to eliminate the off-hauling of the material and minimize highway and neighborhood impacts from trucking, the project proposes to retain the soil on site and distribute the material within the grassland area around the development. To achieve this, 75,000 square feet of *Coastal Prairie Grassland* would be impacted, this includes quantified impacts from a proposed septic leach field within the grassland. In order to mitigate for these impacts, the project will require the development and implementation of a *Coastal Prairie Grassland Restoration Plan* to restore all areas of disturbance and soil redistribution locations. Top soils containing the native seed bank, grasses, bulbs and forb constituents will require scraping and stockpiling, then redistribution to the graded areas to cover fill soils. Erosion control measures will be required to cover exposed soils. *Coastal Prairie Grasslands* are complex communities that are disturbance-dependent ecosystems and require management to promote a

healthy ecosystem. Long-term exotic species management will be critical to eliminate invasive species and encroaching native shrubs and promote native grassland flora. In order to develop a healthy and functioning grassland, qualitative and quantitative monitoring will be essential to meet restoration objectives and success criteria. A minimum 5-year monitoring plan shall be implemented with quarterly monitoring reports submitted to the Monterey County Resource Management Agency – Project Planner.

Mitigation 4:

1. Develop a *Coastal Prairie Grassland Restoration Plan* with the primary goal of restoring all impacted coastal prairie grassland habitat with site-identified native coastal prairie grassland species and eliminate all aggressive exotic invasive species that could adversely impact the grassland. Restoration Plan should also include management techniques to expand the grassland into areas where coyote brush has encroached. Objectives for accomplishing the project goals will include:

a. Prior to grading activities, Project Biologist to conduct qualitative and quantitative analysis of existing coastal prairie grassland for baseline data of species compositions.
b. Native plant salvage and stockpiling of native topsoil's during grading activities.
c. Re-broadcast native stockpiled topsoil's onto graded/fill areas.
d. Stabilize soils with erosion control measures and native seed (locally-sourced) hydroseeding.
e. Add salvaged planting stock if applicable.
f. Establish exotic species control protocols and management tools.
g. Establish a monitoring program to track success of exotic species control and establishment of native species. Quarterly monitoring will be conducted for the first three years followed by bi-annual monitoring for years four and five. Success criteria and percent cover analysis to be determined after establishing the baseline data and will be incorporated into the restoration plan.
h. Establish long-term maintenance program for invasive species control, control of encroaching coyote brush, soil stabilization, and other actions noted during monitoring.
i. Avoid impacts to outlining habitats and improve area as habitat for wildlife.
j. All disturbed soils are to be fully restored with the *Coastal Prairie Grassland* species.

2. Prior to mobilization or land disturbance activities, temporary habitat protective fencing must be installed at the development perimeter to prevent unwarranted impacts within the outer grassland and outlining sensitive habitats. The fencing will keep potential development impacts off of the adjacent sensitive habitat resources and shall restrict to the minimum amount necessary to accommodate a reasonable development and grassland restoration area. Material staging and parking shall not be allowable in undisturbed native areas as soil impacts and compaction shall be avoided to maintain the long-term health of the grassland resources. A qualified biological monitor should be on site to coordinate fencing installation and assure there are no impacts within the neighboring sensitive habitats.

3. There shall be no ornamental landscaped areas outside the residential development. All areas surrounding the footprint of the building development shall be contoured to mimic the natural topography and restored using the constituents of the Coastal Prairie Grassland habitat of the parcel. Green roofs are to be installed using Coastal Prairie Grassland species.

Impact 5: General

The proposed residential structure is set outside a 100-foot setback from the recorded sensitive habitat easement and the areas of the new access driveway are located within the previously determined road easement developed by the Nature Conservancy. The wellhead is sited within the boundaries of the existing ranch road. Sensitive elements exist in close proximity to the road easement along the entry point of the existing driveway as previously noted in *Impact 2 + 3*, though the new road development beyond the existing driveway avoids sensitive resources. General best management practices should be in place to protect habitats that are in close

proximity to the driveway improvement and road development. Pre-grading native plant salvaging should also take place prior to earthmoving activities and these plant materials could be propagated and used to restore habitat along the road edges, fringe disturbed areas, or green roof plantings.

Mitigation 5:
1. Use of heavy equipment should be restricted to areas within the development envelope.

2. Sediment control devices should be installed on the downhill perimeter of the construction envelope and exposed soil areas. Specifically, sediment control devices, debris fencing or silt dams should be installed in a manner that the northern drainage corridor and grassland habitat is protected from disturbed excavated or graded construction soils or construction debris from moving offsite. No site erosion shall be permitted to enter areas supporting natural communities beyond the impact perimeter of the development. Disturbed soils shall be stabilized prior to rainy weather, either with the use of biodegradable netting, mulching or hydroseeding with native seed, mulch and tackifier.

3. Excavated clean upper soil horizon sands from the construction site should be used to top dress final landscape restoration areas or hauled to a receiver site. Prior to final grading, all construction debris shall be removed and construction activities completed in the areas to be treated with the native seed mix. To protect grassland habitat and adjacent sensitive habitats from inadvertent soil deposition impacts, excavated material should not be cast into adjacent habitats; rather it should be hauled off location and disposed at a receiver site.

4. Storm water runoff from impervious surfaces must be dispersed in such a way as to prevent rilling and site erosion.

5. After the completion of the soil disturbance activities, any disturbed soils shall be stabilized with native seed of site-identified species and plant materials should be installed in any non-landscaped areas in the fall months prior to or in conjunction with the seasonal rains.

6. Any disturbed soil generated by the project must be kept free of invasive, exotic plant species.

7. To reduce impacts to the seasonal drainage and surrounding sensitive habitats including outlining *Coastal Prairie Grassland* areas not within the development area, grading activities will avoid deposition of any excavated material beyond the road edge.

8. Restoration in all disturbed soils and drainage swales surrounding the structures shall be restricted to Coastal Terrace Prairie habitat species as listed on the restoration landscape plan. Any out-plantings that stray from the specified grassland plant assemblage could negatively impact the extant grassland through competition, shading, or invasion. Not adhering to the guidelines of this impact mitigation could result in adverse impacts to the sensitive native grassland surrounding the structures and would be inconsistent with Big Sur LUP Policy 3.3.3.A.7., mandating that “land uses in areas where natural grassland is found shall be compatible with the maintenance of the habitat”.

Impact 6: Exoitic Species Control
Adoption of a property wide eradication of invasive species should be on going in an effort to enhance and maintain existing native habitats. Several site-identified highly invasive exotic species have the ability to invade environmentally sensitive and other native habitats throughout the property. Implementing an exotic species eradication plan will be consistent with several LUP policies regarding environmentally sensitive habitats (Ref. LUP Policies 3.3.2.1. + 3.3.2.7). Comprehensive eradication of the invasive, exotic species from environmentally sensitive habitats

(and restoration of these habitats) would allow the existing proposed development to be compatible with the habitats occurring on site, and would reduce long-term impacts there, which if left unmitigated would eventually severely degrade or destroy the sensitive habitats. To prevent erosion in areas treated for eradication, exposed areas not stabilized with existing native plants must be revegetated with site appropriate native species endemic to the communities in which the exotics were removed.

Mitigation 6:
1. French boom is a highly invasive plant listed by the California Invasive Plant Council (Cal-IPC) as an invasive species having substantial adverse ecological impacts. Prior to grading activities, to control the spread and reduce the influx of invasive species into the newly developed site, the stand of French broom plants located to the north of the driveway turn as it leads into the grassland outside of the development area should be eradicated prior to setting seed and responsibly disposed in a green waste facility.

2. In order to protect the habitat values of the riparian and central maritime chaparral, the highly invasive sticky eupatorium along the entry road should be eradiated prior to grading activities. Sticky eupatorium is listed by the Cal-IPC as an invasive species having substantial adverse ecological impacts on native plant communities. By hand removing, the sticky eupatorium is less likely to spread from its windborne seeds where it has the ability to thrive in riparian areas and north facing slopes that contain higher amounts of moisture increasing its ability to persist and rapidly spread.

3. Several non-native exotic thistles (see attached species list), listed as invasive by the Cal-IPC, are present in the *Coastal Prairie Grassland* in low quantities, but have the potential to spread rapidly in disturbed soils. Thistles should be mowed prior to setting seed to prevent spread into exposed soils and adjacent habitats. See Impact 7 for seasonal mowing guidelines for grasslands.

4. Several invasive pampas grass plants are located along the entry driveway near the wet area. This plant is highly invasive, especially in areas where disturbed soils are present. These plants have the ability to spread rapidly if unchecked. This species should be removed prior to any soil disturbance activities along the drive. Seed plumes must be bagged prior to removing the plant.

5. All disturbed soil generated during any site grading shall be kept free of exotic species, which if left unattended, could cause inadvertent spread of the species and degradation of the sensitive habitats on the site.

Impact 7: Coastal Prairie Grassland Management
Coastal Prairie Grassland impacts from the proposed residential development and road grading shall be offset by restoration management of existing grassland that has been overcome from opportunistic coyote bush and exotic annual grasses. Exotic annual grasses, coyote brush, and a few other northern coastal scrub shrubs that have pioneered into the grassland can be managed to reduce their presence and expand the grassland while providing better opportunity for the native perennial grasses and associated forb species to persist. Through timely mowing and eradication of invasive species, the native *Coastal Prairie Grassland* constituents will have less competition for available water and nutrient resources and be less likely to be shaded out from non-native annual grass biomass. Expanding the existing grassland through the use of restoration mowing and exotic species control will improve the ecological functionality of the grassland, reduce fuel loads and increase biodiversity of the grassland. A *Coastal Prairie Grassland Restoration Plan* shall be developed (See Impact/Mitigation 4) to describe salvage and growing operations, plant specifications, restoration techniques, and management strategies including long term monitoring protocols required for the restoration and management of the sensitive grassland.

Mitigation 7:
1. Coastal prairie grasslands should be managed with annual mowing and eradication of invasive species including but not limited to French broom, exotic thistles, poison hemlock and others that may appear or persist on site.
2. Mowing should be completed after bird nesting season with a goal of exotic species suppression. Project Biologist should be consulted for timing of mowing activities to avoid potential nesting impacts.

3. Hand removal techniques should be incorporated for spot control of late or early season flowering invasive species that may flower before or after seasonal mowing has occurred.

4. General prescriptions are specified in the Restoration Landscape Plan (Ballerini, 2016). Specific restoration techniques will require yearly analysis and adaptive management to meet restoration goals.

5. Mowing should also include areas containing grassland that is encroached by coyote brush. Annual mowing should cut the coyote brush to ground level with an attempt to expand the grassland boundaries and reduce the encroachment of coyote brush. The grassland should be expanded to mitigate for the loss of grassland due to development impacts by extending the grassland at a minimum1:1 margin (or 21,000-SF).

Impact 8: Fuel Management Plan
In order to satisfy fire clearance mandates, clearance around new structures need not be complete. Whenever possible, islands of native vegetation should be retained within otherwise cleared zones. In areas where seacliff buckwheat and other sensitive elements have been mapped (north and east of the residence), fire clearance should avoid direct contact with these species. Instead, the sensitive plant species would be left intact as islands of vegetation within the clearance. Annual mowing of the *Coastal Prairie Grassland* will help keep fuel loads low and suppress pioneering coyote brush.

Mitigation 8:
Fuel Management goals and prescriptions area outlined in the Restoration Landscape Plan (Ballerini, 2016).

Impact 9: Monterey Pines
Scattered Monterey pines are found on the property near the entrance road at the northwestern section of the parcel. Monterey pines are listed by the California Native Plant Society as a List 1B species. Previous reporting (Staub, 2013 and Nedeff, 2013) indicate the few pines on the property could represent recruits at the southern-most extension of their natural range in the region or possibly planted or recruited from nearby planted specimens. Young trees along the road are clearly naturalized seedlings, possibly as a result of soil disturbance from exposed soils derived from road maintenance activities. A few of the pines over 6" DBH are in close proximity to the entry road and damage to several of the tree roots could occur if more than 50% of their root systems are severed.

Mitigation 9:
Though root and tree impacts are not anticipated to occur, grading must avoid detrimental impacts to major roots of the existing pine trees and at least 50% of the existing soil surface around the trees should be preserved.

Impact 10: Coastal Bluff Scrub
A small section of environmentally sensitive Coastal Bluff Scrub habitat was impacted as a result of Cal Fire creating a dozer track (fire break) though the property during fire fighting activities during the Soberanes Fire of 2016. This dozer track is still present and cut shrub castings have

been broadcast across the dozer track. Though not a result of the owner's negligence, Coastal Bluff Scrub impacts have occurred in a small section on a west-facing slope directly above Highway 1. Invasive species can easily overwhelm disturbed soils and storm water runoff from unvegetated slopes can adversely impact water quality and adjacent sensitive habitat.

Mitigation 10:
Coastal Bluff Scrub species will likely recruit into the disturbed tracked area, but erosion control measures and invasive species eradication should take place along this tracked section to ensure soils are stabilized and exotic species remain excluded from the area. The area should be monitored seasonally until the site is stabilized and vegetated with native coastal bluff scrub species.

VIII. LIST OF SPECIES ENCOUNTERED (* indicates exotic species)

Tree Species

Pinus radiata	Monterey pine
Salix lasiolepis	arroyo willow

Shrub Species

Acmispon maritimus var. maritimus	coastal lotus
Acmispon glaber var. glaber	deerweed
Adenostoma fasciculatum	chamise
Antirrhinum multiflorum	sticky snapdragon
Arctostapylos hookeri	Hooker's manzanita
Arctostaphylos tomentosa ssp. tomentosa	shaggy-barked manzanita
Artemisia californica	California sagebrush
Bachcharis pilularis ssp. consanguinea	coyote brush
Ceanothus thyrsiflorus var. griseus	Carmel ceanothus
Ceanothus thrysiflorus var. thyrsiflorus	blue blossum
Echium candicans *	pride of Madeira
Ericameria ericoides	mock heather
Eriogonum parvifolium	seacliff buckwheat
Eriophyllum confertifolium	golden yarrow
Eriophyllum staechadifolium	lizard tail
Frangula californica ssp. californica	coffeeberry
Garrya ellyptica	coast silk-tassel
Genista monspessulana *	French broom
Hazardia squarrosa	sawtooth goldenbush
Heteromeles arbutifolia	toyon
Lepechinia calycina	pitcher sage
Lupinus albifrons var. albifrons	silver bush lupine
Lupinus arboreus	bush lupine
Mimulus aurantiacus var. aurantiacus	sticky monkeyflower
Rhus integrifolia	lemonade berry
Rosa californica	California wild rose
Rosa pinetoreum	pine rose
Rubus ursinus	California blackberry
Salvia mellifera	black sage
Solanum xantii	purple nightshade
Symphoricarpos albus	common snowberry
Symphoricarpos mollis	creeping snowberry
Toxicodendron diversilobum	poison oak

Herbaceous/Forb Species

Acaena pinnatifida var. californica	California acaena
Achillea millefolium	common yarrow
Ageratina adenophora *	sticky eupatorium
Anagallis arvensis *	scarlet pimpernel
Artemisia douglasiana	California mugwort
Astragalus nuttalli	Nuttall's milkvetch
Brassica niger *	black mustard
Brassica rapa *	common mustard
Calochortus albus	white fairy lantern
Calystegia macrostegia ssp. cyclostegia	coast morning glory
Cardamine californica	California toothwort
Cardus pycnocephalus *	Italian thistle
Carpobrotus edulis *	Hottentot fig
Castilleja affinis	Indian paintbrush
Castilleja exerta	pink owls clover
Castilleja foliolosa	wooly Indian paintbrush
Castilleja latifolia	Monterey Indian paintbrush
Centaurea melitensis *	Maltese star thistle
Chlorogalum pomeridianum	soap plant
Cirsium brevistylum	clustered thistle
Cirsium occidentale var. occidentale	cobweb thistle
Cirsium vulgare *	bull thistle
Clarkia purpurea	winecup clarkia'
Clinopodium douglasii	yerba buena
Conium maculatum *	poison hemlock
Corethrogyne filaginifolia	California beach aster
Daucus pusillus	rattlesnake weed
Delphinium patens	coast larkspur
Dichelostemma capitatum	blue dicks
Dichondra donelliana	California ponysfoot
Drymocallis glandulosa	sticky cinquefoil
Dryopteris arguta	wood fern
Dudleya caespitosa	sea lettuce
Epilobium canum	California fuchsia
Erigeron canadensis	Canada horseweed
Erodium cicutarium *	red stemmed filaree
Eschscholzia californica	California poppy
Fragaria vesca	woodland strawberry
Galium porrigens	climbing bedstraw
Gilia capitata	blue field gilia
Grindelia stricta var. platyphylla	Pacific gum plant
Hemezonia congesta ssp. luzulifolia	hayfield tarweed
Hirschfeldia incana *	wild mustard
Horkelia californica	California horkelia
Iris douglasiana	Douglas iris
Lathyrus vestitus	Pacific pea
Logfia gallica *	filago
Lomatium parvifolium	small leaved lomatium
Lonicera hispidula	hairy honeysuckle
Lupinus nanus	sky lupine
Madia elegans	common madia
Madia exigua	little tarweed

Marah gabacea	wild cucumber
Melilotus alba *	white sweetclover
Monardella villosa	coyote mint
Pellaea andromedifolia	coffee fern
Pellaea mucronata	bird's foot fern
Pentagramma triangularis	gold back fern
Phacelia malvifolia	stinging phacelia
Piperia elegans	elegant rein orchid
Plantago lanceolata *	English plantain
Polypodium californicum	California polypody
Polystichum munitum	sword fern
Pseudognaphalium californicum	California everlasting
Pseudognaphalium luteoalbum *	Jersey cudweed
Pseudognaphalium stramineum	Cottonbatting plant
Pteridium aquilinum var. pubescens	Western bracken fern
Ranunculus californica	California buttercup
Raphanus sativa *	wild radish
Rumex acetosella *	common sheep sorrel
Rumex conglomeratus *	clustered dock
Rumex crispus *	curly dock
Rumex salicifolius	willow dock
Salvia columbariae	chia sage
Sanicula crassicaulis	gamble weed
Schrophularia californica	bee plant
Selaginella bigelovii	Bigelow's moss fern
Sidalcea malvaeflora	checker bloom
Silene gallica *	windmill pink
Silybum marianum *	milk thistle
Sisyrinchium bellum	blue-eyed grass
Soladago velutina ssp. californica	California goldenrod
Sonchus asper *	prickly sow thistle
Stachys bullata	wood mint
Stephanomeria virgata	tall stephanomeria
Symphyotrichum chilense	common California aster
Toxicoscordion fremontii	Fremont's star lily
Trichostema lanceolatum	vinegar weed
Triteleia ixioides	golden brodiaea
Viola pendunculata	johnny jump up
Woodwardia fimbriata	giant chain fern
Zeltnera davyi	Davy's centaury

Graminoid Species

Agrostis pallens	bent grass
Aira caryophyllea *	silver hairgrass
Avena barbata *	slender oat
Avena fatua *	wild oat
Briza maxima *	big quaking grass
Briza minor *	little quakinggrass
Bromus carinatus	California brome
Bromus diandrus *	ripgut brome
Bromus hordeaceus *	soft chess
Bromus madritensis *	foxtail brome
Carex praegracilis	field clustered sedge

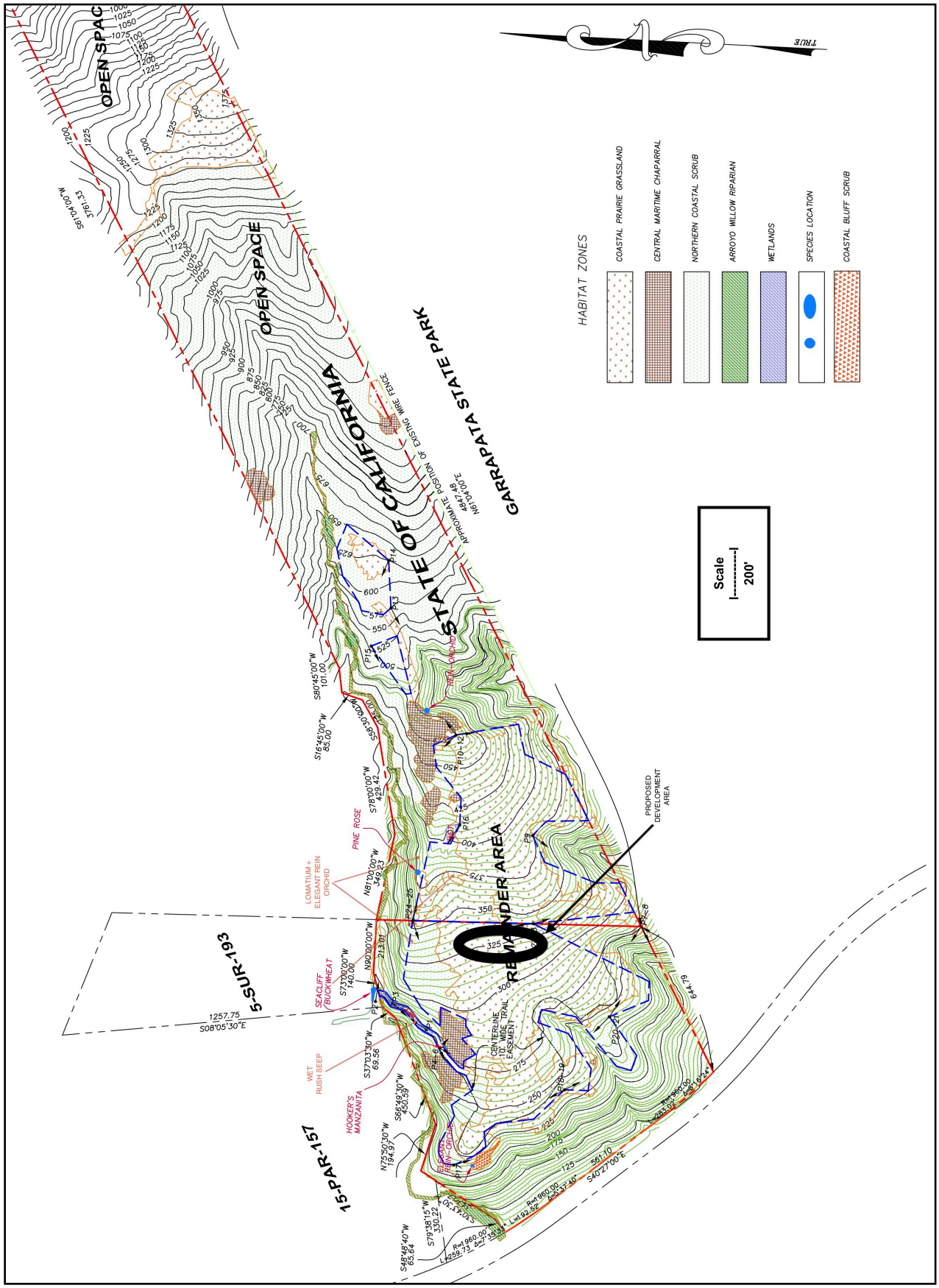
Cortaderia jubata *	pampas grass
Cyperus eragrostis	tall cyperus
Danthonia californica	California oatgrass
Deschampsia cespitosa	Tufted hairgrass
Desmazeria rigida *	ferngrass
Elymus glaucus	blue wildrye
Elymus triticoides	creeping wildrye
Erharta erecta *	veldt grass
Festuca rubra	red fescue
Gastridium ventricosum *	nit grass
Juncus bufonius	common toad rush
Juncus effusus	common rush
Juncus occidentalis	Western rush
Juncus patens	spreading rush
Juncus phaeocephalus	brown headed rush
Juncus xiphioides	iris leaved rush
Koeleria macrantha	june grass
Lolium multiflorum	Italian ryegrass
Lolium perenne	perennial ryegrass
Luzula comosa	common wood rush
Melica californica	California melicgrass
Poa unilateralis	ocean bluff blue grass
Stipa lepida	foothill needlegrass
Stipa pulchra	purple needlegrass

Wildlife Species

Aphelocoma californica	California scrub jay
Apodemus sp.	Field mouse
Buteo jamaicensis	red-tailed hawk
Calypte anna	Anna's hummingbird
Callipepla californica	California quail
Cathartes aura	turkey vulture
Chamaea fasciata	wrentit
Colaptes auratus	northern flicker
Corvus brachyrhynchos	American crow
Elanus leucurus	white-tailed kite
Elgaria multicarinata multicarinata	California alligator lizard
Falco sparverius	American kestrel
Junco hyemalis	dark-eyed junco
Melospiza melodia	song sparrow
Melozone crissalis	California towhee
Odocoileus hemionus	mule deer
Parus rufescens	chestnut-backed chickadee
Pipilo erythrophthalmus	spotted towhee
Plestiodon skitonianus	western skink
Sceloporus occidentalis	western fence lizard
Spinus psaltria	lesser goldfinch
Sylvilagus bachmani	brush rabbit
Tachycineta thalassina	violet green swallow
Thomomys bottae	Botta's pocket gopher
Toxostoma redivivum	California thrasher
Zenaida macroura	mourning dove
Zonotrichia atricapilla	golden-crowned sparrow

IX. REGIONAL MAP

X. VEGETATION MAP



REPORT
to
MR. VIDYA RAJAGOPALAN
C/O STUDIO SCHICKETANZ
P. O. BOX 2704
CARMEL, CALIFORNIA 93921

GEOTECHNICAL REPORT
for the proposed
RAJAGOPALAN RESIDENCE
31613 STATE HIGHWAY ONE
CARMEL, CALIFORNIA
A. P. N. 243-221-019

by

GRICE ENGINEERING, INC.
561-A BRUNKEN AVENUE
SALINAS, CALIFORNIA
DECEMBER 2016

GRICE ENGINEERING INC

ENGINEERING GEOTECHNICS SEPTIC HYDROLOGY
FOUNDATIONS SOILS EARTH STRUCTURES

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File No. 6725-16.12
December 30, 2016

Mr. Vidya Rajagopalan
C/O Studio Schicketanz
P. O. Box 2704
Carmel, California 93921

Project: Rajagopalan Residence
31613 State Highway One
Carmel, California
A. P. N. 243-221-019

Subject: Geotechnical Report

Dear Mr. Rajagopalan;

Pursuant to your request, we have completed our geotechnical investigation and evaluation of the above named site. It is our opinion that this site is suitable for the proposed development, provided the recommendations made herein are followed.

In general, the near surface soils are loose and will need to be taken into account during design and construction of the residence. Recommendations are given relative to this and other characteristics within the report and especially under Special Recommendations.

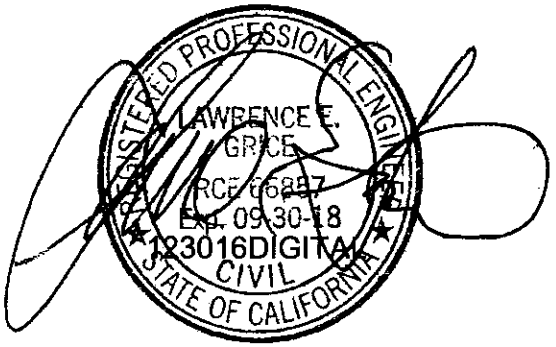
The report contained herein is made with our best efforts to evaluate the site, determine the site's geotechnical conditions and provide recommendations for these conditions. We submit this report with the understanding that it is the responsibility of the owner, or his representative, to ensure incorporation of these recommendations into the final plans, and their subsequent implementation in the field.

In addition, we recommend that GRICE ENGINEERING, INC., be retained to review the project plans and provide the construction supervision and testing required to document compliance with these recommendations. Should any site condition not mentioned in this report be observed, this office should be notified so that additional recommendations can be made, if necessary.

This report and the recommendations herein are made expressly for the above referenced project and may not be utilized for any other site without written permission of GRICE ENGINEERING, INC.

Please feel free to call this office should you have any questions regarding this report.

Very truly yours,
GRICE ENGINEERING, INC.



Lawrence E. Grice, P.E.
R.C.E. 66857

NOTICE TO OWNER

Any earthwork and grading performed without direct engineering supervision and materials testing by Grice Engineering Inc., will not be certified as complete and in accordance with the requirements set forth herein.

Foundations placed without observation of bearing conditions will not be certified as being in accordance with the requirements set forth herein.

Inspection of Work

It is recommended that all site work be inspected and tested during performance by this firm to establish compliance with these recommendations.

NOTIFY:	GRICE ENGINEERING INC.	SALINAS	(831) 422-9619
	561-A Brunken Avenue	MONTEREY	(831) 375-1198
	Salinas, California 93901	FAX	(831) 422-1896

A minimum of 48 hours (2 working days) notification is required prior to commencement of work so that scheduling for testing and inspections can be made.

Please be advised that costs incurred during inspection and testing of all site work is separate and not considered part of the fees as charged by Grice Engineering, Inc. for the report contained herein.

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GEOTECHNICAL REPORT
for the proposed
RAJAGOPALAN RESIDENCE
31613 STATE HIGHWAY ONE
CARMEL, CALIFORNIA
A. P. N. 243-221-019

Introduction, Method and Scope of Investigation

The purpose of this report is to evaluate the geotechnical properties of the site relative to the construction of a single family residence. From these findings recommendations are given for the design of the development and subsequent construction.

For this purpose, the site was investigated, and prior information concerning construction and subsurface exploration in this area was examined for soils and materials data. The investigation consisted of a detailed site evaluation, which included: a site inspection; a review of literature made available to GRICE ENGINEERING, INC., including Site Plans from Studio Schicketanz; geotechnical drilling and soil sampling; materials evaluation; and analysis of the geotechnical properties of the site soils. This report concludes the results of the investigation and provides recommendations based on that work.

The findings and recommendations contained in this report are applicable only to the above named site and its proposed development, and may not be utilized for any other site or purpose without written permission of GRICE ENGINEERING, INC.

Site Description

The project site, 31613 State Highway One, is located approximately 0.49 miles to the east of State Highway One, on a private road, south of the area known as the Carmel Highlands, an un-incorporated area of westernmost Monterey County, California. Please refer to the Vicinity and Location Maps and the Site Map in Appendix A for details.

The topography of the 25.53 acre site encompasses an area containing shallow to moderate slopes on a west-southwest facing marine terrace at elevations of approximately 226 to 344 feet above mean sea level (msl). Along the northeast portion of the site a shallow ridge runs southwest - northeast and drops to the northwest. The building envelope encompasses an area with a moderate slope to the southwest midway on the eastern property line. The majority of the site is covered with native grasses, brush, and several trees.

Currently plans include the construction of a single family residence along the eastern property line, with access by way of a driveway providing access to the private road. The residence is to be made up of a series of rectangular structures linked with enclosed walkways, and lies northwest - southeast within the building envelope. A detached garage is to be located east of the residence's middle portion, with a generous parking area located northeast of the residence and garage. The garage will be accessed by an enclosed walkway.

The residence is to be of conventional wood construction with isolated and/or continuous spread footings. The garage is to have a slab-on-grade floor. Grading is proposed to provide a level building pad, driveways and parking areas.

Domestic water will be provided by a private water service company. Septic waste water will be processed on site by standard septic methods with the effluent dispersed to the subsoils.

Field Investigation

Our field investigation consisted of a site inspection, along with drilling and sampling 13 exploratory bores to establish the subsurface soil profile, and obtain sufficient soil specimens to determine the soil characteristics. Drilling was accomplished by hand and continuous flight auger, with the spoil constantly examined, classified, and logged by field method in accordance with the Unified Soil Classification Chart[1] which is the basis of ASTM D2487-10.

Relatively undisturbed soil samples were obtained by the penetration resistance method, (ASTM Method D1586-08), by which a split barrel sampler (ASTM D-3550-01) was driven a minimum of 18 inches into the sampled materials by free dropping a 140 pound weight 30 inches. The number of blows required to drive the sampler were recorded in 6 inch increments after conversion to Standard Penetration Resistance values utilizing the Burmister Formula. The number of blows required to drive the sampler the last two increments taken as the Standard Penetration Resistance. The split barrel sampler (ASTM D-3550-01), with dimensions of 2.4" I.D. x 3.0" O.D., is provided with 1 inch tall brass ring liners for the purpose of returning the samples to the laboratory in as near *in-situ** condition as possible.

* *In-situ* refers to the in place state of soil. *In-situ* native soils are those which are in-place as deposited by nature and have not been disturbed by man's actions in the historic past.

[1] Adopted 1952 by Corps of Engineers and Bureau of Reclamation. ASTM D2487 was developed as based on the Uniform Soils Classification Chart and System. The methods are equivalent.

Site Soil Profile

As found in the exploratory drilling, the site soils are generally consistent between each of the bores.

The topsoil is silty well graded sands observed in a loose condition and moist to slightly wet at contact with the underlaying horizon. At approximately two feet the clays become dominate in the sands and increase gradually to the next horizon.

Below the topsoil are weathered terrace deposits comprised of fine to medium sands with few-little clays. These materials were observed dense and moist with horizons of increased clays and occasional clasts to approximately 6 inches. The amount of larger clasts increase with depth.

The local granite bedrock is encountered at approximately 19 to 22 feet below grade.

Complete soil characteristics and comments are reported on the boring logs at the depths observed. The logs are located in Appendix B.

Groundwater

No groundwater was encountered at this site to the maximum depth of exploration, approximately 22 feet below grade. Light saturation was noted in the shallow soils above the noted increase in clay content. This saturation most likely increases during and after rainfall.

Laboratory Testing

Laboratory testing consisted of establishing the *in-situ* ** moisture content and dry density (ASTM D 2487-10) and unconfined penetration. Standard Penetration Resistance values gained during the exploratory drilling are also included.

The following is a tabulation of the field and laboratory test result extremes:

TABLE 1

SUMMARY OF SOIL PROPERTIES

TEST	MAXIMUM	MINIMUM
Standard Penetration Resistance	182 blows/foot	105 blows/foot
Unconfined Compression*	9+ kips/ft^2	
In-Situ Density	123.3 lbs/ft^3	
In-Situ Moisture	19.5 %	9.6 %

All data obtained is reported in Appendix B including the boring logs, with soil classified described at depth observed.

* Pocket Penetrometer

** *In-situ* refers to the in-place state.

Seismic History

Although no fault traces are thought to directly cross the building site, Monterey County is traversed by a number of faults most of which are relatively minor hazards for the purposes of the site development. As such, this site will experience seismic activity of various magnitudes emanating from one or more of the numerous faults in the region.

Various maps presently exist, allowing observation on the site of distinctive geologic features. Some maps, such as that by Burkland and Associates (Reference No. 10) developed for Monterey County, are compilations from various sources detailing the locations of studied faults. Faults have inherit variances within their zones, and discoveries of new fault segments or entire faults is ongoing. There is also some difference in exact fault line location from source map to map, making precise location of said faults difficult. Therefore, relative to the information contained within this report, the following is considered to be as accurate as is currently possible from information made available to Grice Engineering Inc..

Regional Faults

Of most concern are active faults which have tectonic movement in the last 11,000 years and as such are called Holocene Faults and potentially active faults. The following are those nearest listed (Reference No. 12).

The most active is the San Andreas Rift System (Pajaro), located approximately 33.4 miles to the northeast. It has the greatest potential for seismic activity with estimated intensities of VI-VII Mercalli in this location.

Other fault zones are the San Gregorio-Palo Colorado (Sur) Fault Zone, the center of which is located approximately 1.9 miles to the southwest, the Monterey Bay-Tularcitos Fault Zone, approximately 7.8 miles to the northeast, the Rinconada Fault Zone, approximately 16.7 miles to the northeast, and the Zayante-Vergeles Fault Zone, approximately 29.2 miles to the northeast. These zones are not as liable to rupture as the San Andreas and a seismic event at any of the above fault zones would likely produce earth movements of a lesser intensity at the site.

Local Faults

In addition to the fault zones as discussed above, the local fault is as listed below as shown on the following maps, "Preliminary geologic map of the Monterey and Seaside 7.5 minute quadrangles, Monterey County, California, with emphasis on active faults" (Reference No. 15), "Geological Map of the Monterey and Seaside 7.5 minute Quadrangles, Monterey County, California: A Digital Database" (Reference No. 16), "Geologic Map of the Monterey Peninsula and Vicinity, Monterey, Salinas, Point Sur, and Jamesburg 15-Minute Quadrangles, Monterey County" (Reference No. 22), "Fault Activity Map of California: California Geological Survey Geologic Data Map" (Reference No. 32), and "Quaternary Fault and Fold Database for the United States" (Reference No. 46) including the USGS overlay on Google Earth.

TABLE OF LOCAL FAULTS

FAULT, PERPENDICULAR TO SITE	APPROXIMATE DISTANCE FROM SITE	DIRECTION	TIME OF LAST DISPLACEMENT ON FAULT (Ref. 32)
Palo Colorado Fault, inferred, concealed beneath the Pacific Ocean	1.10 miles	southwest	Holocene

Liquefaction

The site soils are considered not susceptible to liquefaction as they are un-saturated and dense sands containing a significant proportion of silts and clays.

Differential-Total Settlement - Static and Dynamic

The recommendations given in the Geotechnical Report are such that concerns of settlement are negligible. The total settlement is expected to be less than 1/4 inch and the expected differential settlement less than one half that.

Hydro-Collapse and Subsidence

As observed the near surface soils to an approximate depth of two feet are loose. These soils possess some capacity to settle under hydraulic loading. However this effect is not common in the area. The recommendations given in this report were established to reduce the potential of this occurring.

The area is not within a known Subsidence Zone.

Slope Stability

Inspection of the site indicates that no landslides are located above or below the building area and the area is generally not susceptible to slope failure due to the shallow to moderate slopes and density of the soils.

Seismic Strength Loss

The site soils are considered resistant to seismic strength loss and the resulting momentary liquefaction. The relatively short duration of earthquake loading will not provide a significant number of high amplitude stress cycles to alter the strain characteristics. Additionally the clay-silt fraction is not considered quick nor sensitive, as such it will not have the associated loss of strength.

Chemical Reactivity

The area is well developed with structures, generally found on Portland Cement products. Additionally these structures date back to the 1960's or earlier. Much of the concrete used in these structures has remained as cast. The area soils are not known for sulfate reaction with Portland cement products and as such chemical reactivity is not considered a problem in this area.

Expansive Soils

In general the site soils are or contain clayey sands of very low plasticity. These soils are typical to the area. Expansivity has not been influential to the existing structure as no deformations attributable to expansive soils were observed. Additionally there are no known problems with expansive soils in the area.

Surface Rupture and Lateral Spreading

The project site is located 1.10 miles to the northeast of the Palo Colorado Fault. The site inspection did not reveal any surface features indicating a fault rupture has occurred at the site. The existing structure, driveways and roads do not reveal any strains which would be attributable to subsurface lateral or vertical displacements resulting from fault slip. Therefore surface rupture from fault activity across the site is considered improbable.

The project site is underlain by relatively strong soils and granite bedrock at a relatively shallow depth. These materials are considered resistant to lateral spreading. As such surface rupture from lateral spreading is considered improbable.

Seismicity

It is recommended that all structures be designed and built in accordance with the requirements of the California Building Code's current edition. All buildings should be founded on undisturbed native soils and/or tested and accepted engineering fill to prevent resonance amplification between soils and the structure.

2013 California Building Code Geoseismic Classifications

The California Building Code, 2013 edition (Reference No. 13), provides for seismic design values. These values are to be utilized when evaluating structural elements. The soils profile determination is based on the penetration resistance data developed from advancement of exploratory bores. Using averaged penetration values per depth of soils type gives an overall site value of greater than 50 blows/foot penetration resistance as per Equation 20.4-3, ASCE 7-10. The geoseismic character is as listed in the following table.

2012 I.B.C. - 2013 C.B.C. EARTHQUAKE LOADS: SECTION 1613				
LATITUDE	36.471701	SOIL PROFILE:	Soft Rock	
LONGITUDE	-121.930296	SITE CLASS	C	
PERIOD	S	F	Sm	Sd
0.2 sec	Ss = 1.748	Fa = 1.0	Sms = 1.748	Sds = 1.165
1.0 sec	S1 = 0.694	Fv = 1.3	Sm1 = 0.902	Sd1 = 0.601
Seismic Design Category to be assigned by structural engineer or designer				

CONCLUSIONS OF INVESTIGATION

In general, the suitable, *in-situ**, native soils and certified engineered fill are acceptable for foundation purposes and display engineering properties adequate for the anticipated soil pressures, providing the recommendations in this report are followed.

Special Recommendations

As noted in the exploratory bores, the near surface soils are loose sands and subject to settlement. Therefore it is recommended that foundations bear below these soils or that they be processed as engineered fill. Allowable bearing values and other recommendations relative to foundation are given under **Foundations and Footings** on page 11.

The area is subject to sheet flow drainage in the shallow subsurface soils. Recommendations relative to this are given under **Subsurface Drainage and Drains** on page 15.

On grade structures, eg. interior floor slabs, pavement, etc., should also be provided with adequate support. As such any loose or otherwise unsuitable material which underlays such structures will need to be processed as engineered fill. Further recommendations are given under **Slabs-on-Grade** on page 12 and **General Grading Recommendations** on page 16.

Drainage of surface runoff from rainfall or other sources of water should be released with care for downslope structures. Due to the site soil profile vertical drainage is not possible at this site. Recommendations are given under **Surface Drainage and Erosion Control** on page 14

The base of all excavations and over-excavations are to be inspected by the Soils Engineer prior to further processing, steel or form placement.

Any further site activity, especially grading and foundation excavations, should be under the direction of a qualified Soils Engineer or their Representative.

Should the spectrum of development change, this office should be notified so that additional recommendations can be made, if necessary.

* Suitable, *in-situ,* native soils are those soils which are in-place as deposited by nature and have characteristics adequate for support of the intended load or application.

Foundations and Footings

Geotechnical evaluation indicates that square, round, and continuous spread footings are satisfactory types of support. The minimum embedment for shallow, spread foundations is 12 inches for single stories and 18 inches for two stories into suitable, *in-situ**, native soils or certified engineered fill. Embedment depths do not take into account the loose upper top soils, disturbed soils or any other unacceptable soils which exist at the site, e.g., any un-engineered fill, landscaping soils, etc.

VERTICAL SOIL PRESSURES[1]	
FOOTING TYPE	DEAD + LL, kips/ft^2
Spread & Isolated	3.5
LATERAL SOIL PRESSURES[1]	
TYPE	VALUE, lbs/ft^2
Active Earth Pressure	28 lbs/ft^3 (Equivalent Fluid Pressure)
Restrained Earth Pressure	47 lbs/ft^3 (Equivalent Fluid Pressure)
Seismic	2 lbs/ft^{3}xH^2 applied at 0.6H
Friction at Base	0.35 × Dead Load
Passive Earth Pressure	300 lbs/ft^3 × H^2 NOTE2
Uplift Friction	175 lbs/ft^2 × H

Notes: LL = Live Load; DL = Dead Load; H = Vertical height of material retained. One-third increase to be allowed for wind and seismic forces.
[1] For depths into acceptable native materials or engineered fill.
[2] Excludes near surface 0.5 feet of *in-situ* soils.

Pile and Pier foundation information is not provided as none are required or proposed. All foundation excavations are to be cleaned of debris and loose or otherwise unsuitable soils prior to placement of concrete.

* Suitable, *in-situ,* native soils are those soils which are in-place as deposited by nature and have characteristics adequate for support of the intended load or application.

Slabs-on-Grade

All slabs should be constructed over a prepared sub-grade placed on suitable *in-situ** native material or certified engineered fill. The site exploration observed that the existing surficial soils are loose to depths of approximately 2 feet. These soils should not be relied upon for support of slabs on grade or other surficial structures.

As such where any unsuitable soils remain after excavation to subgrade they are to be processed as engineered fill prior to further fill placement or construction of the on grade structure. At a minimum the upper 6 inches of subgrade below all surficial structures should be processed as engineered fill in areas of on grade structures.

The sub-grade materials should be observed and accepted by a qualified Soils Engineer or their representative prior to placement of forms, reinforcing or concrete..

On-grade slabs should be placed over a moisture vapor barrier consisting of a waterproof membrane (Moist Stop, 10 mil Visqueen, or equal) with a 2 inch protective sand cover. The waterproof membrane should be placed over a capillarity break consisting of 4 inches of open graded rock; round and sub-round rock is recommended to prevent puncture of the membrane. Open graded crushed aggregate may be utilized, provided the vapor barrier is protected from puncture by a cushion of filter fabric (Mirafi 140N or equal) laid over the aggregate prior to placement of the membrane. Where such concerns are not warranted, alternative underlayment may be utilized at the owners discretion.

All care and practice required to prevent puncture of the membrane during placement and pouring of covering slabs should be utilized during construction. Unless otherwise required for structural purposes, all slabs should be reinforced with a minimum of No.4, Grade 40, deformed steel reinforcing bar, 24 inches o.c., each way, to prevent separation and displacement in cases of cracking.

* Suitable, *in-situ,* native soils are those soils which are in-place as deposited by nature and have characteristics acceptable for support of the intended load or application.

Specifications for Rock Under Floor Slabs

Definition: Graded gravel of crushed rock for use under floor slabs shall consist of a minimum thickness of mineral aggregate placed in accordance with these specifications and in conformance with the dimensions shown on the project plans. The minimum thickness is specified under the section Slabs-on-Grade above.

Material: The mineral aggregate for use under floor slabs shall consist of broken stone, crushed or uncrushed gravel, quarry waste, or a combination thereof. The aggregate shall be free from adobe, vegetable matter, loam, volcanic tuff, and other deleterious substances. It shall be of such quality that the absorption of water in a saturated dry condition does not exceed 3 percent of the oven dry weight of the sample.

Grading: The mineral aggregate shall be of such size that the percentage composition by dry weight as determined by the use of laboratory sieves, U.S. Standard, in compliance with ASTM C 136-06, Standard Method for Sieve Analysis of Fine and Coarse Aggregates, will conform to the following grading specification:

SIEVE SIZE	PERCENTAGE PASSING SIEVE
3/4 inch	100 %
No. 4	0 - 10 %
No. 200	0 - 2 %

Placing: Sub-grade upon which gravel or crushed rock is to be placed shall be prepared as outlined in the Recommended Grading Specifications. In addition, the Sub-grade shall be kept moist so that no drying cracks appear prior to pouring slabs. If cracks appear, Sub-grade shall be moistened until cracks close.

Slope Ratio and Drainage

Analysis of site soils indicate that cut and fill slope ratios of 2 horizontal to 1 vertical will be satisfactory provided they are landscaped with soil retaining ground covers and are protected against concentrated over slope drainage. Cut slopes exposing the dense terrace deposit, granite bedrock or similar stable materials may be allowed to steeper gradients. These conditions should be reviewed on site.

Surface Drainage and Erosion Control

Design and construction of the project should fit the topographic and hydrologic features of the site. It is important to minimize unnecessary grading of or near steep slopes. Disturbing native vegetation and natural soil structure allows runoff velocity and transport of sediments to increase.

General surface drainage should be retained at low velocity by slope, sod or other energy reducing features sufficient to prevent erosion, with concentrated over-slope drainage carried in lined channels, flumes, pipe or other erosion-preventing installations.

Runoff flows should be directed into pipes or lined ditches and then onto an energy dissipater before discharging into streams or drainage ways. De-silting should be provided as necessary and may take form of stilling basins, gravel berms, forested/vegetated screens, etc.

All concentrated roof and area drainage should be conveyed and released to the lower portions of the site below and away from structures as divided and dispersed as possible.

Storm runoff should never be directed to septic tank system leachfields and no collected or concentrated drainage should be allowed to discharge to adjacent steep slopes in an uncontrolled fashion.

A sub-surface dispersal system **MAY NOT** be used on this site.

During construction, never store cut and fill material where it may wash into streams or drainage ways. Keep all culverts and drainage facilities free of silt and debris. Keep emergency erosion control materials such as straw mulch, plastic sheeting, and sandbags on-site and install these at the end of each day as necessary.

Re-vegetate and protect exposed soils by October 15. Use appropriate grass/legume seed mixes and/or straw mulch for temporary cover. Plan permanent vegetation to include native and drought tolerant plants. Seeding and re-vegetation may require special soil preparation, fertilizing, irrigation, and mulching.

Subsurface Drains and Drainage

The soils profile is composed of permeable topsoil overlaying relatively impervious terrace deposits. As such free water will be observed to migrate in the topsoil during and after inclement weather. Collection and diversion of such drainage should be provided for up slope of structures. Additionally drainage from crawl spaces and from below slabs on grade should be provided.

The depth of such structures is to penetrate into the denser terrace deposit a minimum of one foot and with the gravel extending to grade. This depth should be readily apparent during excavating and is generally marked by an increase in clay content. The longitudinal slope of such structures should be a minimum of 2% with the collected drainage discharged to daylight away from structures and septic system components.

Use of spun filter fabric is not recommended for use in construction subsurface drains as this type of fabric typically becomes clogged. Should filter fabric be necessary it is recommended that a woven fabric be used such as Mirafi Filterweave 300. Otherwise we would recommend omission of the fabric and placement of Caltrans Class 1, Type 'A" or "B" drain rock, and that any fabric only be placed near the top of the trench between the gravel and earth backfill or where the gravel extends to grade, 1 foot below finish grade.

CLASS 1		
SIEVE SIZES	**PERCENTAGE PASSING**	
	TYPE A	TYPE B
50.0-mm/2 inches	----	100
37.5-mm/1.5 inches	----	95-100
19.0-mm/0.75 inches	100	50-100
12.5-mm/0.5 inches	95-100	-----
9.5-mm/0.415 inches	70-100	15-55
4.75-mm/No. 4	0-55	0-25
2.36-mm/No. 8	0-10	0-5
75.0-µm/No.200	0-3	0-3

General Grading Recommendations

For those items not directly addressed, it is recommended that all earthwork be performed in accordance with the following.

General: This item shall consist of all clearing and grubbing; preparation of land to be filled; excavation and fill of the land; spreading, compaction and control of the fill; and all subsidiary work necessary to complete the graded area to conform with the lines, grades and slopes as shown on the approved plans.

The Contractor shall provide all equipment and labor necessary to complete the work as specified herein, as shown on the approved plans as stated in the project specifications.

Preparation: Site preparation will consist of clearing and grubbing any existing structures and deleterious materials from the site, and the earthwork required to shape the site to receive the intended improvements, in accordance with the recommended grading specifications and the recommendations as provided above.

All vegetable matter, irreducible material greater than 4 inches and other deleterious materials shall be removed from the areas in which grading is to be done. Such materials not suitable for reuse shall be disposed of as directed.

After the foundation for fill has been cleared, it shall be brought to the proper moisture content by adding water or aerating and compacting to a Relative Compaction of not less than 90% or as specified. The soils shall be tested to a depth sufficient to determine quality and shall be approved by the Soils Engineer for foundation purposes prior to placing engineered fill.

General Fill: General fill shall be placed only on approved surfaces, as engineered fill, and shall be compacted to 90% Relative Compaction. Native soils accepted for fill or existing aggregate fill may be used for fill purposes provided all aggregate larger than 6 inches are removed. The material for engineered fill shall be approved by the Soils Engineer before commencement of grading operations.

Each layer shall be compacted to a Relative Compaction of not less than 90% or as specified in the soils report and on the accepted plans. Compaction shall be continuous over the entire area of each layer.

The selected fill material shall be placed in layers which, when compacted, shall not exceed 6 inches in thickness. Each layer shall be spread evenly and shall

be thoroughly mixed during the spreading to ensure uniformity of material in each layer. Fill shall be placed such that cross fall does not exceed 1 foot in 20 unless otherwise directed.

When fill material includes rock or concrete rubble, no irreducible material larger than 4 inches in greatest dimension will be allowed except under the direction of the Soils Engineer.

Imported Materials: Materials imported for fill purposes shall be classified as: SAND, group symbol SW, SP, SC or SM, as given in ASTM 2487-10, "The Classification of Soils For Engineering Purposes." In all cases the portion finer than the No. 200 sieve shall not contain any greatly expansive clays and shall be free from vegetable matter and other deleterious materials. The material for engineered fill shall be approved by the Soils Engineer before commencement of grading operations.

Structural Backfill: Trench, wall and structural backfill shall be placed only on approved surfaces, as engineered fill, and shall be compacted to 95% Relative Compaction. Materials imported for backfill purposes shall have a Sand Equivalent of no less than 30 and shall be classified as Clean Sands as designated in "The Classification of Soils For Engineering Purposes" (ASTM 2487-10).

Pavement Grades: All pavement grades shall be of uniform thickness, density and moisture prior to placement of the next grade. Flexure of each or all grades shall not exceed 0.25 inches in 5 feet under an axial load of 18.5 kip.

Aggregate Base Course: All aggregates used for specified base courses, shall be handled in a manner which prevents segregation and non-uniformity of gradation.

Compaction: All re-compacted soils and/or engineered fill should be placed at a minimum 90% Relative Compaction or at the value required for that portion of the work. All pavement sections should be compacted to a minimum of 95% Relative Compaction.

Field density testing shall be completed by the Soils Engineer on each compacted layer or as determined by the Soils Engineer. At least one test shall be made for each 500 cubic yards or fraction thereof, placed with a minimum of two tests per layer in isolated areas. Where a sheeps'-foot roller is used, the soil may be disturbed to a depth of several inches. Density tests shall be taken in compacted materials below the disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof, is below the required density,

that particular layer or portion shall be reworked until the required density has been obtained.

Moisture: During compaction moisture content of native soils should be that consistent with the moisture relative to 95% Relative Compaction and in no case should these materials be placed at less than 3 percent above the specific optimum moisture content for the soil in question. The engineer may elect to accept high moisture compacted soils provided the materials are at 95% Relative Wet Density at that moisture content.

The moisture content of the fill material shall be maintained in a suitable range to permit efficient compaction. The Soils Engineer may require adding moisture, aerating, or blending of wet and dry soils.

All earth moving and work operations shall be controlled to prevent water from running into and pooling in excavated areas. All such water shall be promptly removed and the site kept drained.

Tests: All materials placed should be tested in accordance with the Compaction Control Tests: "Density of Soil In-Place by Sand Cone Method" (ASTM D-1556-07), "Moisture-Density Relationship of Soils" (ASTM D-1557-09), and "Density of Soils In-Place by Nuclear Method" (ASTM D-6938-10).

The standard test used to define maximum densities of all compaction work shall be the A.S.T.M. D-1557-09, Moisture Density of Soils, using a 10-pound ram and 18-inch drop. All densities shall be expressed as a relative density in terms of the maximum density obtained in the laboratory by the foregoing standard procedure.

Deleterious Materials: Materials containing an excess of 5% (by weight) of vegetative or other deleterious matter may be utilized in areas of landscaping or other non-structural fills. Deleterious material includes all vegetative and non-mineral material, and all non-reducible stone, rubble and/or mineral matter of greater than 6 inches.

Over-Excavations: Over-excavations, when required, should include the foundation and pavement envelopes. Such excavations should extend beyond edge of development a minimum of 5 feet and to an imaginary line extending away and downward at a slope of 45 degrees from the edge of development. The process shall include the complete removal of the required soils and subsequent placement of engineered fill. After removal of the soils to the required depth, the base of the excavation shall be inspected and approved by the Soils Engineer or his representative prior to further soils processing or

placement. Based on this inspection other recommendations may be made.

Existing Conditions: In developed areas underground utilities may be located within the area of proposed construction. In addition, buried objects or deeply disturbed soils may also be encountered. As such all care and practice is to be exercised to observe for and locate any such objects. Where these objects are to be removed or use discontinued, they are to be removed in their entirety and all disturbed soils are to be processed as engineered fill.

Key: All fills on slopes greater than 1 vertical to 6 horizontal shall be keyed into the adjacent soil. The toe of all slopes should be supported by a key cut a minimum of 3 feet into undisturbed soils to the inside of the fills toe. This key should be a minimum of 6 feet in width and slope at no less than 10% into the slope. In addition, as the fill advances up slope benches, 3 feet across, should be scarified into the fill/undisturbed soil interface.

Seasonal Limits: When the work is interrupted by rain, fill operations shall not be resumed until field tests by the Soils Engineer indicate that the moisture content and density of the fill is as previously specified and soils to be placed are in suitable condition

Unusual Conditions: In the event that any unusual conditions are encountered during grading operations which are not covered by the soil investigation or the specifications, the Soils Engineer shall be immediately notified such that additional recommendations may be made.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

The recommendations of this report are based on our understanding of the project as represented by the plans, and the assumption that the soil conditions do not deviate from those represented in this site soils investigation. Therefore, should any variations or undesirable conditions be encountered during construction, or if the actual project will differ from that planned at this time, GRICE ENGINEERING INC. should be notified and provided the opportunity to make addendum recommendations if required.

NOTIFY:	GRICE ENGINEERING INC.	SALINAS	(831) 422-9619
	561-A Brunken Avenue	MONTEREY	(831) 375-1198
	Salinas, California 93901	FAX	(831) 422-1896

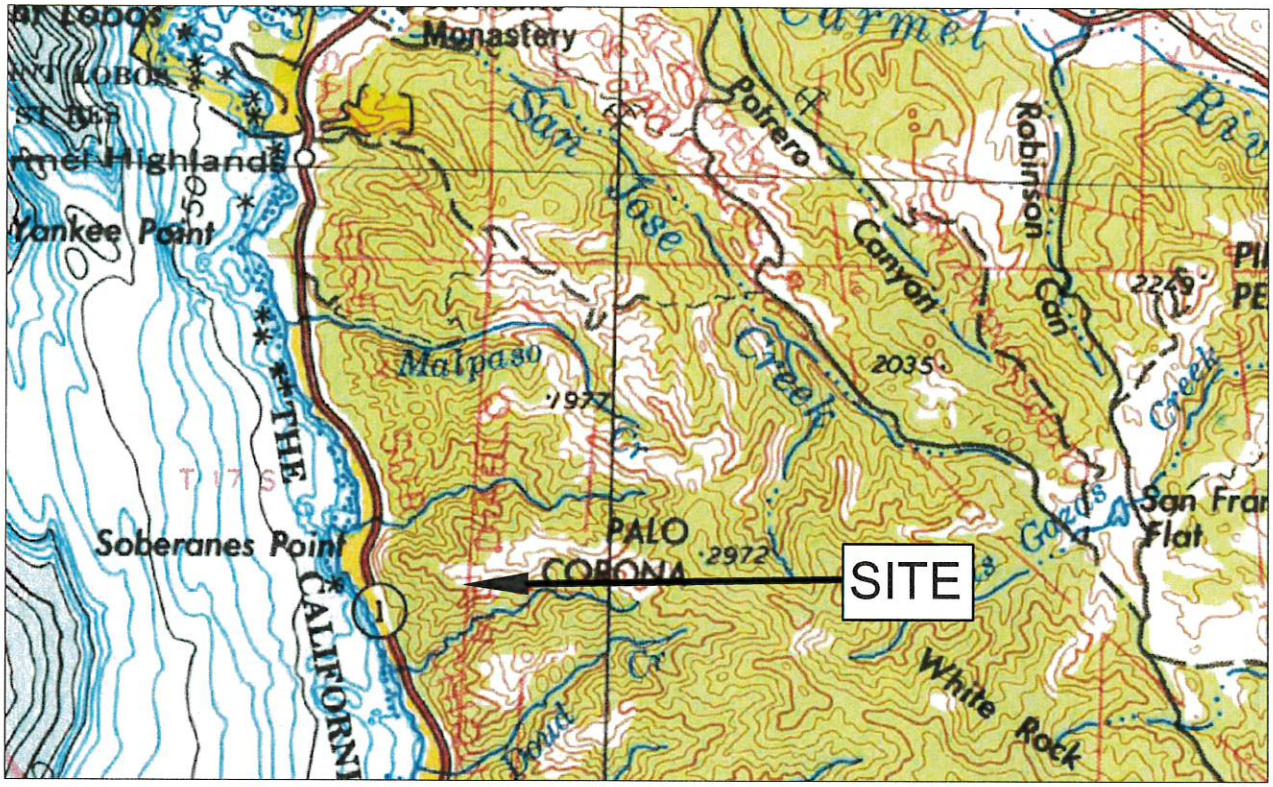
This report is issued with admonishment to the Owner and to his representative(s), that the information contained herein should be made available to the responsible project personnel including the architects, engineers, and contractors for the project. The recommendations contained herein should be incorporated into the plans, the specifications, and the final work.

It is requested that GRICE ENGINEERING INC. be retained to review the project grading and foundation plans to ensure compliance with these recommendations. Further, it is the position of GRICE ENGINEERING INC. that work performed without our knowledge and supervision, or the direction and supervision of a project responsible professional soils engineer renders this report invalid.

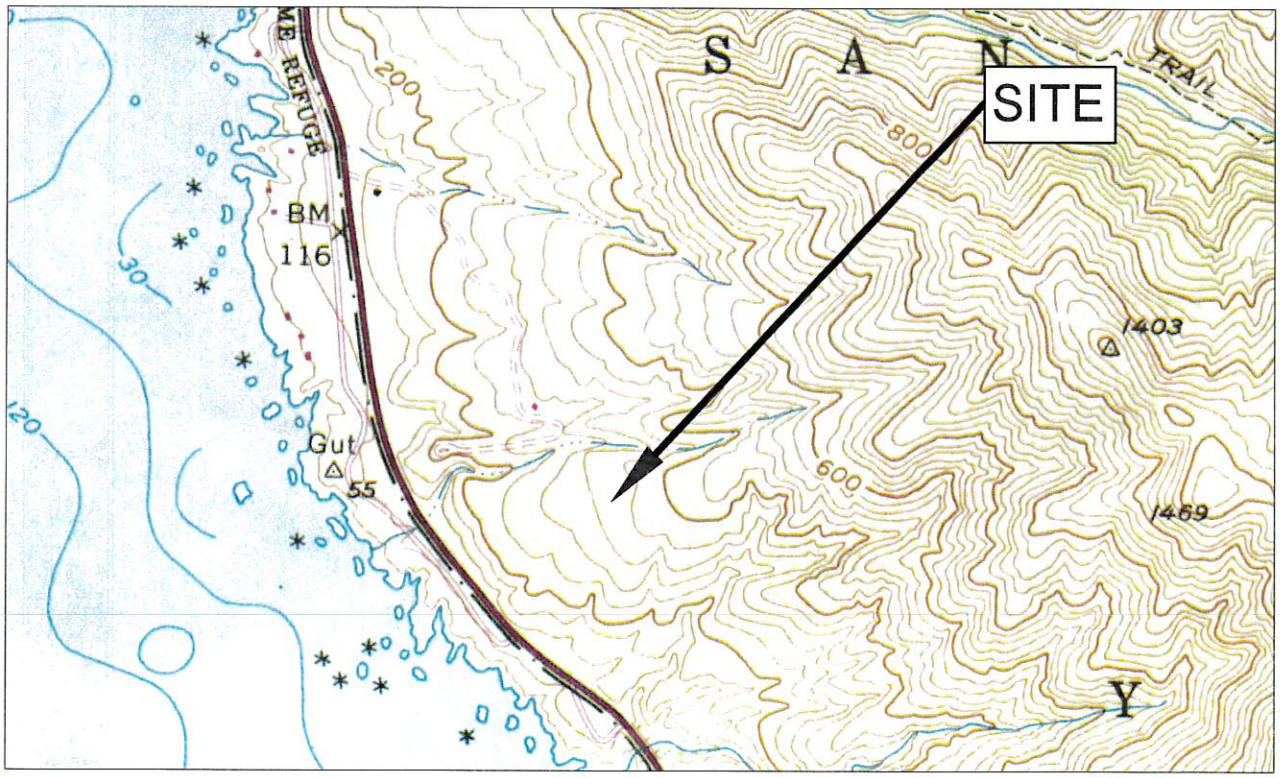
It is our opinion the findings of this report are **valid** as of the **present date**, **however**, changes in the **Codes and Requirements** can occur and change the recommendations given within this report concerning the property. In addition changes in the conditions of a property can occur with the passage of time, due either to natural processes or to the works of man and may effect this property. In addition, changes in **standards** may occur as a result of legislation, or the broadening of knowledge, and these changes may require re-evaluation of the conditions stated herein. Accordingly, the findings of this report may be invalidated wholly, or partially, by changes beyond our control. Therefore, this report is subject to review and should not be relied upon after a period of **three years**.

REVISED 01-07-2011

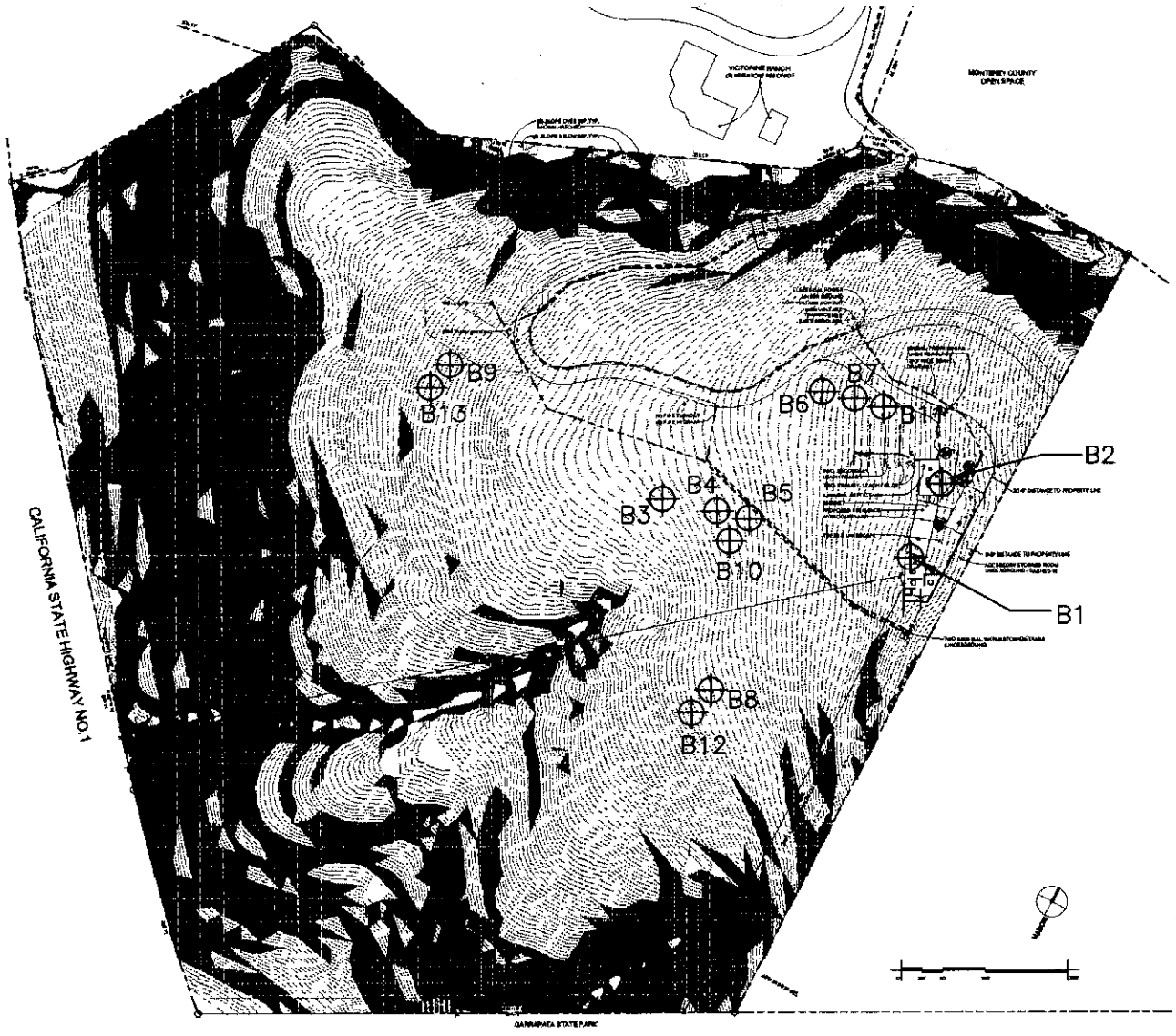
APPENDIX A



Vicinity Map



Location Map



GRICE ENGINEERING INC

ENGINEERING • GEOTECHNICS • HYDROLOGY • SOILS • FOUNDATIONS • EARTH STRUCTURES

851A Brunken Avenue Salinas, California Salinas: (831) 422-9519 Monterey: (831) 375-1196 FAX: (831) 422-1935

SITE PLAN with BORE LOCATIONS

Rajagobalan Residence, 31613 State Highway One, Carmel, CA A.P.N. 243-221-019

APPENDIX B

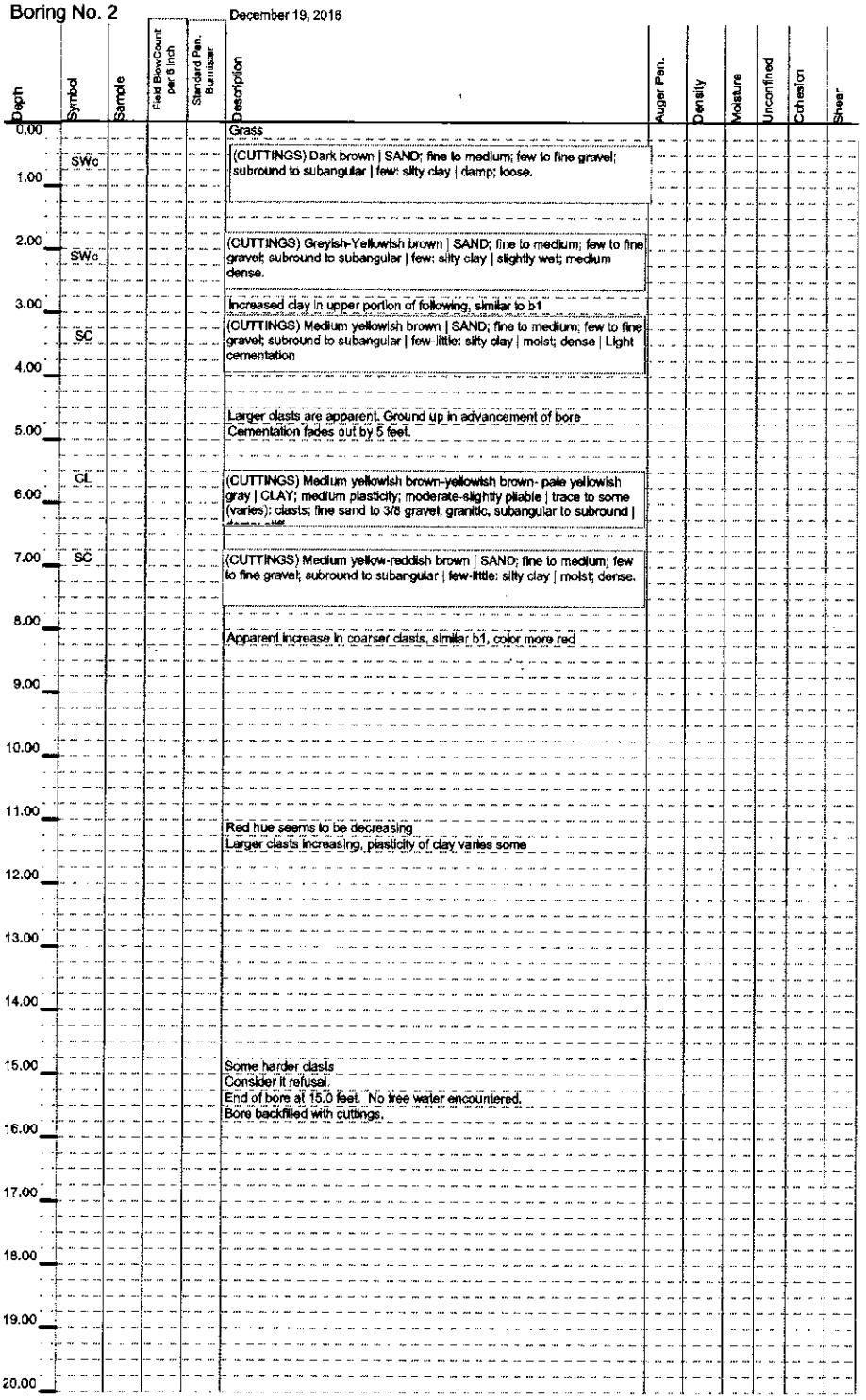
Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 1 December 19, 2016

Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Bumpster	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
0.00					Grass						
1.00	SWc				(CUTTINGS) Dark brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | damp; loose.						
2.00	SWc				(CUTTINGS) Greyish-Yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | slightly wet; medium dense.						
3.00	SC	3.00	75.00 3.75	91 182	(CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few-little: silty clay | moist; dense | light cementation..		NA	19.6			
4.00											
5.00					Larger clasts are apparent. Ground up in advancement of bore Cementation fades out by 5 feet.						
6.00											
7.00											
8.00		8.00	43.00	33							
9.00			75.00 4.75	72 105	Same		123.3	9.6	9+		
10.00					Extremely hard object More frequent larger clasts, less weathered.						
11.00											
12.00											
13.00											
14.00											
15.00											
16.00											
17.00											
18.00											
19.00					End of bore at 19.0 feet. No free water observed, near saturated conditions at 2-3 feet. Bore backfilled with cuttings.						
20.00											

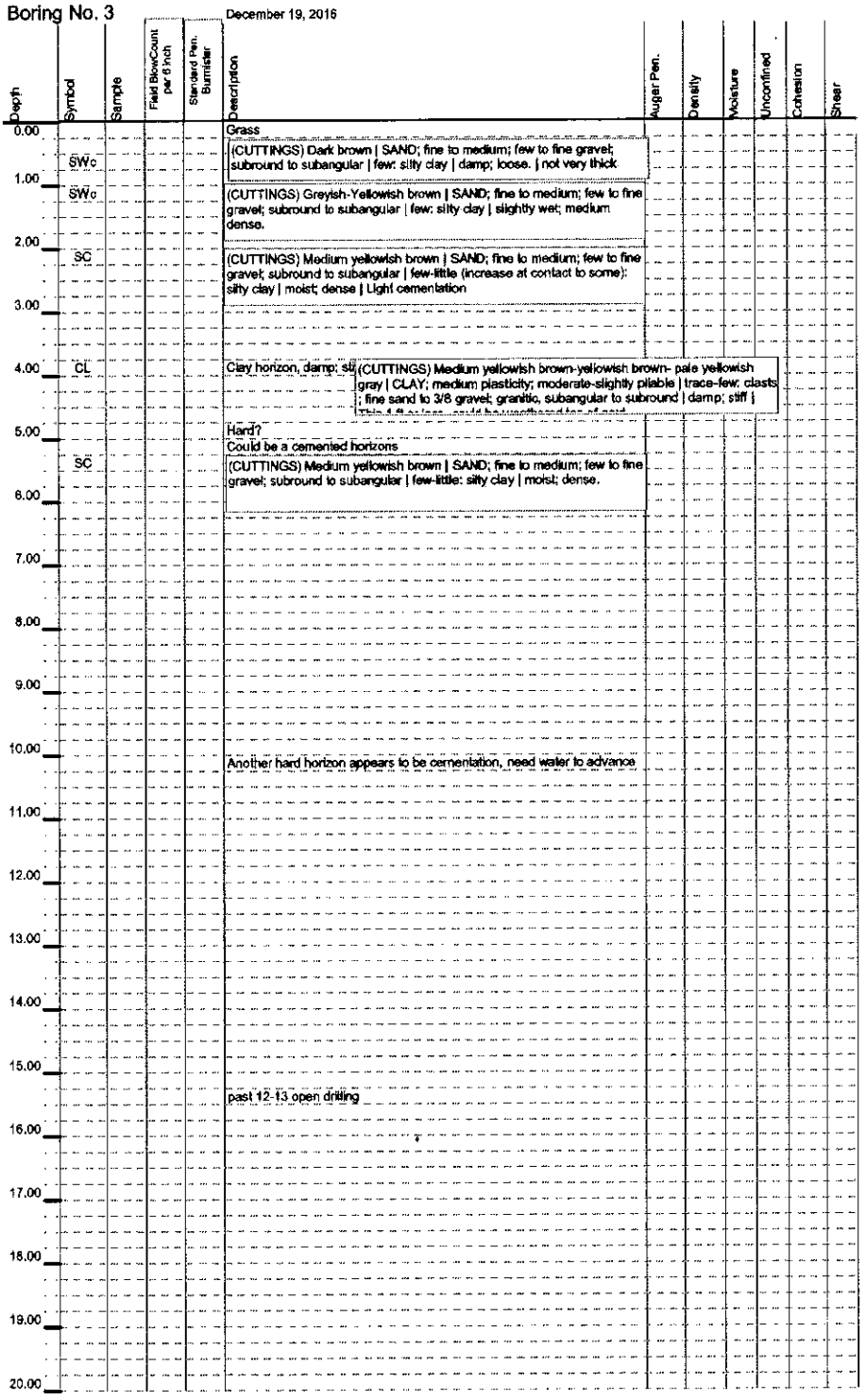
Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 2 December 19, 2016



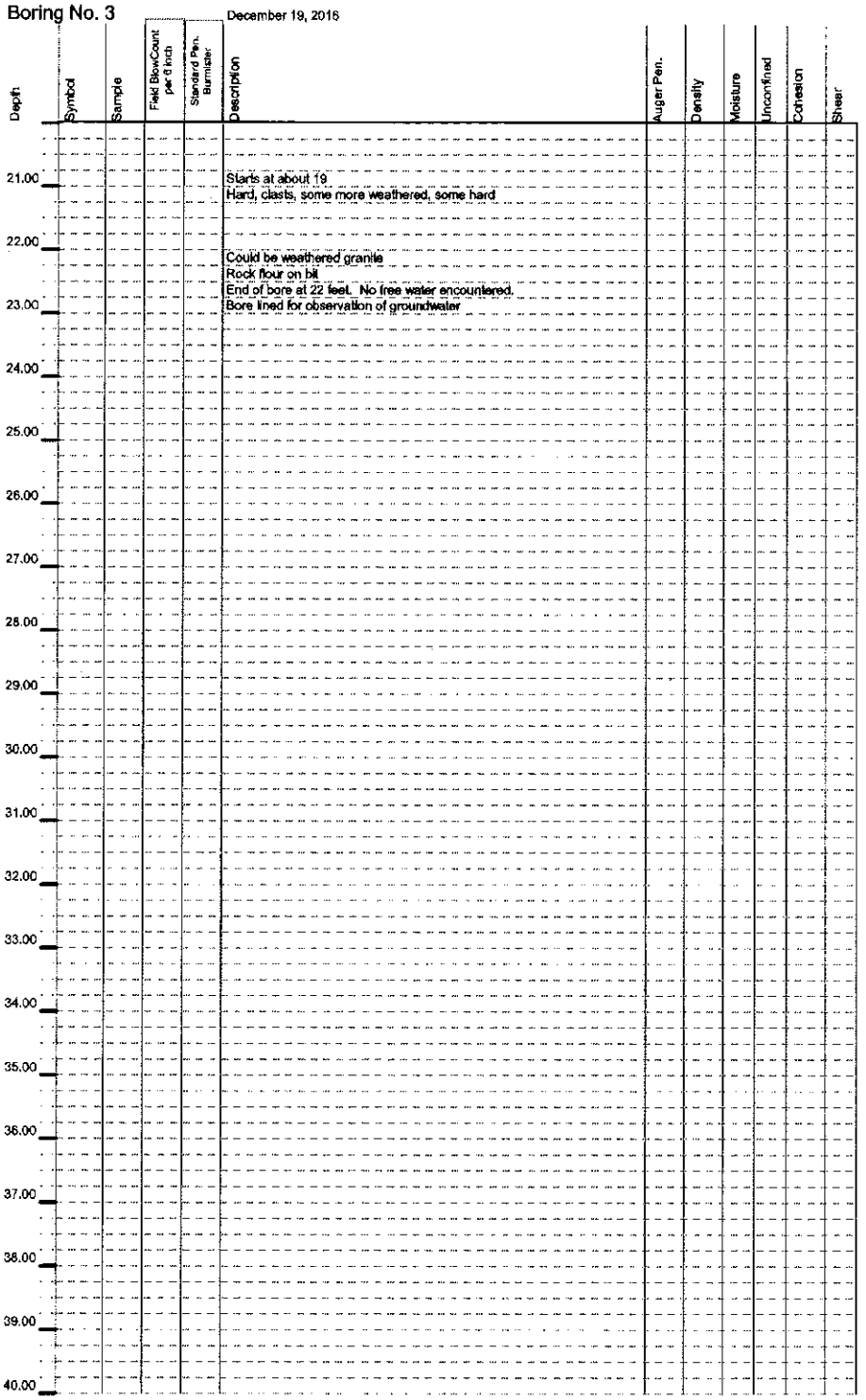
Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 3 December 19, 2016



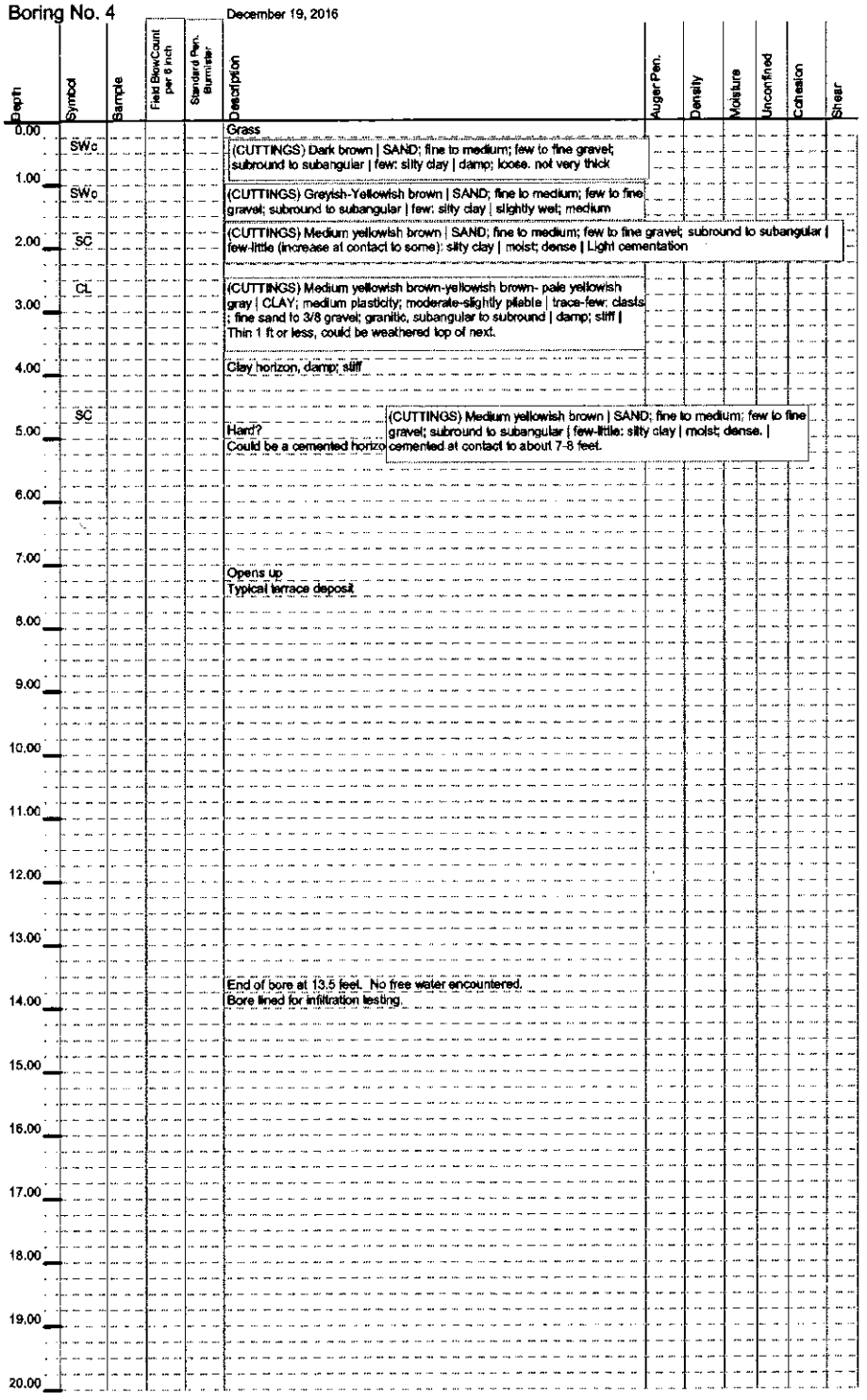
Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 3 December 19, 2016



Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 4 December 19, 2016



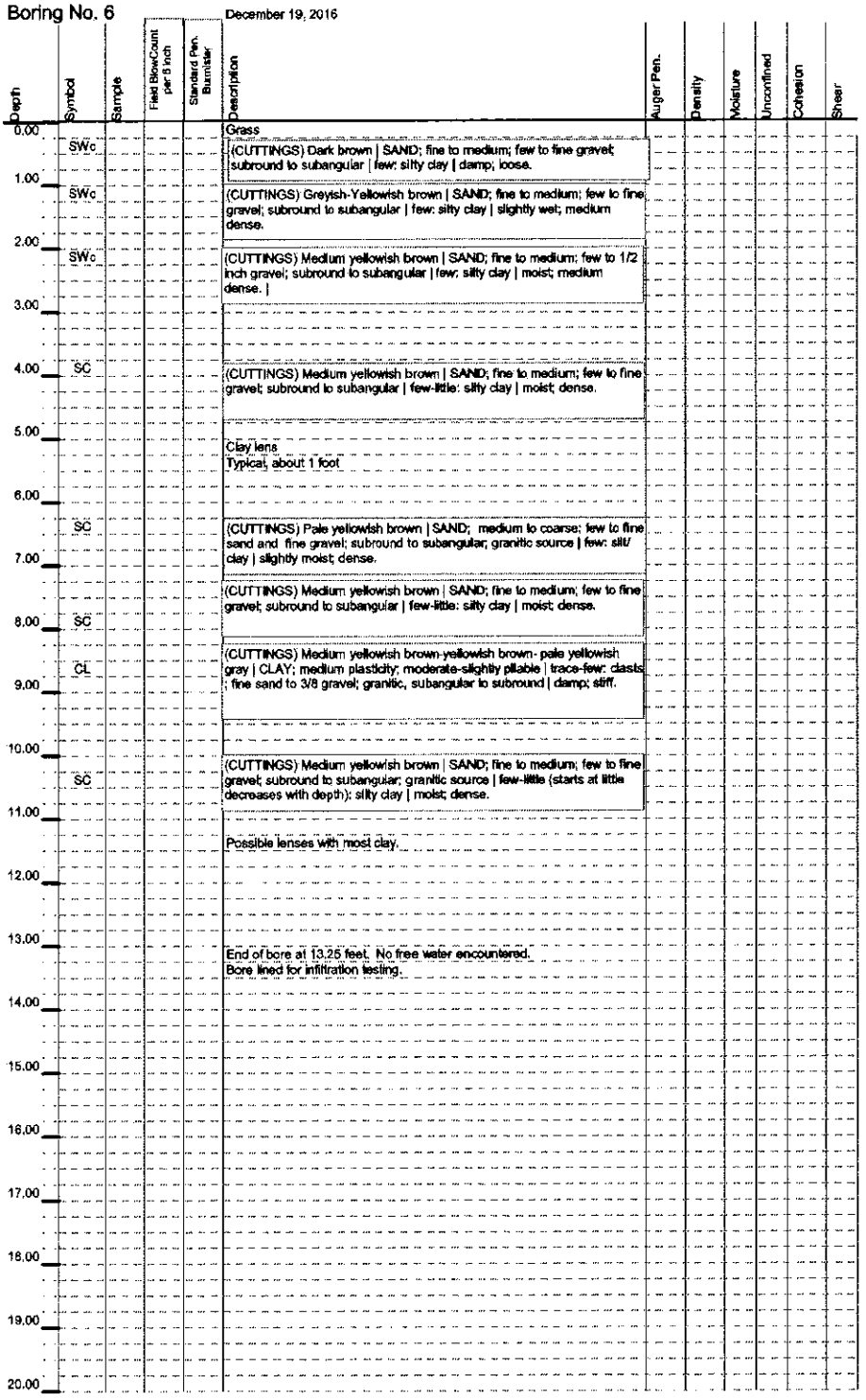
Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 5 December 19, 2016

Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
0.00					Grass						
	SWo				(CUTTINGS) Dark brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | damp; loose | not very thick						
1.00	SWo				(CUTTINGS) Greyish-Yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | slighlty wet; medium						
2.00	SC				(CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few-little (increase at contact to some): silty clay | moist; dense | Light cementation						
	CL				(CUTTINGS) Medium yellowish brown-yellowish brown- pale yellowish gray | CLAY; medium plasticity; moderate-slightly pliable | trace-few: clasts ; fine sand to 3/8 gravel; granitic, subangular to subround | damp; stiff | Thin 1 ft or less, could be weathered top of next.						
3.00											
4.00					Clay horizon, damp; stiff						
5.00	SC				Hard? (CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few-little: silty clay | moist; dense. | Could be a cemented horizo cemented at contact to about 7-8 feet.						
					End of bore at 5.25 feet. No free water encountered. Bore lined for infiltration testing.						
6.00											
7.00											
8.00											
9.00											
10.00											
11.00											
12.00											
13.00											
14.00											
15.00											
16.00											
17.00											
18.00											
19.00											
20.00											

Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 6 December 19, 2016



Depth	Symbol	Sample	Field Blow Count per 6 inch	Standard Pen. Blows/ft	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
0.00					Grass						
	SWc				(CUTTINGS) Dark brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | damp; loose.						
1.00	SWc				(CUTTINGS) Greyish-Yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | slightly wet; medium dense.						
2.00	SWc				(CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to 1/2 inch gravel; subround to subangular | few: silty clay | moist; medium dense. |						
3.00											
4.00	SC				(CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few-little: silty clay | moist; dense.						
5.00					Clay lens Typical, about 1 foot						
6.00											
	SC				(CUTTINGS) Pale yellowish brown | SAND; medium to coarse; few to fine sand and fine gravel; subround to subangular; granitic source | few: silt/ clay | slightly moist; dense.						
7.00					(CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few-little: silty clay | moist; dense.						
8.00	SC										
	CL				(CUTTINGS) Medium yellowish brown-yellowish brown- pale yellowish gray | CLAY; medium plasticity; moderate-slightly pliable | trace-few: clasts ; fine sand to 3/8 gravel; granitic, subangular to subround | damp; stiff.						
9.00											
10.00											
	SC				(CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular; granitic source | few-little (starts at little decreases with depth): silty clay | moist; dense.						
11.00					Possible lenses with most clay.						
12.00											
13.00					End of bore at 13.25 feet. No free water encountered. Bore lined for infiltration testing.						
14.00											
15.00											
16.00											
17.00											
18.00											
19.00											
20.00											

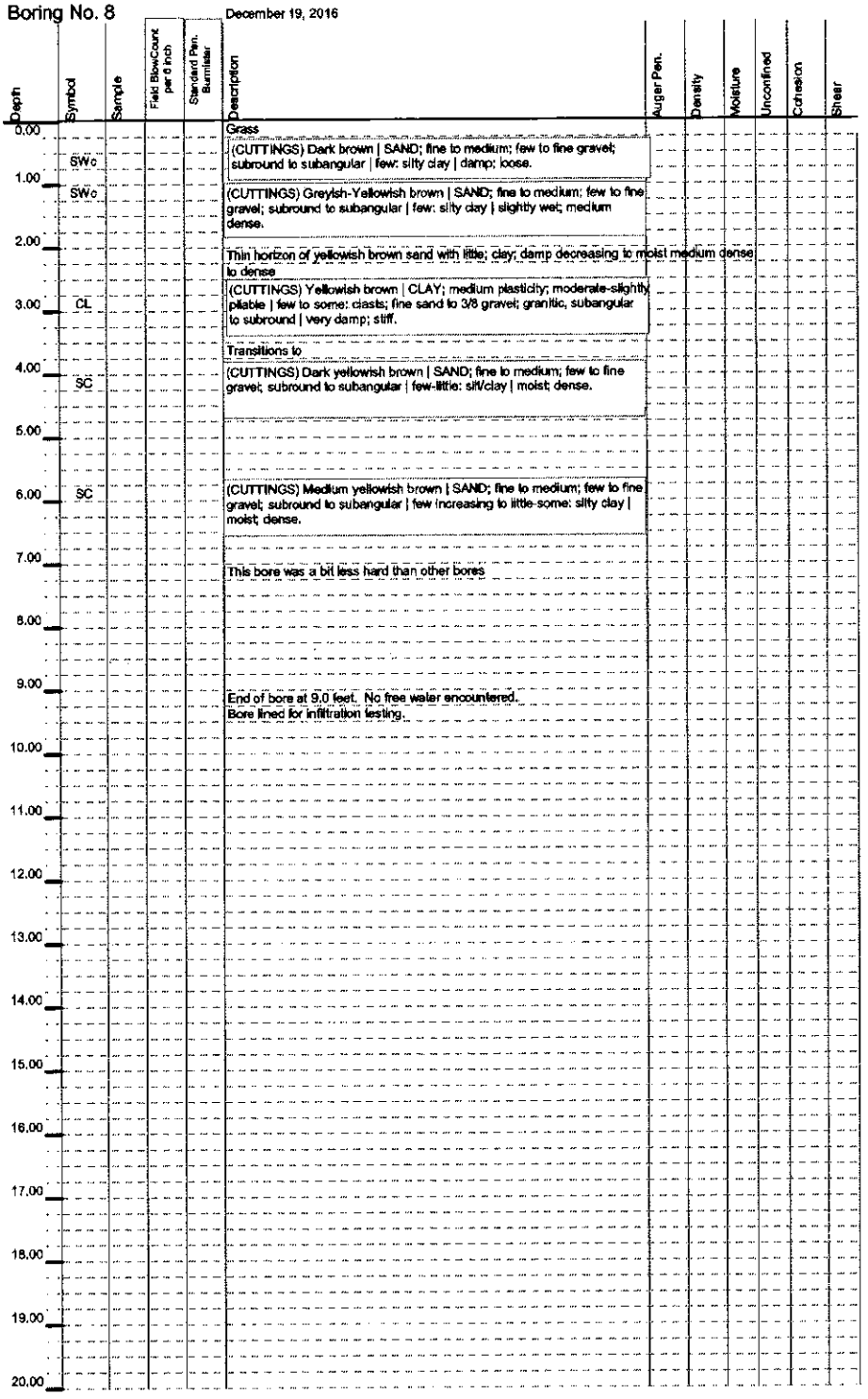
Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 7 December 19, 2016

Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Blows/ft	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
0.00					Grass						
	SWc				(CUTTINGS) Dark brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | damp; loose.						
1.00	SWc				(CUTTINGS) Greyish-Yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | slightly wet; medium dense.						
2.00	SC				(CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to 1/2 inch gravel; subround to subangular | few: silty clay | moist; medium dense. |						
3.00											
4.00	SC				(CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few-little: silty clay | moist; dense.						
5.00											
6.00	SC				(CUTTINGS) Pale yellowish brown | SAND; medium to coarse; few to fine sand and fine gravel; subround to subangular; granitic source | few: silt/ clay | slightly moist; dense | Smell and appearance suggest weathered granite in place						
7.00	SC				(CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few increasing to little-some: silty clay | moist; dense.						
8.00	CL				(CUTTINGS) Medium yellowish brown-yellowish brown- pale yellowish gray | CLAY; medium plasticity; moderate-slightly pliable | trace-few: clasts ; fine sand to 3/8 gravel; granitic, subangular to subround | damp; stiff.						
9.00					End of bore at 9.0 feet. No free water encountered. Bore lined for infiltration testing.						
10.00											
11.00											
12.00											
13.00											
14.00											
15.00											
16.00											
17.00											
18.00											
19.00											
20.00											

Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 8 December 19, 2016



Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 9 December 19, 2016

Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
0.00					Grass						
	SWD				(CUTTINGS) Dark brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | damp; loose.						
1.00	CL				(CUTTINGS) Dark grayish brown | CLAY; medium plasticity; moderate-slightly pliable | few to some: clasts; fine sand to 3/8 gravel; granitic, subangular to subround | very damp-slightly wet; medium stiff.						
2.00	CL				(CUTTINGS) Yellowish brown | CLAY; medium plasticity; moderate-slightly pliable | few to some: clasts; fine sand to 3/8 gravel; granitic, subangular to subround | very damp; stiff.						
3.00					Very tight drilling						
4.00	SC				(CUTTINGS) Yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | little: silt/clay | moist; dense.						
5.00											
6.00	SC				(CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | little: clayey silt | moist; dense.						
7.00					This bore was a bit less hard than other bores						
	SC-SWm				Still very tight, could be fines are more silty						
8.00					Cutting indicate a decreasing amount of fines to few						
					End of bore at 9.0 feet. No free water encountered.						
9.00					Bore lined for infiltration testing.						
10.00											
11.00											
12.00											
13.00											
14.00											
15.00											
16.00											
17.00											
18.00											
19.00											
20.00											

Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 10 December 19, 2016

Depth	Symbol	Sample	Field Blow Count per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
0.00					Grass						
	SWc				(CUTTINGS) Dark brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | damp; loose | not very thick						
0.50											
	SWc				(CUTTINGS) Greyish-Yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | slightly wet; medium dense.						
1.00											
1.50											
					Clay increasing						
2.00					End of bore at 2.00 feet. No free water encountered. Bore lined for infiltration testing						
2.50											
3.00											
3.50											
4.00											
4.50											
5.00											
5.50											
6.00											
6.50											
7.00											
7.50											
8.00											
8.50											
9.00											
9.50											
10.00											

Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 11 December 19, 2016

Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Burmister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
0.00					Grass						
	SW				(CUTTINGS) Dark brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | damp; loose | not very thick						
0.50											
1.00											
	SW				(CUTTINGS) Greyish-Yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | slightly wet; medium dense.						
1.50											
2.00											
2.50					Slight increase in clay						
					End of bore at 2.75 feet. No free water encountered. Bore lined for infiltration testing						
3.00											
3.50											
4.00											
4.50											
5.00											
5.50											
6.00											
6.50											
7.00											
7.50											
8.00											
8.50											
9.00											
9.50											
10.00											

Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 12 December 19, 2016

Depth	Symbol	Sample	Field Blow Count per 6 Inch	Standard Pen. Blows/ft	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
0.00					Grass						
	SWc				(CUTTINGS) Dark brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | damp; loose | not very thick						
0.50											
1.00											
	SWc				(CUTTINGS) Greyish-Yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | slightly wet; medium dense.						
1.50											
					Clay increasing						
2.00											
					End of bore at 5.25 feet. No free water encountered. Bore lined for infiltration testing						
2.50											
3.00											
3.50											
4.00											
4.50											
5.00											
5.50											
6.00											
6.50											
7.00											
7.50											
8.00											
8.50											
9.00											
9.50											
10.00											

Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 13 December 19, 2016

Depth	Symbol	Sample	Field Blow/Count per 6 inch	Standard Pen. Blow/ft	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
0.00					Grass						
	SWc				(CUTTINGS) Dark brown | SAND; fine to medium; few to fine gravel; subround to subangular | few; silty clay | damp; loose | not very thick						
0.50											
	SWc				(CUTTINGS) Greyish-Yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few-little; silty clay | slightly wet; medium dense.						
1.00											
1.50											
					Clay increasing						
2.00					End of bore at 2.75 feet. No free water encountered. Bore lined for infiltration testing						
2.50											
3.00											
3.50											
4.00											
4.50											
5.00											
5.50											
6.00											
6.50											
7.00											
7.50											
8.00											
8.50											
9.00											
9.50											
10.00											

CRICE ENGINEERING INC
501A Brunken Avenue, Salinas, California 93901
Salinas: (831) 422-8819 Monterey: (831) 375-1188 FAX: (831) 422-1086

SOIL CLASSIFICATION CHART
conforms to Unified Soils Classification
and ASTM D2487

UNIFIED SOIL CLASSIFICATION & ASTM D2487: INCLUDING IDENTIFICATION AND DESCRIPTION

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 3 inches and basing fractions on estimated weights)				GROUP SYMBOLS N.	TYPICAL NAMES	INFORMATION REQUIRED FOR DESCRIBING SOILS
COARSE GRAINED SOILS More than half of material is larger than No. 200 sieve size is (The No. 200 sieve size is about the smallest particle visible to the naked eye)	GRAVELS More than half of coarse fraction is larger than No. 4 sieve size (For visual classifications, the 1/4" size may be used as equivalent to the No. 4 sieve size.)	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.	GW	Well graded gravels, gravel-sand mixtures, little or no fines.	Give typical name, indicate approximate percentages of sand and gravel, max. size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information, and symbol in parentheses. For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics. EXAMPLE: **Silty Sand**, gravelly; about 20% hard, angular gravel particles ½ inch maximum size; rounded and subangular sand grains coarse to fine, about 15 % non-plastic fines with low dry strength, well compacted and moist in place, alluvial sand; (SM).
			Predominantly one size or a range of sizes with some intermediate sizes missing.	GP	Poorly graded gravels, gravel-sand mixtures, little or no fines.	
		GRAVELS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).	GM	Silty gravels, poorly graded gravel-sand-silt mixtures.	
			Plastic fines (for identification procedures see CL below).	GC	Clayey gravels, poorly graded gravel-sand-clay mixtures.	
	SANDS More than half of coarse fraction is smaller than No. 4 sieve size	CLEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes.	SW	Well graded sands, gravelly sands, little or no fines.	
			Predominantly one size or a range of sizes with some intermediate sizes missing.	SP	Poorly graded sands, gravelly sands, little or no fines.	
		SANDS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).	SM	Silty sands, poorly graded sand-silt mixtures.	
			Plastic fines (for identification procedures see CL below).	SC	Clayey sands, poorly graded sand-clay mixtures.	
FINE GRAINED SOILS More than half of material is smaller than No. 200 sieve size	IDENTIFICATION PROCEDURES ON FRACTION SMALLER THAN No. 40 SIEVE SIZE	DRY STRENGTH (CRUSHING CHARACTERISTICS)	DILATANCY (REACTION TO SHAKING)	TOUGHNESS (CONSISTENCY NEAR PLASTIC LIMIT)			
	SILTS AND CLAYS Liquid limit less than 50	None to slight	Quick to slow	None	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity.	Give typical name, indicate degree and character of plasticity, amount and maximum size of coarse grains, color in wet conditions, odor if any, local or geologic name, and other pertinent descriptive information, and symbol in parentheses. For undisturbed soils add information on structure, stratification, consistency in undisturbed and remolded states, moisture and drainage conditions. EXAMPLE: **Clayey silt**, brown, slightly plastic, small percentage of fine sand, numerous vertical root holes, firm and dry in place, loess; (ML).
		Medium to high	None to very slow	Medium	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.	
		Slight to medium	Slow	Slight	OL	Organic silts and organic silt-clays of low plasticity.	
	SILTS AND CLAYS Liquid limit greater than 50	Slight to medium	Slow to none	Slight to medium	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.	
		High to very high	None	High	CH	Inorganic clays of high plasticity, fat clays.	
		Medium to high	None to very slow	Slight to medium	OH	Organic clays of medium to high plasticity.	
HIGHLY ORGANIC SOILS		Readily identified by color, odor, spongy feel and frequently by fibrous texture.			Pt	Peat and other highly organic soils.	

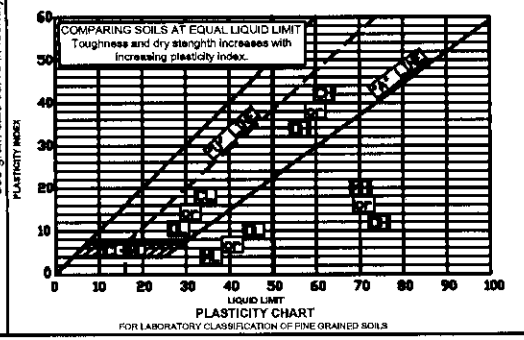
LABORATORY CLASSIFICATION CRITERIA

Use grain size curve in identifying the fractions as given under field identification.

Determine percentages of gravel and sand from grain size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size) coarse grained soils are classified as follows:

Less than 5%	GW, GP, SW, SP
More than 12 %	GM, GC, SW, SC
6% to 12%	Borderline cases requiring use of dual symbols.

$C_u = \frac{D_{60}}{D_{10}}$ Greater than 4 $C_c = \frac{(D_{30})^2}{(D_{10} \times D_{60})}$ Between one and 3	
Not meeting all gradation requirements for GW	
Atterberg limits below "A" line or PI less than 4	Above "A" line with PI between 4 and 7 are **borderline** cases requiring use of dual symbols
Atterberg limits above "A" line or PI greater than 7	
$C_u = \frac{D_{60}}{D_{10}}$ Greater than 6 $C_c = \frac{(D_{30})^2}{(D_{10} \times D_{60})}$ Between one and 3	
Not meeting all gradation requirements for SW	
Atterberg limits below "A" line or PI less than 4	Above "A" line with PI between 4 and 7 are **borderline** cases requiring use of dual symbols
Atterberg limits above "A" line or PI greater than 7	



PLASTICITY CHART
FOR LABORATORY CLASSIFICATION OF FINE GRAINED SOILS

N. **Boundary** classifications: Soils possessing characteristics of two groups are designated by combinations of group symbols. For example GW-GC, well graded gravel-sand mixture with clay binder.
N. All sieve sizes on this chart are U.S. Standard.

FIELD IDENTIFICATION PROCEDURES FOR FINE GRAINED SOILS OR FRACTIONS

These procedures are to be performed on the minus No. 40 sieve size particles, approximately 1/64 inches. For field classification purposes, screening is not intended; simply remove by hands the coarse particles that interfere with the test.

DILATANCY (Reaction to shaking)

After removing portions larger than No. 40 sieve size, prepare a pot of moist soil with a volume of about one-half cubic inch. Add enough water if necessary to make the soil soft but not sticky.

Place the pot in the open palm of one hand and shake horizontally, stricking vigorously against the other hand several times. A positive reaction consists of the appearance of water on the surface of the pot which changes to a livery consistency and becomes glossy. When the sample is squeezed between the fingers, the water and gloss disappear from the surface, the pot stiffens and finnally it crackes or crumbles. The rapidity of appearance of water during shaking and of its diappearance during squeezing assist in identifying the character of the fines in a soil.

Very fine clean sands give the quickes and most distinct reactoin whereas a plastic clay has no reaction. Inorganic silts, such as a typical rock flour, show a moderately quick reaction.

DRY STRENGTH (Crushing characteristics)

After removing particles larger than No. 40 sieve size, mold a pat of soil to the consistency of putty, adding water if necessary. Allow the pat to dry completely by oven, sun, or air drying, and then test its strength by breaking and crumbling between the fingers. This strength is a measure of the character and quality of the colloidal fraction contained in the soil. The dry strength increases with increasing plasticity.

High dry strength is characteristic for clays of the CH group. A typical inorganic silt possesses only very slight dry strength. Silty fine sand and silts have about the same slight dry strength, but can be distinguished by the feel when powdering the dried specimen. Fine sand feels gritty whereas a typical silt has the smooth feel of flour.

TOUGHNESS (Consistency near plastic limit)

After removing particles larger that the No. 40 sieve size, a specimen of soil about one-half inch cube in size is molded to the consistency of putty. If too dry, water must be added and if sticky, the specimen should be spread out in a thin layer and allowed to lose some moisture by evaporation. Then the specimen is rolled out by hand on a smooth surface of between the palms into a thread about one-eight inch in diameter. The thread is then folded and rerolled repeatedly. Durning this manipulation the moisture content is gradually reduced and the specimen stiffens, finally loses its plasticity, and crumbles when the plastic limit is reached.

After the thread crumbles, the places should be lumped together and a slight kneading action continued until the lump crumbles.

The tougher the thread near the plastic limit and the stiffer the lump when it finally crumbles, the more potent is the colloidal clay fraction in the soil. Weakness of the thread at the plastic limit and quick loss of coherence of the lump below the plastic limit indicate either inorganic clay of low plasticity, or materials such as kaolin-type clays and organic clays which occure below the A-line.

Highly organic clays have a very weak and spongy feel at the plastic limit.

ADOPTED BY: CORPS OF ENGINEERS AND BUREAU OF RECLAMATION-JANUARY 1962

103-D-347

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REPORT
to
MR. VIDYA RAJAGOPALAN
C/O STUDIO SCHICKETANZ
P. O. BOX 2704
CARMEL, CALIFORNIA 93921

PERCOLATION and GROUNDWATER STUDY with SEPTIC RECOMMENDATIONS for the proposed RAJAGOPALAN RESIDENCE 31613 STATE HIGHWAY ONE CARMEL, CALIFORNIA A. P. N. 243-221-019

by

GRICE ENGINEERING INC.
561 A BRUNKEN AVENUE
SALINAS, CALIFORNIA
DECEMBER 2016

GRICE ENGINEERING INC

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File No. 6725-16.12
December 30, 2016

Mr. Vidya Rajagopalan
C/O Studio Schicketanz
P. O. Box 2704
Carmel, California 93921

Project: Rajagopalan Residence
31613 State Highway One
Carmel, California
A. P. N. 243-221-019

Subject: Percolation and Groundwater Study

Dear Mr. Rajagopalan;

Pursuant to your request, we have completed the Percolation and Groundwater Study with Septic Report for the proposed development. Included with this report is a Leachfield Plan attached in Appendix D.

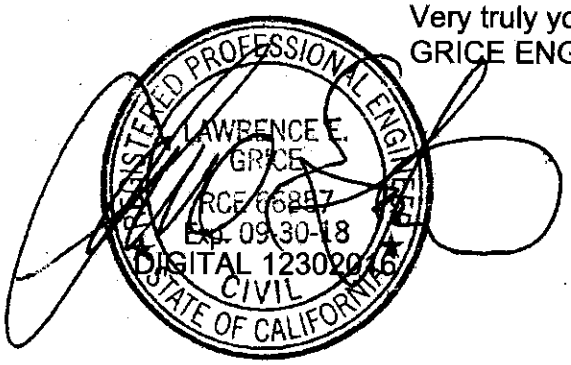
In general, this study indicates that the native topsoil are the most preferable for dispersal of septic effluent. However due to the difference between the permeability of the topsoil and underlaying terrace deposits, free water is typically migrating or pooled in the topsoil during and after inclement weather. Recommendations are given to address these site characteristics.

The systems should be constructed in accordance with the recommendations made herein and the Monterey County Health and Building Codes. This report should be fully read and understood prior to further planning, design and especially prior to construction.

The findings given forth in this report are applicable only to this property and may not be utilized for any other site or purpose without the written consent of GRICE ENGINEERING, INC.

Please feel free to call this office should you have any questions regarding this report.

Very truly yours,
GRICE ENGINEERING INC.



Lawrence E. Grice, P.E.
R.C.E. 66857

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PERCOLATION and GROUNDWATER STUDY
with
SEPTIC RECOMMENDATIONS
for the proposed
RAJAGOPALAN RESIDENCE
31613 STATE HIGHWAY ONE
CARMEL, CALIFORNIA
A. P. N. 243-221-019

Introduction and Scope of Work

The purpose of this report is to evaluate the geotechnical properties of the site relative to the installation of septic disposal system for sewage treatment from single family residence.

The study consisted of determining the subsurface soil profile, presence or absence of groundwater and testing for soil percolation rates. In conclusion recommendation are given for the design of septic systems for the parcel based on the data found.

The findings set forth in this report apply only to the above indicated areas on the property and may not be utilized for any other purpose without the written consent of GRICE ENGINEERING, INC.

Site Description

The project site, 31613 State Highway One, is located approximately 0.49 miles to the east of State Highway One, on a private road, south of the area known as the Carmel Highlands, an un-incorporated area of westernmost Monterey County, California. Please refer to the Vicinity and Location Maps and the Site Map in Appendix A for details.

The topography of the 25.53 acre site encompasses an area containing shallow to moderate slopes on a west-southwest facing marine terrace at elevations of approximately 226 to 344 feet above mean sea level (msl). Along the northeast portion of the site a shallow ridge runs southwest - northeast and drops to the northwest. The building envelope encompasses an area with a moderate slope to the southwest midway on the eastern property line. The majority of the site is covered with native grasses, brush, and several trees.

Currently plans include the construction of a single family residence along the eastern property line, with access by way of a driveway providing access to the private road. The residence is to be made up of a series of rectangular structures linked with enclosed walkways, and lies northwest - southeast within the building envelope. A detached garage is to be located east of the residence's middle portion, with a generous parking area located northeast of the the residence and garage. The garage will be accessed by an enclosed walkway.

The residence is to be of conventional wood construction with isolated and/or continuous spread footings. The garage is to have a slab-on-grade floor. Grading is proposed to provide a level building pad, driveways and parking areas.

Domestic water will be provided by a private water service company. Septic waste water will be processed on site by standard septic methods with the effluent dispersed to the subsoils.

Field Investigation

The field investigation included a soils investigation, percolation testing and groundwater observation. The soils investigation consisted of drilling test bores to establish the subsurface soil profile, depth to groundwater and to provide bores for percolation testing.

Subsurface explorations were carefully monitored to establish soil consistency, strata change, and drilling conditions. Drilling was accomplished by continuous flight auger. The spoils were continuously examined and logged according to the soil type encountered and classified by field method in accordance with the Unified Soil Classification Chart[1].

A total of thirteen bores were advanced in the areas of development All bores were utilized and determination of the soil profile. The first and second bores were use for geotechnical evaluation. The remaining bores were used for percolation testing. For the location of each boring please refer to the Site Map in Appendix A.

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[1] Adopted 1952 by Corps of Engineers and Bureau of Reclamation. ASTM D2487 was developed as based on the Uniform Soils Classification Chart and System. The methods are equivalent.

Site Soils Profile

As found in the exploratory drilling, the site soils are generally consistent between each of the bores.

The topsoil is silty well graded sands observed in a loose condition and moist to slightly wet at contact with the underlaying horizon. At approximately two feet the clays become dominate in the sands and increase gradually to the next horizon.

Below the topsoil are weathered terrace deposits comprised of fine to medium sands with few-little clays. These materials were observed dense and moist with horizons of increased clays and occasional clasts to approximately 6 inches. The amount of larger clasts increase with depth.

The local granite bedrock is encountered at approximately 19 to 22 feet below grade.

Complete soil characteristics and comments are reported on the boring logs at depth observed. See Appendix B.

Ground Water Conditions

No groundwater was encountered at this site to the maximum depth of exploration, approximately 22 feet below grade. Light saturation was noted in the shallow soils above the noted increase in clay content. This saturation most likely increases during and after rainfall.

Results of Percolation Testing

The site soils were tested for their ability to absorb water by the falling head test method as commonly utilized in Monterey County and constant head infiltration tests.

In the falling head tests the immediate results of the test method as given by dividing the duration between measurements by the measured unit of fall are given. This firm does not recommend use of those calculations. The percolation rate computed by this method are grossly higher than the actual rate. This is primarily due to disregard of the available wall area for infiltration, available water volume and head pressure.

For more appropriate interpretation, the data is also presented as an Absorption Rate given in gallons per square foot (of soil face) per day and Taft Equivalent Percolation Rates in minutes per inch of fall or inches of fall per hour. These two rates are comparable among readings without respect to head pressures.

In addition, an appropriate design application rate is provided. The relationship between the test percolation rate and design rate is based on the safety factor between a Constant Head Standard Taft Test Method and the current Monterey County Application Rate of 0.3 gallons per square foot per day. This is determined by computing the discharge rate (2.36 gallons per square foot per day) for a test performing at 60 minutes per inch (general limit of acceptable percolation) and dividing it by the mandated application rate. As computed, the minimum safety factor utilizing the Monterey County application rate is 7.9.

The percolation tests indicate the more sandy topsoil are of moderately high to moderate permeability and are the most acceptable for dispersal septic effluent. The percolation rates (absorption rates) within these sands range from approximately 4.7 to 140 gallons per square foot per day. Percolation rates within the deeper terrace deposits range from approximately 0.11 to 8.5 gallons per square foot per day. Attached is the test data and graph of the rates including the averaged rate.

Inspection indicates the rates approximately coincide with the soils type and consistency as noted on the bore logs.

Percolation rates were established by the falling head method and constant head methods with measurements were recorded for approximately 4 hours. Please review the bore logs and percolation test data in Appendix B.

CONCLUSIONS AND RECOMMENDATIONS

Septic System Recommendations

In general, this study indicates that the topsoil generally has the most preferable rate of percolation relative to dispersal of septic effluent. Review of these characteristics indicates that a shallow depth trench or drip dispersal type leachfield may provide the most function and life for leachate dispersal.

The recommended sewage disposal system configuration should be a septic tank, associated piping and leachfields sized as discussed in this report. Due to the high potential for pooling near surface drainage all leachfields should have a curtain drain installed up slope. The construction and operation of the system should conform to the recommendations given in this report and the requirements set forth by the County of Monterey.

Septic System Requirements

The recommended sewage disposal system configuration should be a septic tank, associated piping and leachfields sized as shown in the following table. The recommended installation for leachate disposal is by percolation trench as discussed below. The following table gives the minimum standard county requirements for leachfield sizes based on an application rate of 0.3 gallons per square foot per day.

TABLE 1: SEPTIC SYSTEM REQUIREMENTS

Number of Bedrooms (BR)	Septic Tank Size*	Standard Effective Leachfield Wall Area**
1 to 2	1,000 gallon	1,000 sq. ft.
3	1,500 gallon	1,000 sq. ft.
4	1,500 gallon	1,250 sq. ft.
Over 4	+500 gallon / BR	+250 sq. ft. / BR

*Should the kitchen appliances include a garbage disposal unit it is recommended that an additional capacity of 500 gal. be added to the septic tank.

**The maximum length of an individual trench is 100 feet. Should a single system require more than 100 feet of trench it is allowable to make up a single system with multiple trenches.

Leachfields

As observed in the percolation testing, the topsoil has the best percolation rates. This horizon was noted to vary in depth from approximately 1.0 to 2.5 feet. Review of these characteristics indicates that a shallow depth trench or drip dispersal type leachfield may provide the most function and life for leachate dispersal

Each individual leachfield should be constructed with a riser which allows for monitoring of the effluent level for the full depth of the system.

It is recommended that the Secondary System be installed at the same time as the Primary System and that the area for a third system be designated at that time. The area for the third system should be that which will be most accessible after construction. A diversion valve shall be installed to permit alternation between the systems. The included Septic System Plans indicate primary, secondary and tertiary systems.

Installation of lateral trenches should be along a level elevation line to prevent excessive over-excavation to top of effective depth at portions along the field. For installation of multiple leachfields (primary, secondary, ternary), comprised of singular or multiple lateral trenches, it is recommended that they be installed parallel to the topography as apposed to being stacked perpendicular if possible. As an alternative the side wall setback between each leachfield can be increased.

Subsurface Drains and Drainage

The soils profile is composed of permeable topsoil overlaying relatively impervious terrace deposits. As such free water will be observed to migrate in the topsoil during and after inclement weather. Collection and diversion of such drainage should be provided up slope of leachfield areas by trench style curtain drains.

The depth of such structures is to penetrate into the denser terrace deposit a minimum of one foot and with the gravel extending to grade. This depth should be readily apparent during excavating and is generally marked by an increase in clay content. The longitudinal slope of such structures should be a minimum of 2% with the collected drainage discharged to daylight away from structures and septic system components.

Use of spun filter fabric is not recommended for use in construction subsurface drains as this type of fabric typically becomes clogged. Should filter fabric be

necessary it is recommended that a woven fabric be used such as Mirafi Filterweave 300. Otherwise we would recommend omission of the fabric and placement of Caltrans Class 1, Type 'A" or "B" drain rock, and that any fabric only be placed near the top of the trench between the gravel and earth backfill or where the gravel extends to grade, 1 foot below finish grade.

CLASS 1		
SIEVE SIZES	**PERCENTAGE PASSING**	
	TYPE A	TYPE B
50.0-mm/2 inches	----	100
37.5-mm/1.5 inches	----	95-100
19.0-mm/0.75 inches	100	50-100
12.5-mm/0.5 inches	95-100	-----
9.5-mm/0.415 inches	70-100	15-55
4.75-mm/No. 4	0-55	0-25
2.36-mm/No. 8	0-10	0-5
75.0-µm/No.200	0-3	0-3

Septic Tank and Storage-Pump Tank

Septic tank size should be as given in the previous table.

The tank should be installed to provide gravity drainage to the leachfields and reasonable access after completed construction. Should the kitchen appliances include a garbage disposal unit it is recommended that an additional capacity of 500 gallons be added to the septic tank. The code requires installation of an effluent screen in the discharge line.

Special Conditions

Since the proper performance of a septic system depends on many variables, it is recommended that site development plan allow maximum leachfield area. This report and recommendations should remain available for future installation of additional leachfields.

It is also recommended that the secondary leachfields be constructed at the time of initial installation. If this is done, it should be connected by a valve such that leachate may be directed to either system for periods ranging from 4 to 8 months.

General

All installation requirements not specifically mentioned herein should be made in accordance with the requirements set forth by the Monterey County Health Department. The above septic system recommendations are based on the parameters stated and the subsurface soils observed during our investigation, as well as standard practice set forth in the manual "Septic Tank Systems for Private Homes", as available from the Monterey County Health Department - Environmental Health Division, and the manual "Septic Tank Practice", as published by the United States Health Department. Should these factors change or soil conditions not shown be encountered, this office should be notified such that additional requirements may be made, if necessary.

As stated previously, the performance of a septic system depends on many variables including; volume of effluent, performance of septic tank, concentration of leachate, and soil type and density. Consequently, design is based on empirical theory, i.e., successful past experience and collected field data. However, since control of all these elements is impossible, the recommendations stated herein are made to the best of our ability to anticipate these variables. Suggested details are included in Appendix B.

Inspection of Work

It is recommended that all site work be inspected and tested by this firm during the performance of work to establish compliance with these recommendations:

NOTIFY:	GRICE ENGINEERING INC.	SALINAS	(831) 422-9619
	561-A Brunken Avenue	MONTEREY	(831) 375-1198
	Salinas, California 93901	FAX	(831) 422-1896

A minimum of one working day prior to commencement of work so that scheduling for testing and inspections can be made.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

The recommendations of this report are based on our understanding of the project as represented by the plans, and the assumption that the soil conditions do not deviate from those represented in this site soils investigation. Therefore, should any variations or undesirable conditions be encountered during construction, or if the actual project will differ from that planned at this time, GRICE ENGINEERING INC. should be notified and provided the opportunity to make addendum recommendations if required.

NOTIFY: GRICE ENGINEERING INC. SALINAS (831) 422-9619
561-A Brunken Avenue MONTEREY (831) 375-1198
Salinas, California 93901 FAX (831) 422-1896

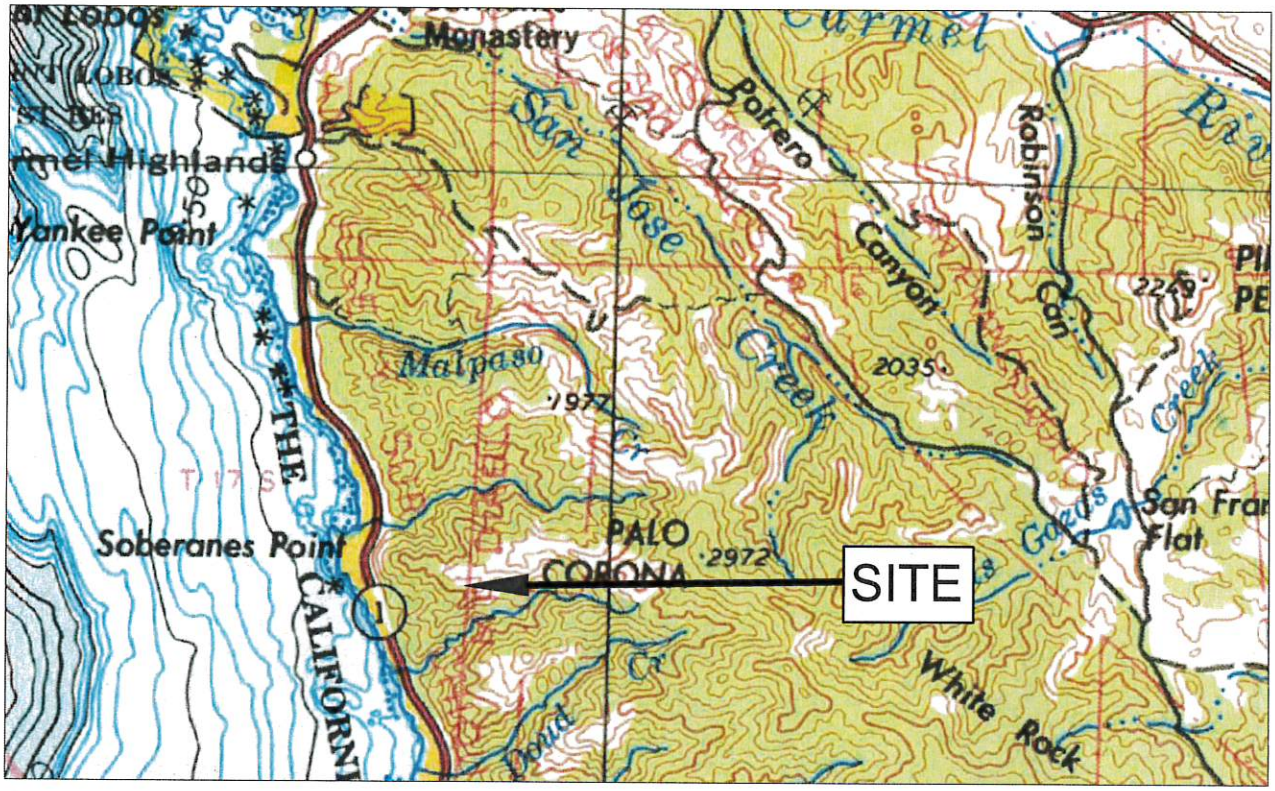
This report is issued with admonishment to the Owner and to his representative(s), that the information contained herein should be made available to the responsible project personnel including the architects, engineers, and contractors for the project. The recommendations contained herein should be incorporated into the plans, the specifications, and the final work.

It is requested that GRICE ENGINEERING INC. be retained to review the project grading and foundation plans to ensure compliance with these recommendations. Further, it is the position of GRICE ENGINEERING INC. that work performed without our knowledge and supervision, or the direction and supervision of a project responsible professional soils engineer renders this report invalid.

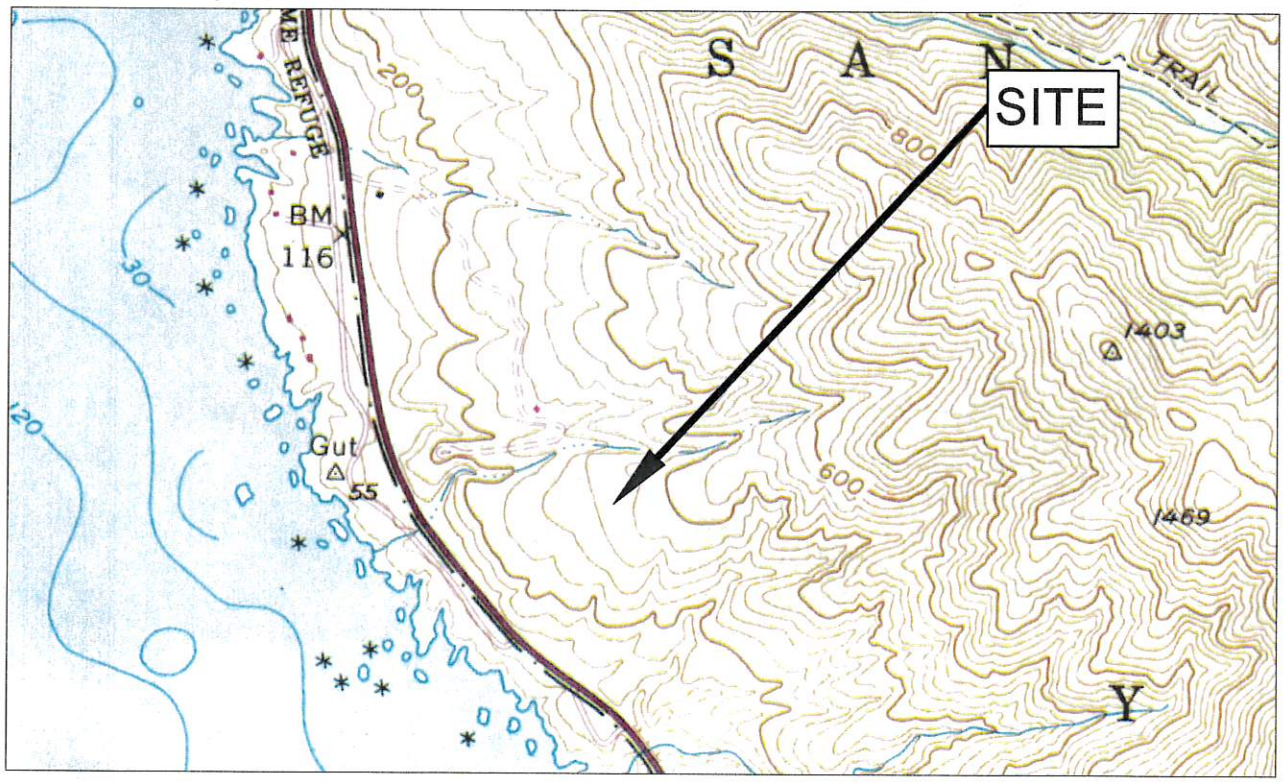
It is our opinion the findings of this report are **valid** as of the **present date**, **however**, changes in the **Codes and Requirements** can occur and change the recommendations given within this report concerning the property. In addition changes in the conditions of a property can occur with the passage of time, due either to natural processes or to the works of man and may effect this property. In addition, changes in **standards** may occur as a result of legislation, or the broadening of knowledge, and these changes may require re-evaluation of the conditions stated herein. Accordingly, the findings of this report may be invalidated wholly, or partially, by changes beyond our control. Therefore, this report is subject to review and should not be relied upon after a period of **three years**.

REVISED 01-07-2011

APPENDIX A

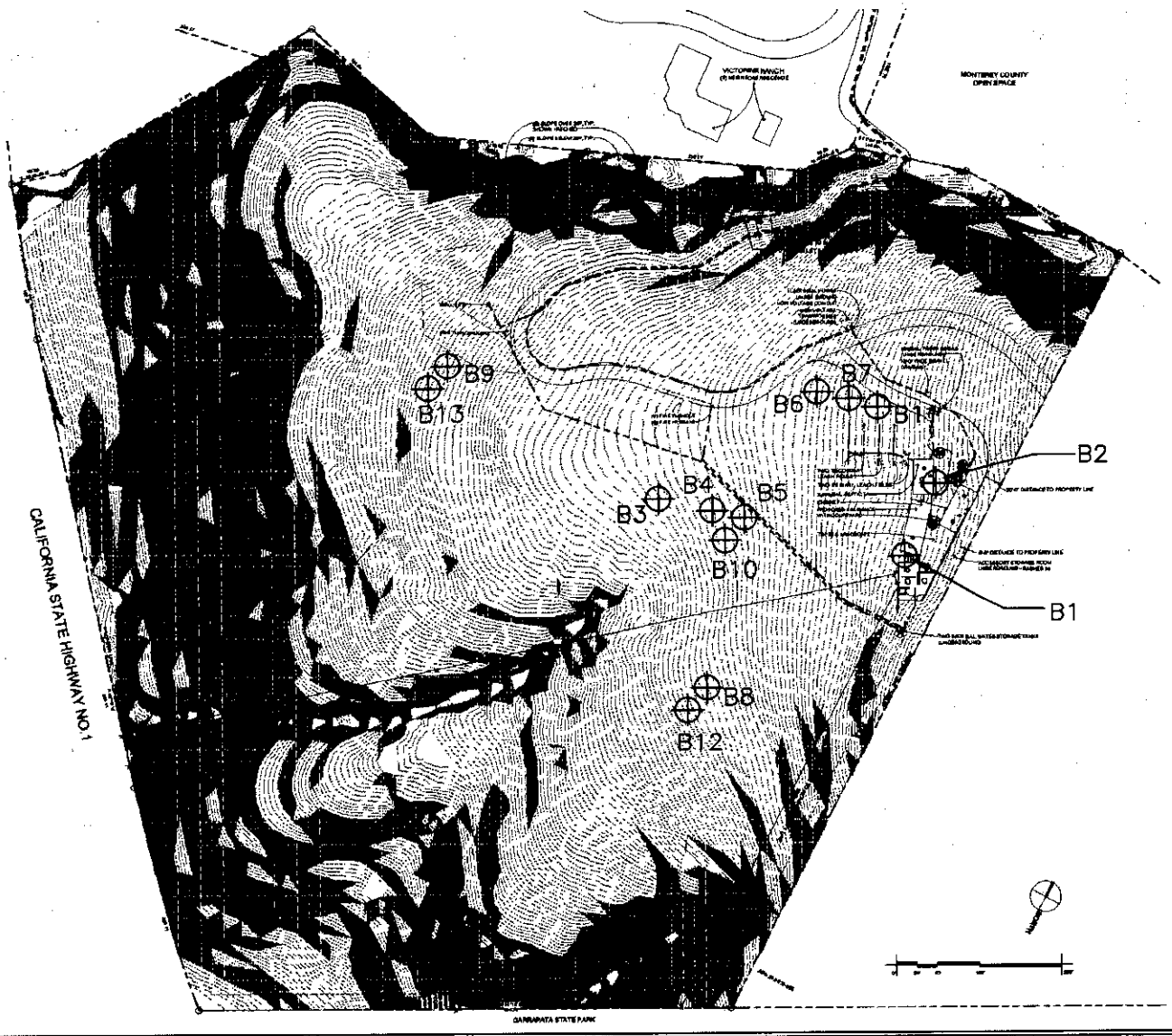


Vicinity Map



Location Map

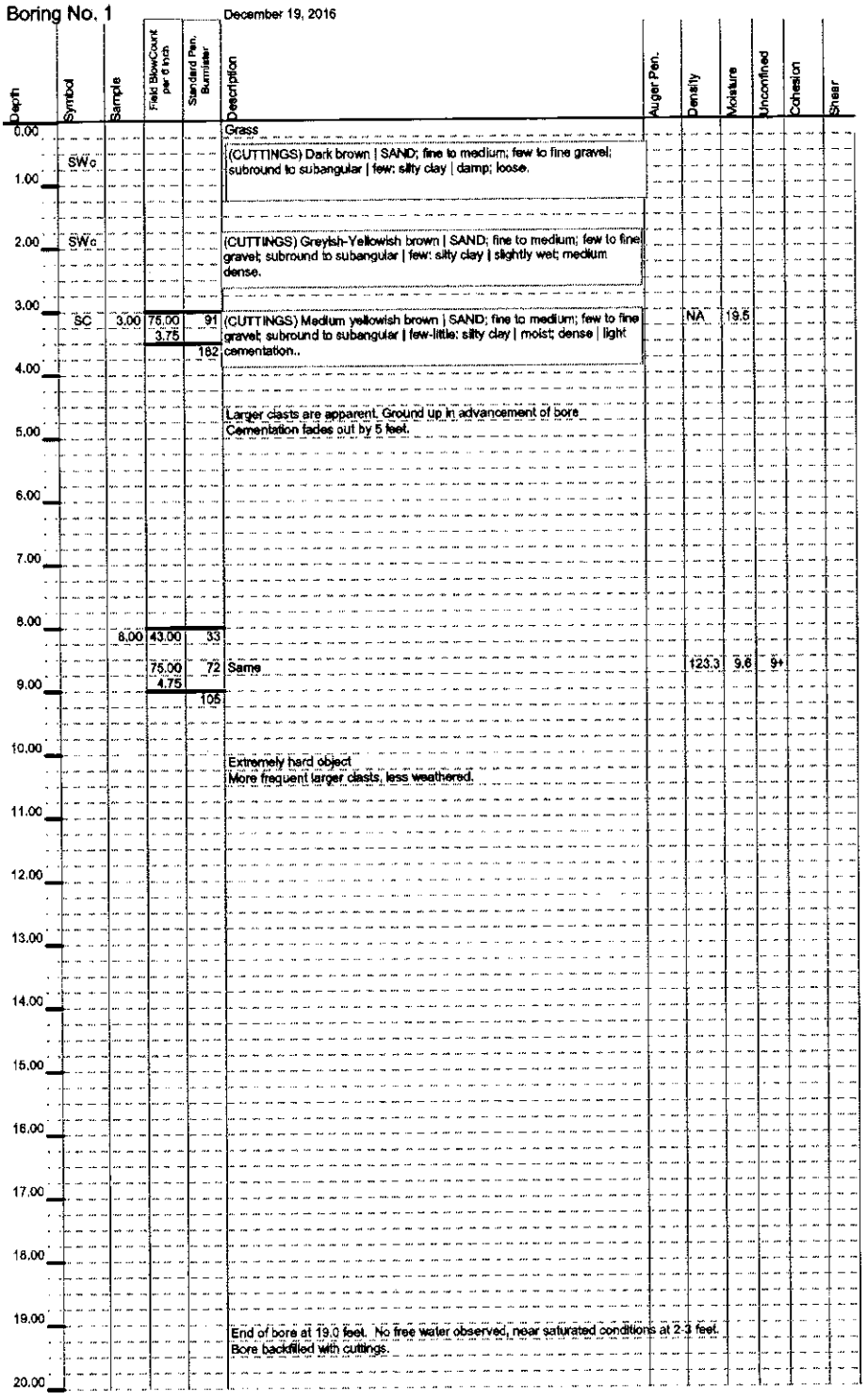
GRICE ENGINEERING INC
561A Brunken Avenue
Salinas, California 93901
Salinas: (831) 422-9619
Monterey: (831) 375-1198 FAX: (831) 422-1896


B9
B13
B7
B6
B11
B2
B4
B5
B3
B10
B1
B8
B12
CALIFORNIA STATE HIGHWAY NO.1

APPENDIX B

Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 1 December 19, 2016



Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 2 December 19, 2016

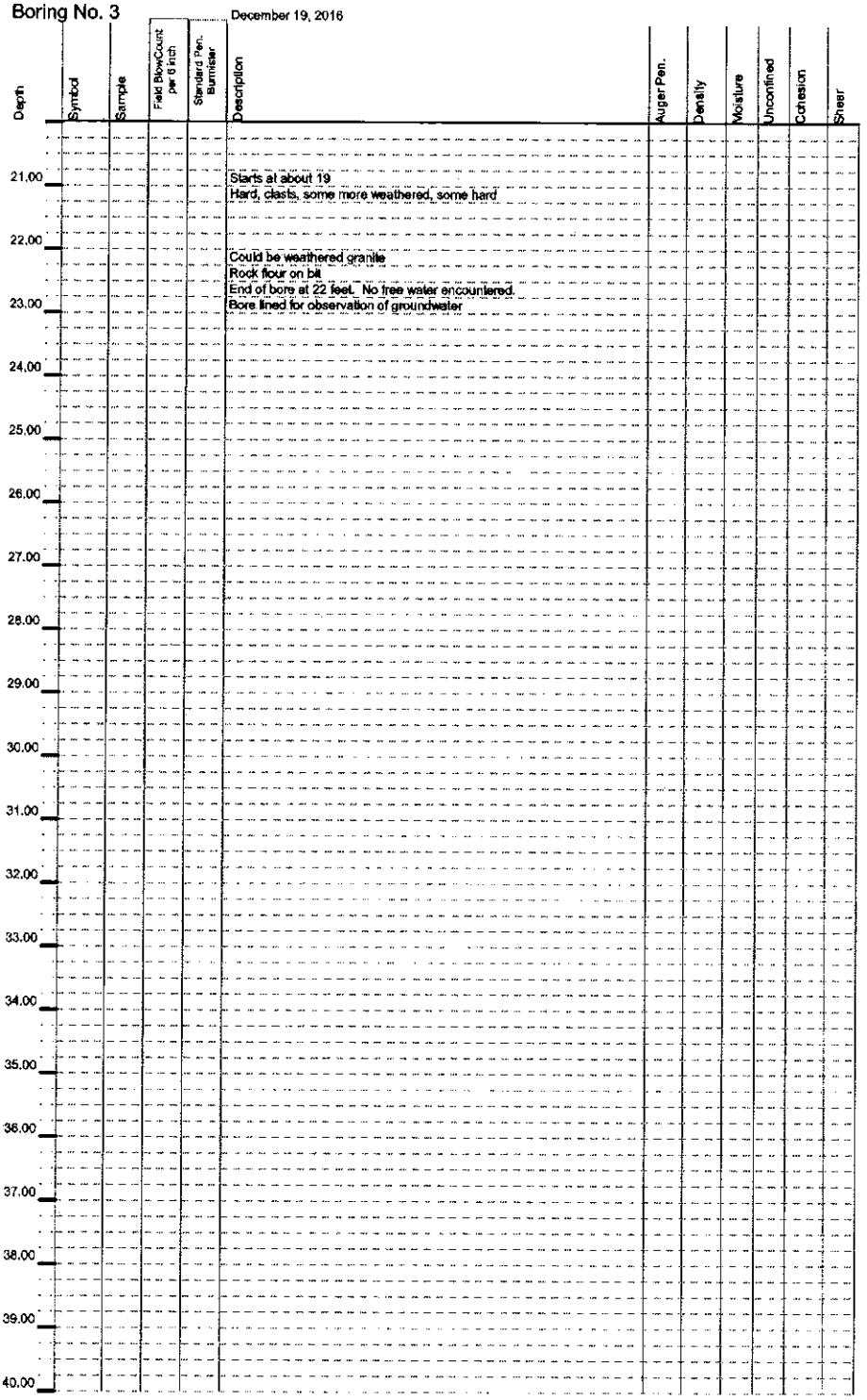
Depth	Symbol	Sample	Field BlowCount per d inch	Standard Pen. Blow/ft	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
0.00					Grass						
1.00	SWc				(CUTTINGS) Dark brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | damp; loose.						
2.00	SWc				(CUTTINGS) Greyish-Yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | slightly wet; medium dense.						
3.00					Increased clay in upper portion of following, similar to b1						
4.00	SC				(CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few-little: silty clay | moist; dense | Light cementation						
5.00					Larger clasts are apparent. Ground up in advancement of bore Cementation fades out by 5 feet.						
6.00	CL				(CUTTINGS) Medium yellowish brown-yellowish brown- pale yellowish gray | CLAY; medium plasticity; moderate-slightly pliable | trace to some (varies): clasts; fine sand to 3/8 gravel; granitic, subangular to subround |						
7.00	SC				(CUTTINGS) Medium yellow-reddish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few-little: silty clay | moist; dense.						
8.00					Apparent increase in coarser clasts, similar b1, color more red						
9.00											
10.00											
11.00					Red hue seems to be decreasing Larger clasts increasing, plasticity of clay varies some						
12.00											
13.00											
14.00											
15.00					Some harder clasts Consider it refusal. End of bore at 15.0 feet. No free water encountered. Bore backfilled with cuttings.						
16.00											
17.00											
18.00											
19.00											
20.00											

Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 3 December 19, 2016

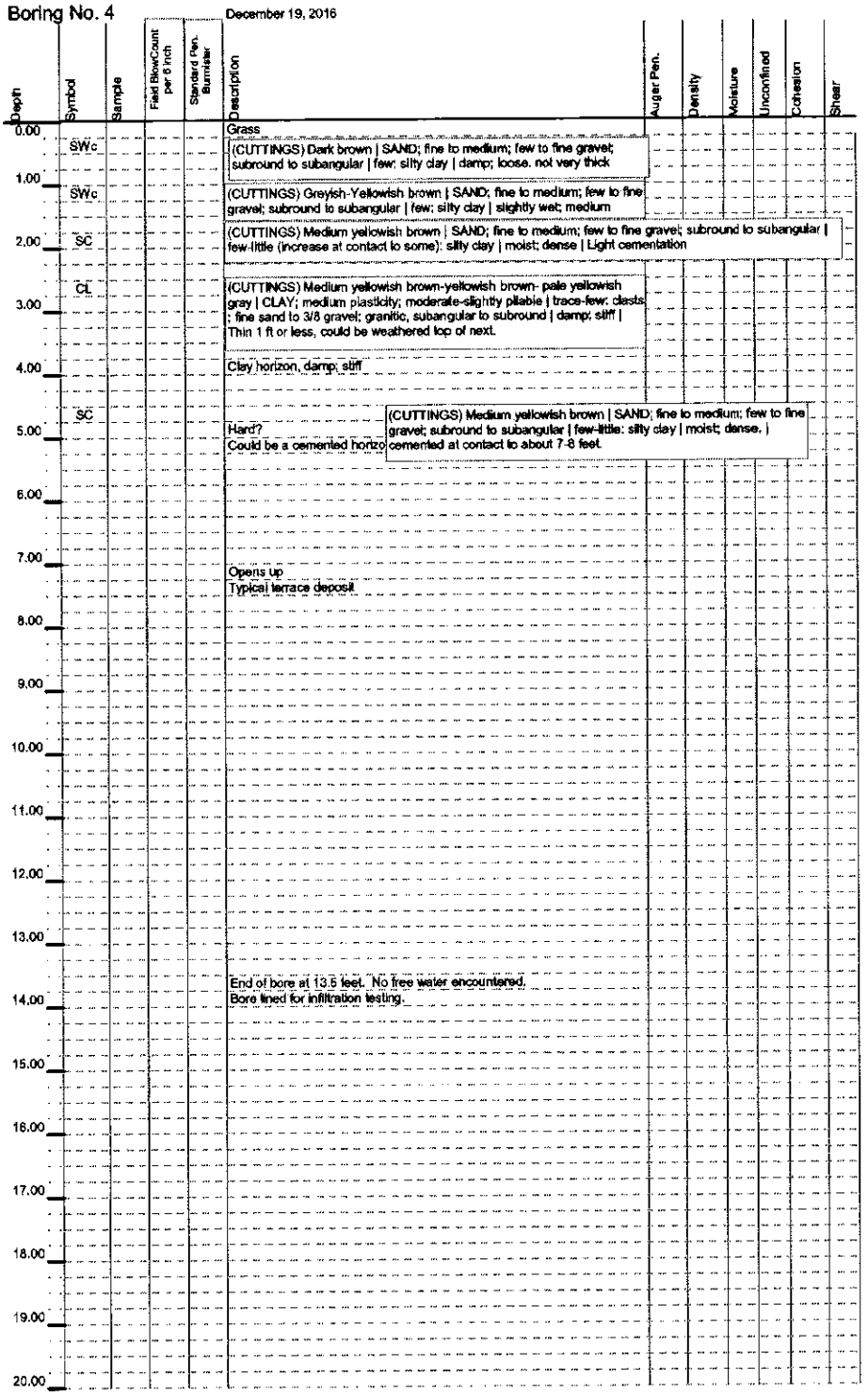
Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Blow/Meter	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Sheer
0.00					Grass						
	SWc				(CUTTINGS) Dark brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | damp; loose. | not very thick						
1.00	SWc				(CUTTINGS) Greyish-Yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | slightly wet; medium dense.						
2.00	SC				(CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few-little (increase at contact to some); silty clay | moist; dense | Light cementation						
3.00											
4.00	CL				Clay horizon, damp; sti (CUTTINGS) Medium yellowish brown-yellowish brown- pale yellowish gray | CLAY; medium plasticity; moderate-slightly pliable | trace-few: clasts ; fine sand to 3/8 gravel; granitic, subangular to subround | damp; stiff |						
5.00					Hard? Could be a cemented horizons						
	SC				(CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few-little: silty clay | moist; dense.						
6.00											
7.00											
8.00											
9.00											
10.00					Another hard horizon appears to be cementation, need water to advance						
11.00											
12.00											
13.00											
14.00											
15.00											
					past 12-13 open drilling						
16.00											
17.00											
18.00											
19.00											
20.00											

Rajagopalan Estate; 31613 Highway One, Carmel, California
Boring No. 3 December 19, 2016



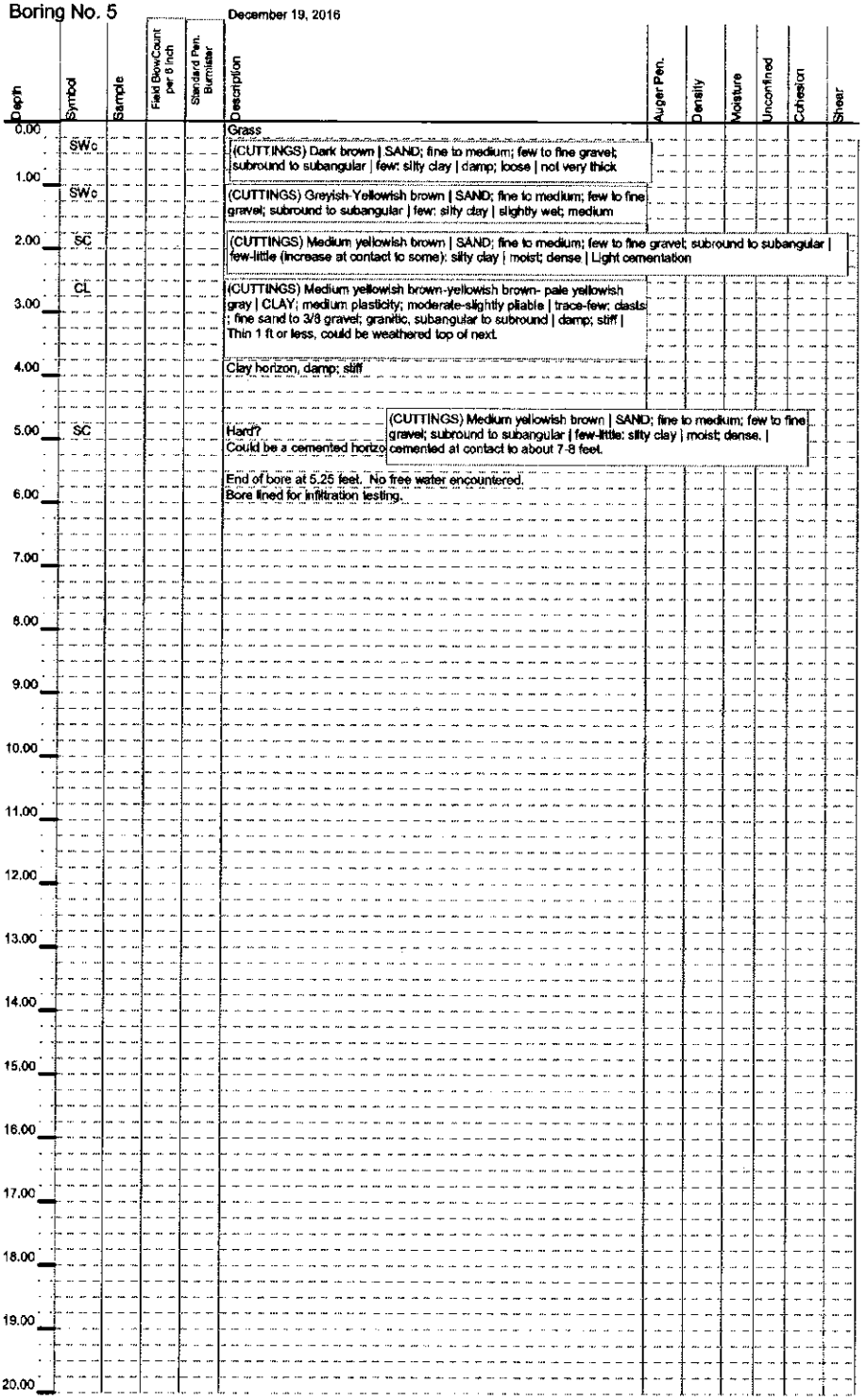
Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 4 December 19, 2016



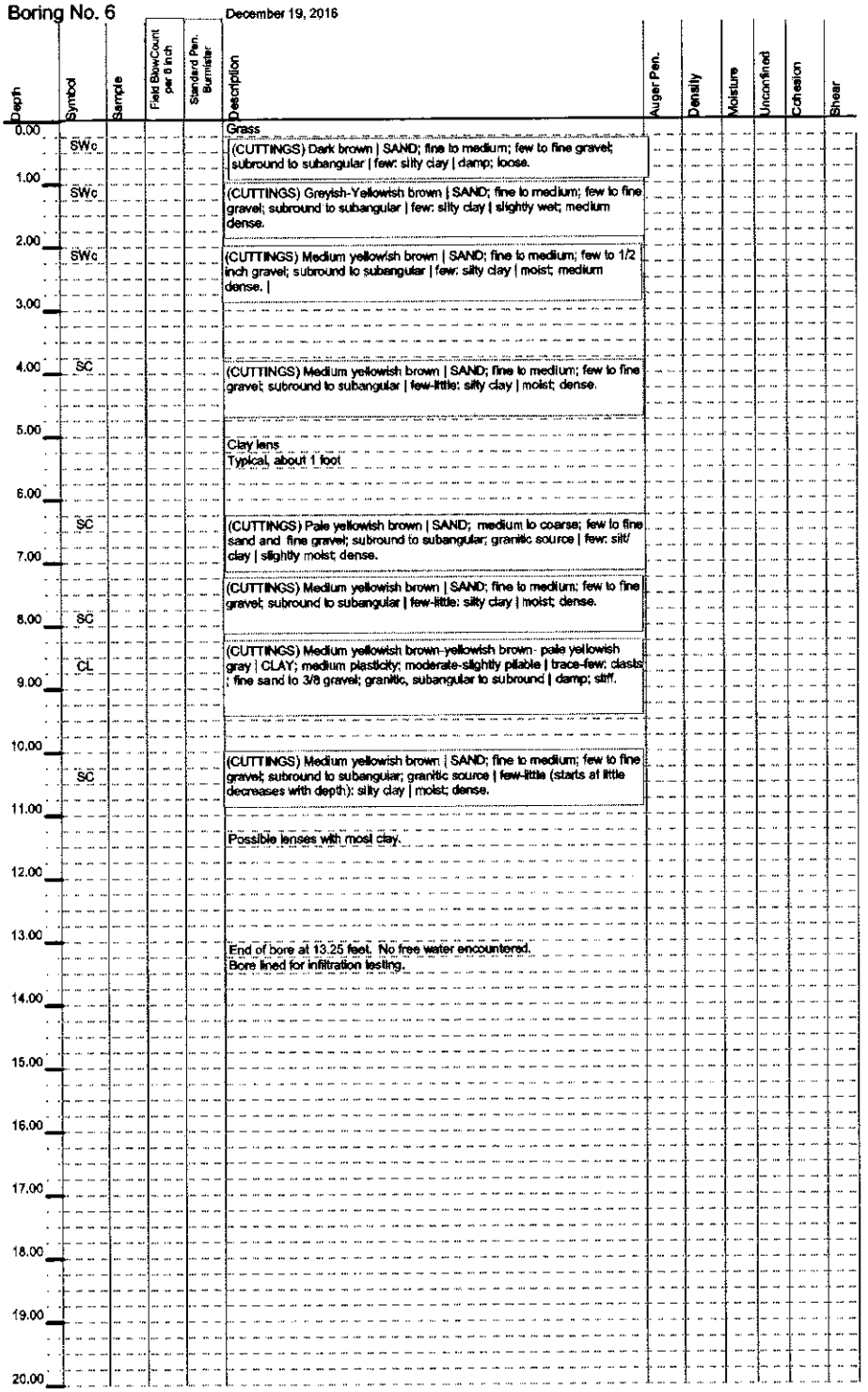
Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 5 December 19, 2016



Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 6 December 19, 2016



Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 7 December 19, 2016

Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Blows/ft	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
0.00					Grass						
	SWc				(CUTTINGS) Dark brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | damp; loose.						
1.00	SWc				(CUTTINGS) Greyish-Yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | slightly wet; medium dense.						
2.00	SC				(CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to 1/2 inch gravel; subround to subangular | few: silty clay | moist; medium dense. |						
3.00											
4.00	SC				(CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few-little: silty clay | moist; dense.						
5.00											
6.00	SC				(CUTTINGS) Pale yellowish brown | SAND; medium to coarse; few to fine sand and fine gravel; subround to subangular; granitic source | few: silt/ clay | slightly moist; dense | Smell and appearance suggest weathered granite is above.						
7.00	SC				(CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few increasing to little-some: silty clay | moist; dense.						
8.00	CL				(CUTTINGS) Medium yellowish brown-yellowish brown- pale yellowish gray | CLAY; medium plasticity; moderate-slightly pliable | trace-few: clasts ; fine sand to 3/8 gravel; granitic, subangular to subround | damp; stiff.						
9.00					End of bore at 9.0 feet. No free water encountered. Bore lined for infiltration testing.						
10.00											
11.00											
12.00											
13.00											
14.00											
15.00											
16.00											
17.00											
18.00											
19.00											
20.00											

Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 8 December 19, 2016

Depth	Symbol	Sample	Field Blow Count per 6 inch	Standard Pen. Blows/ft	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
0.00					Grass						
	SWc				(CUTTINGS) Dark brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | damp; loose.						
1.00	SWc				(CUTTINGS) Greyish-Yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | slightly wet; medium dense.						
2.00					Thin horizon of yellowish brown sand with little clay; damp decreasing to moist medium dense to dense						
3.00	CL				(CUTTINGS) Yellowish brown | CLAY; medium plasticity; moderate-slightly pliable | few to some: clasts; fine sand to 3/8 gravel; granitic, subangular to subround | very damp; stiff.						
					Transitions to						
4.00	SC				(CUTTINGS) Dark yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few-little: silt/clay | moist; dense.						
5.00											
6.00	SC				(CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few increasing to little-some: silty clay | moist; dense.						
7.00					This bore was a bit less hard than other bores						
8.00											
9.00					End of bore at 9.0 feet. No free water encountered. Bore lined for infiltration testing.						
10.00											
11.00											
12.00											
13.00											
14.00											
15.00											
16.00											
17.00											
18.00											
19.00											
20.00											

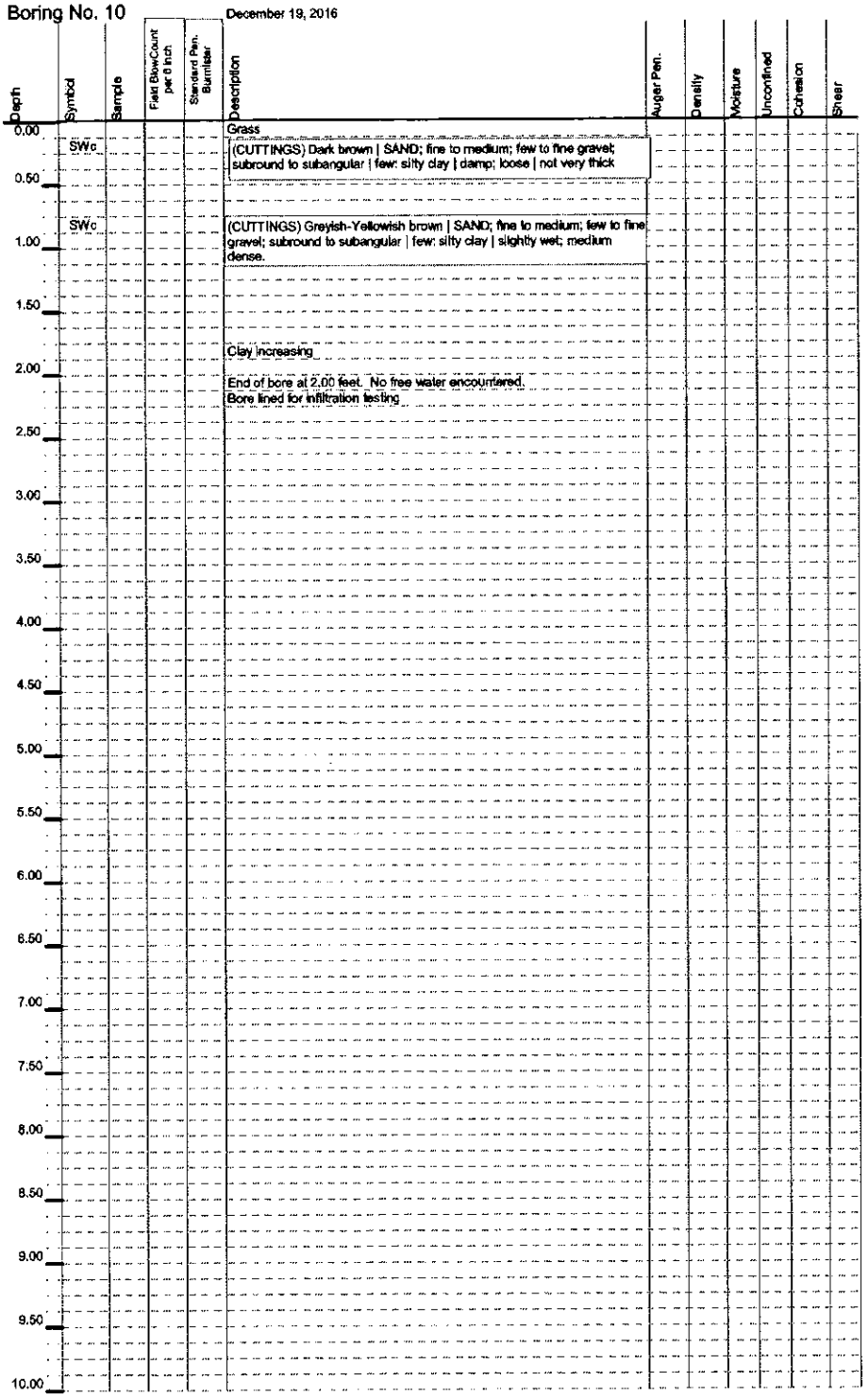
Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 9 December 19, 2016

Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Blows/ft	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
0.00					Grass						
	SWc				(CUTTINGS) Dark brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | damp; loose.						
1.00	CL				(CUTTINGS) Dark grayish brown | CLAY; medium plasticity; moderate-slightly pliable | few to some: clasts; fine sand to 3/8 gravel; granitic, subangular to subround | very damp-slightly wet; medium stiff.						
2.00	CL				(CUTTINGS) Yellowish brown | CLAY; medium plasticity; moderate-slightly pliable | few to some: clasts; fine sand to 3/8 gravel; granitic, subangular to subround | very damp; stiff.						
3.00					Very tight drilling						
4.00	SC				(CUTTINGS) Yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | little: silt/clay | moist; dense.						
5.00											
6.00	SC				(CUTTINGS) Medium yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | little: clayey silt | moist; dense.						
7.00					This bore was a bit less hard than other bores						
	SC-SWm				Still very tight, could be fines are more silty Cutting indicate a decreasing amount of fines to few						
8.00											
					End of bore at 9.0 feet. No free water encountered. Bore lined for infiltration testing.						
9.00											
10.00											
11.00											
12.00											
13.00											
14.00											
15.00											
16.00											
17.00											
18.00											
19.00											
20.00											

Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 10 December 19, 2016



Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 11 December 19, 2016

Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Bumrister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
0.00					Grass						
	SWc				(CUTTINGS) Dark brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | damp; loose | not very thick						
0.50											
1.00											
	SWc				(CUTTINGS) Greyish-Yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | slightly wet; medium dense.						
1.50											
2.00											
2.50					Slight increase in clay						
					End of bore at 2.75 feet. No free water encountered. Bore lined for infiltration testing						
3.00											
3.50											
4.00											
4.50											
5.00											
5.50											
6.00											
6.50											
7.00											
7.50											
8.00											
8.50											
9.00											
9.50											
10.00											

Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 12 December 19, 2016

Depth	Symbol	Sample	Field Blow/Count per 6 inch	Standard Pen. Blow/Foot	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
0.00					Grass						
	SWc				(CUTTINGS) Dark brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | damp; loose | not very thick						
0.50											
1.00											
	SWc				(CUTTINGS) Greyish-Yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | slightly wet; medium dense.						
1.50											
					Clay increasing						
2.00											
					End of bore at 5.25 feet. No free water encountered.						
2.50					Bore lined for infiltration testing						
3.00											
3.50											
4.00											
4.50											
5.00											
5.50											
6.00											
6.50											
7.00											
7.50											
8.00											
8.50											
9.00											
9.50											
10.00											

Rajagopalan Estate; 31613 Highway One, Carmel, California

Boring No. 13 December 19, 2016

Depth	Symbol	Sample	Field BlowCount per 6 inch	Standard Pen. Barnister	Description	Auger Pen.	Density	Moisture	Unconfined	Cohesion	Shear
0.00					Grass						
	SWc				(CUTTINGS) Dark brown | SAND; fine to medium; few to fine gravel; subround to subangular | few: silty clay | damp; loose | not very thick						
0.50											
	SWc				(CUTTINGS) Greyish-Yellowish brown | SAND; fine to medium; few to fine gravel; subround to subangular | few-little: silty clay | slightly wet; medium dense.						
1.00											
1.50					Clay increasing						
					End of bore at 2.75 feet. No free water encountered.						
2.00					Bore lined for infiltration testing						
2.50											
3.00											
3.50											
4.00											
4.50											
5.00											
5.50											
6.00											
6.50											
7.00											
7.50											
8.00											
8.50											
9.00											
9.50											
10.00											

FILE No. 6725-16.12
JOB NAME: RAJAGOPALAN RESIDENCE
CLIENT: RAJAGOPALAN

DATE DRILLED: 12/20/2016
DATE PRESOAKED: 12/27/2016
DATE PERCED: 12/28/2016

PERFORMED BY:
LAWRENCE E GRICE
GRICE ENGINEERING INC.

WITNESSED BY:
NONE

DURATION OF TEST 344.10 minutes
5.74 hours

BORING No 4
HOLE DEPTH FROM GROUND SURFACE 13.82 feet
ELEVATION OF BORING na feet

REFERENCE FOR GROUNDWATER na
ELEVATION OF GROUNDWATER 0.00 feet
TOP OF HOLE TO GRND WATER 0.00 feet

DEPTH TO PRESOAK WATER LEVEL 0.00 feet
DEPTH TO RESIDUAL WATER LEVEL WET 8.57 feet

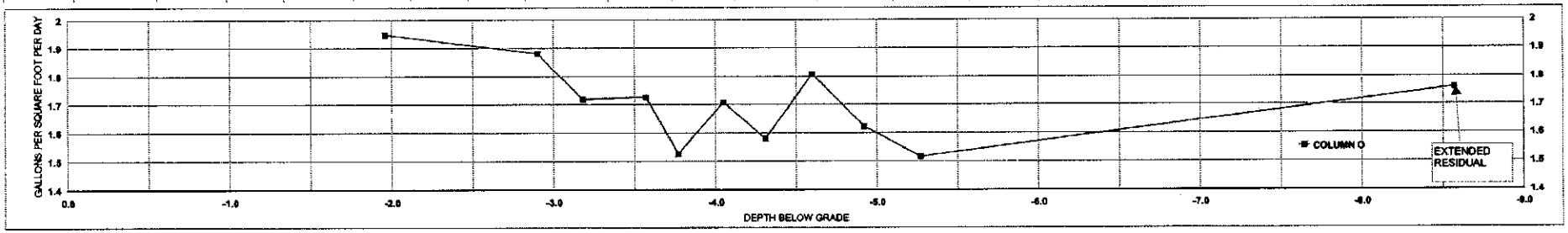
DEPTH OF HOLE USED FOR COMPUTATIONS RESIDUAL 8.57 feet
FROM BOTTOM 102.84 inches
INCLUDE BOTTOM OF HOLE IN WALL AREA NO
GALLONS PER CUBIC FOOT 7.48052
CUBIC INCHES PER GALLON 231
CUBIC FEET PER GALLON 0.1337

DIAMETER OF HOLE 5.00 inches
0.417 feet
GROSS AREA OF HOLE 19.63 square inches
0.136 square feet
CIRCUMFERENCE OF HOLE 15.71 inches
1.31 feet
APPLICATION RATE FACTOR OF SAFETY 7.9

PREPARATION OF HOLE Lined
DIAMETER OF PIPE 3 inch
0.25 feet
AREA OF PIPE 7.07 square inches
0.049 square feet
ANNULAR FILL Pea Gravel
POROSITY OF FILL 0.3260 percent
NET AREA OF HOLE 11.17 square inches
Corrected for volume of gravel 0.078 square feet
STANDARD FALL
CORRECTION FACTOR 0.5686

FOR CONVERSION TO EQUIVALENT "TAFT FALL"
TAFT TEST DEPTH 8 inches
TAFT BORE DIAMETER 6 inches
TAFT BORE CROSSECTIONAL AREA 28.27 square inches
TAFT WALL AREA 1.24 square feet

DATE	CLOCK TIME	ELAPSED TIME	TOTAL FALL		STANDARD UNIT FALL	STANDARD RATES OF FALL		CORRECTED STANDARD UNIT FALL	CORRECTED STANDARD RATES OF FALL		TAFT CORRECTED UNIT FALL	TAFT EQUIVALENT PERCOLATION RATES		VOLUME CHANGE	AVERAGE WALL AREA	DISCHARGE	ABSORPTION RATE				APPLICATION RATE
						min. per inch	inches per hour		min. per inch	inches per hour		min. per inch	inches per hour			cubic feet per sq. foot	cubic feet per square foot per minute	gallons per square foot per minute	gallons per square foot per hour	O gallons per square foot per day	gallons per square foot per day
		minutes	feet	inches	inches			inches			inches			cubic feet	sq. feet						
PRESATURATION																					
12/27/2016	04:20:00 PM	0.00	-0.00	-0.00																	
12/28/2016	08:23:10 AM	963.17	-8.57	-102.84	102.84	9.37	6.41	58.48	16.47	3.64	40.61	71.32	0.84	0.6645	3.739	0.1777	0.0002	0.0014	0.08	1.99	0.25
PERCOLATION - INFILTRATION																					
12/28/2016	08:32:00 AM	0.00	-0.25	-3.00																	
12/28/2016	09:50:00 AM	78.00	-1.96	-23.52	20.52	3.80	15.78	11.67	6.66	8.98	8.10	72.75	0.82	0.1326	9.399	0.0141	0.0002	0.0014	0.08	1.95	0.26
12/28/2016	10:43:18 AM	53.30	-2.90	-34.80	11.28	4.73	12.70	6.41	8.31	7.22	4.45	75.36	0.80	0.0729	7.832	0.0093	0.0002	0.0013	0.08	1.88	0.24
12/28/2016	11:02:15 AM	18.95	-3.18	-38.16	3.36	5.64	10.64	1.91	9.92	6.05	1.33	82.44	0.73	0.0217	7.178	0.0030	0.0002	0.0012	0.07	1.72	0.22
12/28/2016	11:30:20 AM	28.08	-3.57	-42.84	4.66	6.00	10.00	2.66	10.55	5.69	1.85	82.06	0.73	0.0302	6.715	0.0045	0.0002	0.0012	0.07	1.73	0.22
12/28/2016	11:47:30 AM	17.17	-3.77	-45.24	2.40	7.15	8.39	1.36	12.58	4.77	0.95	92.79	0.65	0.0155	6.370	0.0024	0.0001	0.0011	0.06	1.53	0.19
12/28/2016	12:10:10 PM	22.67	-4.05	-48.60	3.36	6.75	8.89	1.91	11.66	5.06	1.33	82.96	0.72	0.0217	6.039	0.0036	0.0002	0.0012	0.07	1.71	0.22
12/28/2016	12:34:20 PM	24.17	-4.31	-51.72	3.12	7.75	7.75	1.77	13.82	4.40	1.23	89.75	0.67	0.0202	5.690	0.0035	0.0001	0.0011	0.07	1.56	0.20
12/28/2016	12:59:30 PM	25.17	-4.60	-55.20	3.48	7.23	8.30	1.98	12.72	4.72	1.37	78.39	0.77	0.0225	5.323	0.0042	0.0002	0.0013	0.08	1.81	0.23
12/28/2016	01:33:00 PM	33.50	-4.92	-59.04	3.84	6.72	6.68	2.16	15.34	3.91	1.52	87.36	0.69	0.0248	4.917	0.0050	0.0002	0.0011	0.07	1.62	0.21
12/28/2016	02:16:06 PM	43.10	-5.27	-63.24	4.20	10.26	5.85	2.39	16.05	3.32	1.86	93.46	0.64	0.0271	4.472	0.0061	0.0001	0.0011	0.08	1.52	0.19
RESIDUAL	08:23:10 AM	1087.07	-8.57	-102.84	39.60	27.45	2.19	22.52	46.26	1.24	15.84	80.49	0.75	0.2559	1.440	0.1777	0.0002	0.0012	0.07	1.76	0.22
	AVERAGE RATE	344.10	-5.27	-63.24	60.24	5.71	10.50	34.25	10.05	5.97	23.79	75.73	0.79	0.3882	6.510	0.0598	0.0002	0.0013	0.08	1.87	0.24



FILE No. 6725-16.11
JOB NAME: Rajagopalan Residence
CLIENT: Rajagopalan

DATE DRILLED: 12/20/2016
DATE PRESOAKED: 12/27/2016
DATE PERC'ED: 12/28/2016

PERFORMED BY:
LAWRENCE E. GRICE
GRICE ENGINEERING INC.

WITNESSED BY:
None
MONTEREY COUNTY HEALTH DEPT.

DURATION OF TEST 289.42 minutes
4.82 hours

BORING No. 5
HOLE DEPTH FROM GROUND SURFACE 5.43 feet
ELEVATION OF BORING NA feet

REFERANCE FOR GROUNDWATER NA
ELEVATION OF GROUNDWATER NA feet
TOP OF HOLE TO GRND WATER NA feet

DEPTH TO PRESOAK WATER LEVEL 0.963 feet
DEPTH TO RESIDUAL WATER LEVEL WET 0.963 feet

GROSS FIELD MEASUREMENTS

	decimal feet	Inches 12ths foot	16ths inch	
top pipe to bot hole	6.03	0	0	6.0300
top of pipe to presoak water	0	18	12	1.5625
top pipe to res. water	0	18	12	1.5625
top pipe to test water level	0	18	12	1.5626
REFERENCE POINT				
top pipe to grnd srfce	0.6	0	0	0.6000

DEPTHS FROM GRADE

decimal feet	
5.4300	bot hole
0.9625	presoak level
0.9625	res water level
0.9625	test water level

APPLICATION RATE FACTOR OF SAFETY 7.9

TAFT BORE DEPTH 8 inches
TAFT BORE DIAMETER 6 inches
TAFT BORE AREA 28.274 sq.inches 0.196 sq.feet
TAFT WALL AREA 179.0708 sq.inches 1.243547 sq.feet

Depth of bore used in test 4.4675 feet
Wall area of tested depth includes bottom 4.6039 square feet

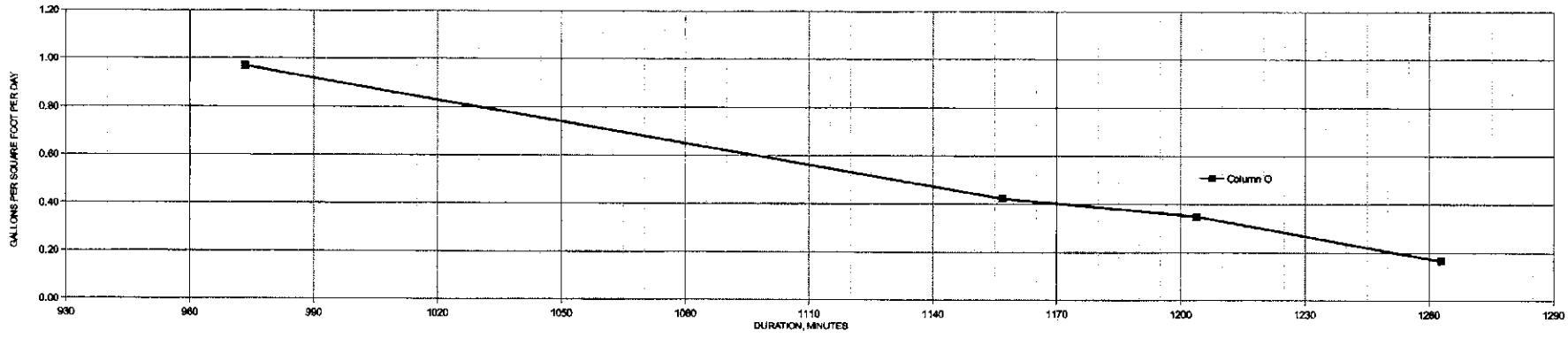
PREPARATION OF HOLE Lined
DIAMETER OF PIPE 3 inch 0.25 feet
AREA OF PIPE 7.07 square inches 0.049 square feet

ANNULAR FILL Pea Gravel
POROSITY OF FILL 0.33 percent

DIAMETER OF HOLE 5.00 inches 0.417 feet
GROSS AREA OF HOLE 19.63 square inches 0.136 square feet
NET AREA OF HOLE 11.17 square inches
Corrected for volume of gravel 0.078 square feet
CIRCUMFERENCE OF HOLE 15.71 inches 1.31 feet

VOLUME CHANGE PER 1 INCH FALL IN AN UNLINED HOLE
19.6349541 cubic inches
0.01136282 cubic feet
0.0849939 gallons

DATE	CLOCK TIME	ELAPSED TIME	VESSEL WATER LEVEL				POSITION VOLUME	VOLUME CHANGE	WALL AREA	DURATION	ABSORPTION RATE				TAFT PERCOLATION RATES Relative to a fall in 6 inch diameter tube Per 1.24 square foot of wall area				APPLICATION RATE Base on a Safety Factor of 7.9
											cubic feet per sqr. foot per minute	gallons per sqr. foot per minute	gallons per sqr. foot per day	inches per sqr. inch per hour	feet fall per minute	inches fall per minute	minutes per inch of fall	inches per hour	gal per sqr. foot per day
		minutes	feet	inches	sixtenths	decimal inches	total cubic feet	cubic feet	sq. feet	minutes									
12/27/2016	04:28:50 PM	0.00	0.00	246.00	4.00	35.00000	5.944258												
12/28/2016	08:42:15 AM	973.42	0.00	244.00	8.00	33.25000	5.541139	0.403	4.604	973.42	0.0001	0.0007	0.97	0.0648	0.002	0.020	49.13	1.221	0.123
12/28/2016	11:45:40 AM	183.42	0.00	244.00	7.00	33.18750	5.508000	0.033	4.604	183.42	0.0000	0.0003	0.42	0.0283	0.001	0.009	112.62	0.533	0.054
12/28/2016	12:32:40 PM	47.00	0.00	244.00	6.00	33.12500	5.501000	0.007	4.604	47.00	0.0000	0.0002	0.35	0.0233	0.001	0.007	136.62	0.439	0.044
12/28/2016	01:31:40 PM	59.00	0.00	244.00	5.00	33.06250	5.496823	0.004	4.604	59.00	0.0000	0.0001	0.17	0.0111	0.000	0.003	267.42	0.209	0.021
AVERAGE		1262.83						0.447	4.604	1262.83	0.0001	0.0006	0.83	0.0554	0.001	0.017	57.43	1.045	0.105



FILE No. 6725-16.12
JOB NAME: RAJAGOPALAN RESIDENCE
CLIENT: RAJAGOPALAN

DATE DRILLED: 12/20/2016
DATE PRESOAKED: 12/27/2016
DATE PERC'ED: 12/28/2016

PERFORMED BY:
LAWRENCE E GRICE
GRICE ENGINEERING INC.

WITNESSED BY:
NONE

BORING No 6
HOLE DEPTH FROM GROUND SURFACE 13.61 feet
ELEVATION OF BORING na feet

REFERENCE FOR GROUNDWATER na
ELEVATION OF GROUNDWATER 0.00 feet
TOP OF HOLE TO GRND WATER 0.00 feet

DEPTH TO PRESOAK WATER LEVEL 0.00 feet
DEPTH TO RESIDUAL WATER LEVEL WET 6.25 feet

DEPTH OF HOLE USED FOR COMPUTATIONS RESIDUAL 6.25 feet
FROM BOTTOM 75.00 inches
INCLUDE BOTTOM OF HOLE IN WALL AREA NO

DURATION OF TEST 259.87 minutes
4.33 hours

GALLONS PER CUBIC FOOT 7.48052
CUBIC INCHES PER GALLON 231
CUBIC FEET PER GALLON 0.1337

DIAMETER OF HOLE 5.00 inches
0.417 feet

GROSS AREA OF HOLE 19.63 square inches
0.136 square feet

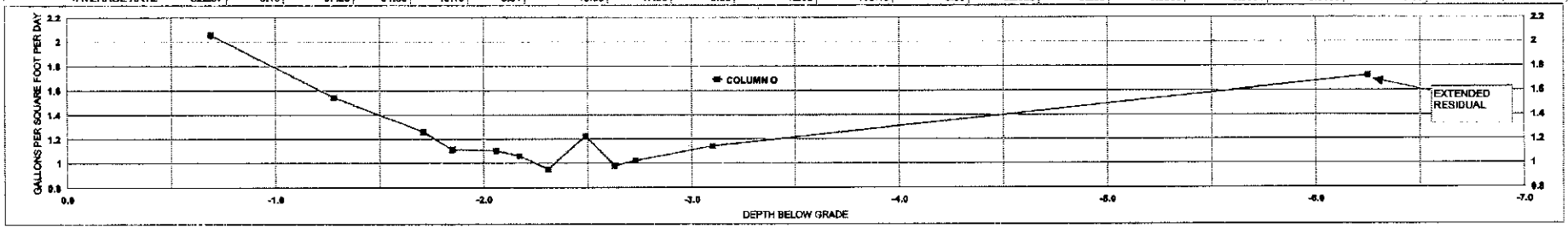
CIRCUMFERENCE OF HOLE 15.71 inches
1.31 feet

APPLICATION RATE FACTOR OF SAFETY 7.9

PREPARATION OF HOLE Lined
DIAMETER OF PIPE 3 inch
0.25 feet
AREA OF PIPE 7.07 square inches
0.049 square feet
ANNULAR FILL Pea Gravel
POROSITY OF FILL 0.3260 percent
NET AREA OF HOLE 11.17 square inches
Corrected for volume of gravel 0.078 square feet
STANDARD FALL
CORRECTION FACTOR 0.5686

FOR CONVERSION TO EQUIVALENT "TAFT FALL"
TAFT TEST DEPTH 8 inches
TAFT BORE SIZE 6 inches
TAFT BORE CROSSECTIONAL AREA 28.27 square inches
TAFT WALL AREA 1.24 square feet

DATE	CLOCK TIME	ELAPSED TIME	TOTAL FALL		STANDARD UNIT FALL	STANDARD RATES OF FALL		CORRECTED STANDARD UNIT FALL	CORRECTED STANDARD RATES OF FALL		TAFT CORRECTED UNIT FALL	TAFT EQUIVALENT PERCOLATION RATES		VOLUME CHANGE	AVERAGE WALL AREA	DISCHARGE	ABSORPTION RATE				APPLICATION RATE
						min. per inch	inches per hour		min. per inch	inches per hour		min. per inch	inches per hour			cubic feet per sq. foot	cubic feet per square foot per minute	gallons per square foot per minute	gallons per square foot per hour	O gallons per square foot per day	gallons per square foot per day
		minutes	feet	inches	inches			inches			inches			cubic feet	sq. feet						
PRESATURATION																					
12/27/2016	04:30:00 PM	0.00	-0.00	-0.00																	
12/28/2016	08:50:20 AM	980.33	-6.25	-75.00	75.00	13.07	4.59	42.65	22.99	2.61	29.82	72.59	0.83	0.4646	2.727	0.1777	0.0002	0.0014	0.06	1.95	0.25
PERCOLATION - INFILTRATION																					
12/28/2016	08:54:22 AM	0.00	-0.45	-5.40																	
12/28/2016	09:07:34 AM	13.20	-0.89	-8.28	2.88	4.58	13.09	1.84	8.06	7.44	1.14	66.91	0.87	0.0186	7.383	0.0025	0.0002	0.0014	0.09	2.06	0.28
12/28/2016	09:54:45 AM	47.18	-1.28	-15.36	7.08	6.66	9.00	4.03	11.72	5.12	2.80	91.78	0.65	0.0457	6.763	0.0068	0.0001	0.0011	0.06	1.54	0.20
12/28/2016	10:41:12 AM	46.45	-1.71	-20.52	5.16	9.00	6.67	2.93	15.63	3.79	2.04	112.36	0.53	0.0333	6.130	0.0054	0.0001	0.0009	0.05	1.26	0.18
12/28/2016	10:59:15 AM	18.05	-1.85	-22.20	1.68	10.74	5.58	0.96	18.69	3.18	0.66	127.35	0.47	0.0109	5.821	0.0019	0.0001	0.0008	0.05	1.11	0.14
12/28/2016	11:27:45 AM	28.50	-2.06	-24.72	2.52	11.31	5.31	1.43	19.69	3.02	1.00	128.43	0.47	0.0163	5.576	0.0029	0.0001	0.0008	0.05	1.10	0.14
12/28/2016	11:43:48 AM	16.05	-2.17	-26.04	1.32	12.16	4.93	0.75	21.36	2.81	0.52	133.43	0.45	0.0085	5.369	0.0016	0.0001	0.0007	0.04	1.06	0.13
12/28/2016	12:07:16 PM	23.50	-2.31	-27.72	1.68	13.99	4.29	0.96	24.60	2.44	0.66	146.65	0.40	0.0109	5.219	0.0021	0.0001	0.0007	0.04	0.95	0.12
12/28/2016	12:31:50 PM	24.53	-2.49	-29.88	2.16	11.36	5.28	1.23	19.97	3.00	0.85	115.66	0.52	0.0140	5.000	0.0028	0.0001	0.0009	0.05	1.23	0.16
12/28/2016	12:56:40 PM	24.83	-2.83	-31.56	1.68	14.78	4.06	0.96	25.99	2.31	0.66	144.48	0.42	0.0109	4.600	0.0023	0.0001	0.0007	0.04	0.98	0.12
12/28/2016	01:14:14 PM	17.57	-2.73	-32.76	1.20	14.64	4.10	0.68	25.74	2.33	0.47	136.66	0.43	0.0078	4.651	0.0017	0.0001	0.0007	0.04	1.02	0.13
12/28/2016	02:17:20 PM	63.10	-3.10	-37.20	4.44	14.21	4.22	2.52	24.99	2.40	1.75	124.00	0.48	0.0287	4.285	0.0067	0.0001	0.0008	0.05	1.14	0.14
RESIDUAL	08:50:20 AM	1113.00	-6.25	-75.00	37.80	29.44	2.04	21.49	51.76	1.16	14.93	82.41	0.73	0.2442	1.374	0.1777	0.0002	0.0012	0.07	1.72	0.22
	AVERAGE RATE	322.97	-3.10	-37.20	31.80	10.16	5.91	18.08	17.86	3.36	12.56	109.19	0.55	0.2055	5.280	0.0389	0.0001	0.0009	0.05	1.30	0.16



FILE No. 6725-16.11
JOB NAME: Rajagopalan Residence
CLIENT: Rajagopalan

DATE DRILLED: 12/20/2016
DATE PRESOAKED: 12/27/2016
DATE PERC'ED: 12/28/2016

PERFORMED BY:
LAWRENCE E. GRICE
GRICE ENGINEERING INC.

WITNESSED BY:
None
MONTEREY COUNTY HEALTH DEPT.

DURATION OF TEST 282.50 minutes
4.71 hours

BORING No. 7
HOLE DEPTH FROM GROUND SURFACE 8.94 feet
ELEVATION OF BORING NA feet

REFERANCE FOR GROUNDWATER NA
ELEVATION OF GROUNDWATER NA feet
TOP OF HOLE TO GRND WATER NA feet

DEPTH TO PRESOAK WATER LEVEL 0.970 feet
DEPTH TO RESIDUAL WATER LEVEL WET 0.970 feet

GROSS FIELD MEASUREMENTS

	decimal feet	inches 12ths foot	16ths inch	
top pipe to bot hole	11.64	0	0	11.6400
top of pipe to presoak water	3.67	0	0	3.6700
top pipe to res. water	3.67	0	0	3.6700
top pipe to test water level	3.67	0	0	3.6700
REFERENCE POINT				
top pipe to grnd srfce	2.7	0	0	2.7000

Depth of bore used in test 7.9700 feet
Wall area of tested depth includes bottom 8.1064 square feet

DEPTHS FROM GRADE

decimal feet	
8.9400	bot hole
0.9700	presoak level
0.9700	res water level
0.9700	test water level

APPLICATION RATE FACTOR OF SAFETY 7.9

TAFT BORE DEPTH 8 inches
TAFT BORE DIAMETER 6 inches
TAFT BORE AREA 28.274 sq.inches
0.196 sq.feet
TAFT WALL AREA 179.0708 sq.inches
1.243547 sq.feet

PREPARATION OF HOLE Lined
DIAMETER OF PIPE 3 inch
0.25 feet
AREA OF PIPE 7.07 square inches
0.049 square feet

ANNULAR FILL Pea Gravel
POROSITY OF FILL 0.33 percent

DIAMETER OF HOLE 5.00 inches
0.417 feet

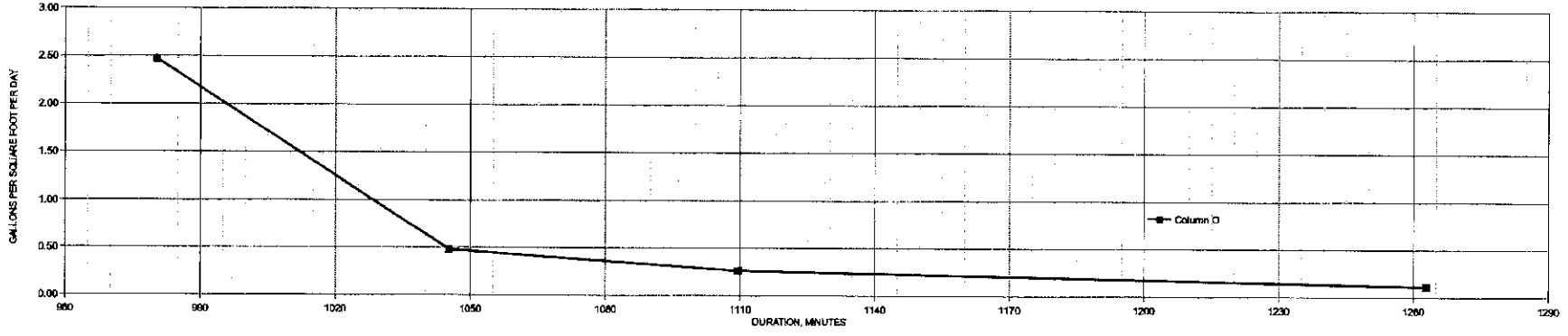
GROSS AREA OF HOLE 19.63 square inches
0.136 square feet

NET AREA OF HOLE 11.17 square inches
Corrected for volume of gravel 0.078 square feet

CIRCUMFERENCE OF HOLE 15.71 inches
1.31 feet

VOLUME CHANGE PER 1 INCH FALL IN AN UNLINED HOLE
19.6349541 cubic inches
0.01136282 cubic feet
0.0849939 gallons

DATE	CLOCK TIME	ELAPSED TIME	VESSEL WATER LEVEL				POSITION VOLUME	VOLUME CHANGE	WALL AREA	DURATION	ABSORPTION RATE				TAFT PERCOLATION RATES Relative to a fall in 6 inch diameter tube Per 1.24 square foot of wall area				APPLICATION RATE Base on a Safety Factor of 7.9
											cubic feet per sqr. foot per minute	gallons per sqr. foot per minute	gallons per sqr. foot per day	inches per sqr. inch per hour	feet fall per minute	inches fall per minute	minutes per inch of fall	inches per hour	gal per sqr. foot per day
		minutes	feet	inches	sixtenths	decimal inches	total cubic feet	cubic feet	sq. feet	minutes									
12/27/2016	04:28:50 PM	0.00	0.00	208.00	4.00	34.25000	5.774467												
12/28/2016	08:49:10 AM	980.33	0.00	200.00	3.00	26.18750	3.949864	1.825	8.106	980.33	0.0002	0.0017	2.47	0.1663	0.008	0.091	10.93	5.468	0.313
12/28/2016	09:54:03 AM	64.88	0.00	200.00	1.00	26.06250	3.926297	0.024	8.106	64.88	0.0000	0.0003	0.48	0.0323	0.001	0.018	56.02	1.071	0.061
12/28/2016	10:58:20 AM	64.28	0.00	200.00	0.00	26.00000	3.913783	0.013	8.106	64.28	0.0000	0.0002	0.26	0.0173	0.001	0.010	104.52	0.574	0.033
12/28/2016	01:31:40 PM	153.33	0.00	199.00	15.00	25.93750	3.901269	0.013	8.106	153.33	0.0000	0.0001	0.11	0.0072	0.000	0.004	249.32	0.241	0.014
AVERAGE		1262.83						1.873	8.106	1262.83	0.0002	0.0014	1.97	0.1317	0.006	0.073	13.72	4.374	0.249



FILE No. 5725-16.11
JOB NAME: Rajagopalan Residence
CLIENT: Rajagopalan

DATE DRILLED: 12/20/2016
DATE PRESOAKED: 12/27/2016
DATE PERC'ED: 12/28/2016

PERFORMED BY:
LAWRENCE E. GRICE
GRICE ENGINEERING INC.

WITNESSED BY:
None
MONTEREY COUNTY HEALTH DEPT.

DURATION OF TEST 269.23 minutes
4.49 hours

BORING No. 8
HOLE DEPTH FROM GROUND SURFACE 8.79 feet
ELEVATION OF BORING NA feet

REFERANCE FOR GROUNDWATER NA
ELEVATION OF GROUNDWATER NA feet
TOP OF HOLE TO GRND WATER NA feet

DEPTH TO PRESOAK WATER LEVEL 3.000 feet
DEPTH TO RESIDUAL WATER LEVEL WET 3.000 feet

GROSS FIELD MEASUREMENTS

	decimal feet	inches 12ths foot	16ths inch	
top pipe to bot hole	11.69	0	0	11.6900
top of pipe to presoak water	5.9	0	0	5.9000
top pipe to res. water	5.9	0	0	5.9000
top pipe to test water level	5.9	0	0	5.9000
REFERENCE POINT				
top pipe to grnd srfce	2.9	0	0	2.9000

Depth of bore used in test 5.7900 feet
Wall area of tested depth includes bottom 5.9264 square feet

DEPTHS FROM GRADE

decimal feet
8.7900 bot hole
3.0000 presoak level
3.0000 res water level
3.0000 test water level

APPLICATION RATE FACTOR OF SAFETY
7.9

TAFT BORE DEPTH 6 inches
TAFT BORE DIAMETER 6 inches
TAFT BORE AREA 28.274 sq.inches
0.196 sq.feet
TAFT WALL AREA 179.0708 sq.inches
1.243547 sq.feet

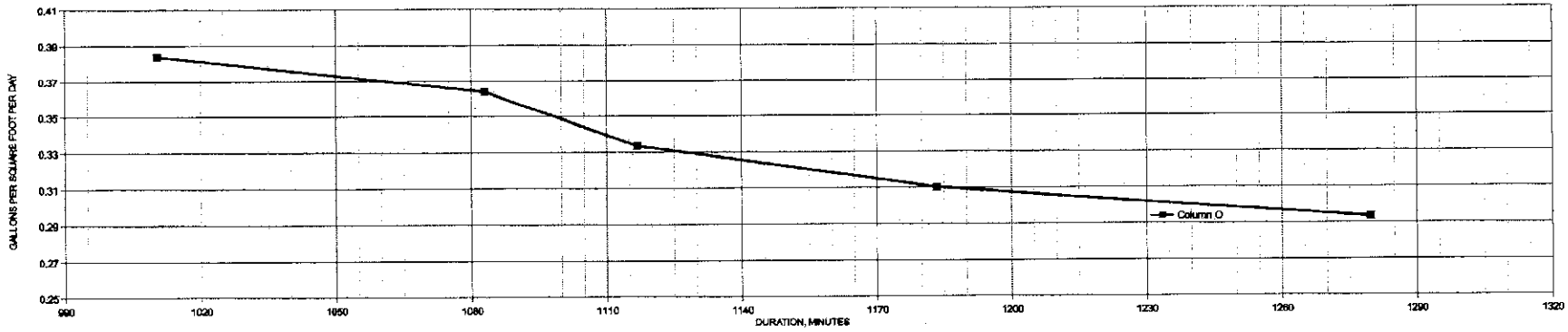
VOLUME CHANGE PER 1 INCH FALL IN AN UNLINED HOLE
19.6349541 cubic inches
0.01136282 cubic feet
0.0849939 gallons

PREPARATION OF HOLE Lined
DIAMETER OF PIPE 3 inch
0.25 feet
AREA OF PIPE 7.07 square inches
0.049 square feet

ANNULAR FILL Pea Gravel
POROSITY OF FILL 0.33 percent

DIAMETER OF HOLE 5.00 inches
0.417 feet
GROSS AREA OF HOLE 19.63 square inches
0.136 square feet
NET AREA OF HOLE 11.17 square inches
Corrected for volume of gravel 0.078 square feet
CIRCUMFERENCE OF HOLE 15.71 inches
1.31 feet

DATE	CLOCK TIME	ELAPSED TIME	VESSEL WATER LEVEL				POSITION VOLUME	VOLUME CHANGE	WALL AREA	DURATION	ABSORPTION RATE O				TAFT PERCOLATION RATES Relative to a fall in 6 inch diameter tube Per 1.24 square foot of wall area				APPLICATION RATE Base on a Safety Factor of 7.9
											cubic feet per sqr. foot per minute	gallons per sqr. foot per minute	gallons per sqr. foot per day	inches per sqr. inch per hour	feet fall per minute	inches fall per minute	minutes per inch of fall	inches per hour	gal per sqr. foot per day
		minutes	feet	inches	sixtenths	decimal inches	total cubic feet	cubic feet	sq. feet	minutes									
12/27/2016	04:26:50 PM	0.00	0.00	108.00	2.00	39.00000	5.944258												
12/28/2016	09:19:16 AM	1010.43	0.00	103.00	3.00	34.06250	5.730849	0.213	5.926	1010.43	0.0000	0.0003	0.38	0.0257	0.001	0.010	96.34	0.623	0.049
12/28/2016	10:31:50 AM	72.57	0.00	103.00	2.00	34.00000	5.716310	0.015	5.926	72.57	0.0000	0.0003	0.36	0.0243	0.001	0.012	81.67	0.735	0.046
12/28/2016	11:05:40 AM	33.83	0.00	103.00	1.00	33.93750	5.710100	0.006	5.926	33.83	0.0000	0.0002	0.33	0.0223	0.001	0.011	89.15	0.673	0.042
12/28/2016	12:12:12 PM	66.53	0.00	102.00	15.00	33.81250	5.698740	0.011	5.926	66.53	0.0000	0.0002	0.31	0.0207	0.001	0.010	95.83	0.626	0.039
12/28/2016	01:48:30 PM	96.30	0.00	102.00	14.00	33.75000	5.683200	0.016	5.926	96.30	0.0000	0.0002	0.29	0.0196	0.001	0.010	101.40	0.592	0.037
AVERAGE		1279.67						0.261	5.926	1279.67	0.0000	0.0003	0.37	0.0248	0.001	0.012	80.21	0.748	0.047



FILE No. 6725-16.11
JOB NAME: Rajagopalan Residence
CLIENT: Rajagopalan

DATE DRILLED: 12/20/2016
DATE PRESOAKED: 12/27/2016
DATE PERC'ED: 12/28/2016

PERFORMED BY:
LAWRENCE E. GRICE
GRICE ENGINEERING INC.

WITNESSED BY:
NONE
MONTEREY COUNTY HEALTH DEPT.

DURATION OF TEST 259.17 minutes
4.32 hours

BORING No. 9
HOLE DEPTH FROM GROUND SURFACE 8.39 feet
ELEVATION OF BORING 364.90 feet

REFERANCE FOR GROUNDWATER Interpolated
ELEVATION OF GROUNDWATER 345.00 feet
TOP OF HOLE TO GRND WATER 19.90 feet

DEPTH TO PRESOAK WATER LEVEL 1.65 feet
DEPTH TO RESIDUAL WATER LEVEL WET 5.66 feet

GROSS FIELD MEASUREMENTS

	decimal feet	inches 12ths foot	16ths inch	
top pipe to bot hole	10.86	0	0	10.8600
top of pipe to presoak water	4.12	0	0	4.1200
top pipe to res. water	8.13	0	0	8.1300
top pipe to test water level	4.12	0	0	4.1200
REFERENCE POINT				
top pipe to grnd srfce	2.47	0	0	2.4700

Depth of bore used in test 6.7400 feet
Wall area of tested depth includes bottom 6.8764 square feet

DEPTHS FROM GRADE

decimal feet
8.3900 bot hole
1.6500 presoak level
5.6600 res water level
1.6500 test water level

APPLICATION RATE FACTOR OF SAFETY 7.9

TAFT BORE DEPTH 8 inches
TAFT BORE DIAMETER 6 inches
TAFT BORE AREA 28.274 sq.inches
0.196 sq.feet
TAFT WALL AREA 179.0706 sq.inches
1.243547 sq.feet

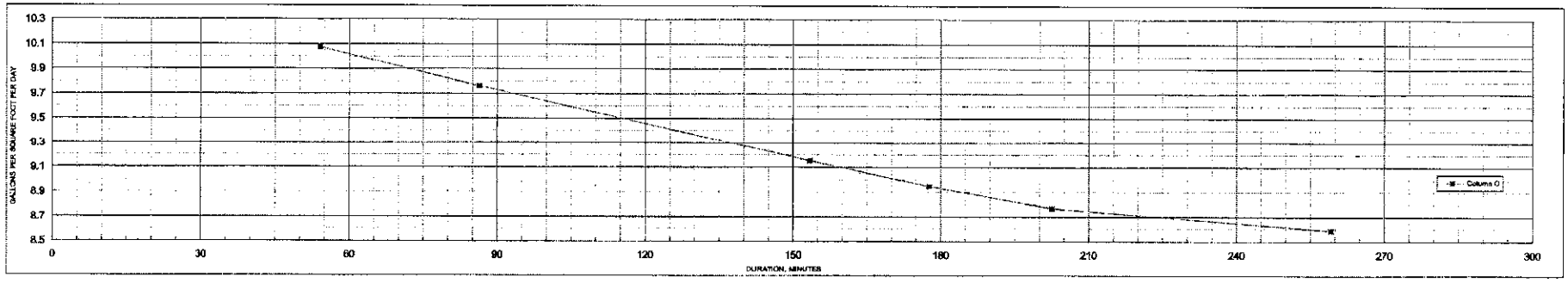
PREPARATION OF HOLE Lined
DIAMETER OF PIPE 3 inch
0.25 feet
AREA OF PIPE 7.07 square inches
0.049 square feet

ANNULAR FILL Pea Gravel
POROSITY OF FILL 0.33 percent

DIAMETER OF HOLE 5.00 inches
0.417 feet
GROSS AREA OF HOLE 19.63 square inches
0.136 square feet
NET AREA OF HOLE 11.17 square inches
Corrected for volume of gravel 0.078 square feet
CIRCUMFERENCE OF HOLE 15.71 inches
1.31 feet

VOLUME CHANGE PER 1 INCH FALL IN AN UNLINED HOLE
19.6349541 cubic inches
0.01136282 cubic feet
0.0849939 gallons

DATE	CLOCK TIME	ELAPSED TIME	VESSEL WATER LEVEL				POSITION VOLUME	VOLUME CHANGE	WALL AREA	DURATION	ABSORPTION RATE				TAFT PERCOLATION RATES Relative to a fall in 6 inch diameter tube				APPLICATION RATE Base on a Safety Factor of 7.9
											cubic feet per sqr. foot per minute	gallons per sqr. foot per minute	gallons per sqr. foot per day	inches per sqr. inch per hour	Per 1.24 square foot of wall area feet fall per minute	inches fall per minute	minutes per inch of fall	inches per hour	gal per sqr. foot per day
		minutes	feet	inches	sixtenths	decimal inches	total cubic feet	cubic feet	sq. feet	minutes									
06/20/2015	09:42:40 AM		35.00	11.00	6.00	431.37500	3.645712												
06/20/2015	10:36:50 AM	54.17	35.00	9.00	8.00	429.50000	3.297344	0.348	6.876	54.17	0.0009	0.0070	10.0735	0.6734	0.026	0.316	3.16	18.965	1.2751
06/20/2015	11:09:00 AM	32.17	35.00	8.00	6.00	428.37500	3.096830	0.201	6.876	32.17	0.0009	0.0068	9.7636	0.6527	0.026	0.306	3.26	18.381	1.2359
06/20/2015	12:16:09 PM	67.15	35.00	6.00	3.00	426.18750	2.704371	0.392	6.876	67.15	0.0008	0.0064	9.1542	0.6120	0.024	0.287	3.48	17.234	1.1588
06/20/2015	12:40:20 PM	24.18	35.00	5.00	6.00	425.37500	2.566190	0.138	6.876	24.18	0.0008	0.0062	8.9496	0.5983	0.023	0.281	3.56	16.849	1.1329
06/20/2015	01:05:15 PM	24.92	35.00	4.00	8.00	424.50000	2.426736	0.139	6.876	24.92	0.0008	0.0061	8.7663	0.5860	0.023	0.275	3.64	16.504	1.1097
06/20/2015	02:01:50 PM	56.58	35.00	2.00	10.00	422.62500	2.116539	0.310	6.876	56.58	0.0008	0.0060	8.5866	0.5740	0.022	0.269	3.71	16.166	1.0869
OVERALL		259.17						1.529	6.876	259.17	0.0009	0.0064	9.2417	0.6178	0.024	0.290	3.45	17.399	1.1698



FILE No. 6725-16.11
JOB NAME: Rajagopalan Residence
CLIENT: Rajagopalan

DATE DRILLED: 12/20/2016
DATE PRESOAKED: 12/27/2016
DATE PERC'ED: 12/28/2016

PERFORMED BY:
LAWRENCE E. GRICE
GRICE ENGINEERING INC.

WITNESSED BY:
None
MONTEREY COUNTY HEALTH DEPT.

DURATION OF TEST 289.13 minutes
4.82 hours

BORING No. 10
HOLE DEPTH FROM GROUND SURFACE 2.14 feet
ELEVATION OF BORING NA feet

REFERANCE FOR GROUNDWATER NA
ELEVATION OF GROUNDWATER NA feet
TOP OF HOLE TO GRND WATER NA feet

DEPTH TO PRESOAK WATER LEVEL 0.470 feet
DEPTH TO RESIDUAL WATER LEVEL WET 0.470 feet

GROSS FIELD MEASUREMENTS

	decimal feet	inches 12ths foot	16ths inch
top pipe to bot hole	4.59	0	0
top of pipe to presoak water	2.92	0	0
top pipe to res. water	2.92	0	0
top pipe to test water level	2.92	0	0
REFERENCE POINT			
top pipe to grnd srfce	2.45	0	0

DEPTHS FROM GRADE

decimal feet
2.1400 bot hole
0.4700 presoak level
0.4700 res water level
0.4700 test water level

APPLICATION RATE FACTOR OF SAFETY
7.9

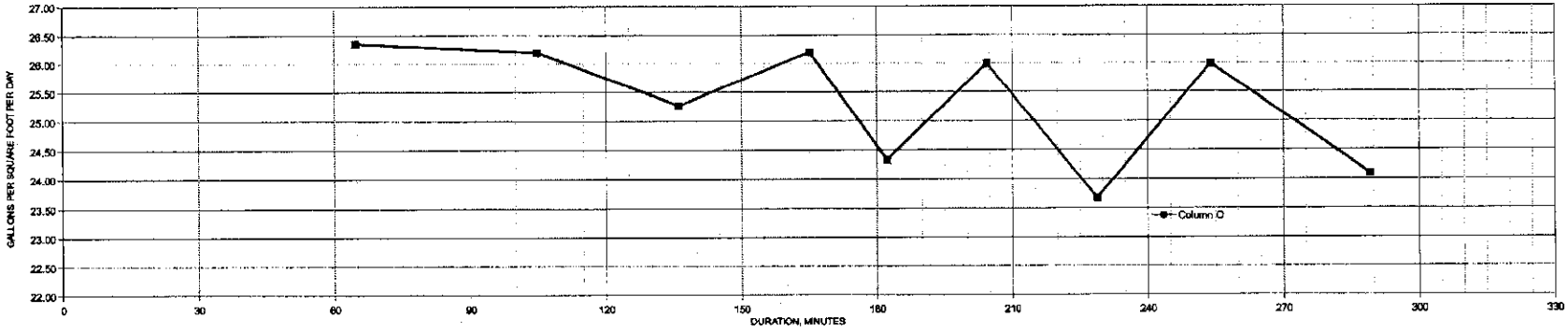
TAFT BORE DEPTH	8 inches		
4.5900 TAFT BORE DIAMETER	6 inches		
2.9200 TAFT BORE AREA	28.274 sq.inches		
2.9200	0.196 sq.feet		
2.9200 TAFT WALL AREA	179.0708 sq.inches		
	1.243547 sq.feet		
2.4500			

Depth of bore used in test 1.6700 feet
Wall area of tested depth includes bottom 1.8064 square feet

VOLUME CHANGE PER 1 INCH FALL IN AN UNLINED HOLE
19.6349541 cubic inches
0.01136262 cubic feet
0.0849939 gallons

PREPARATION OF HOLE Lined
DIAMETER OF PIPE 3 inch
0.25 feet
AREA OF PIPE 7.07 square inches
0.049 square feet
ANNULAR FILL Pea Gravel
POROSITY OF FILL 0.33 percent
DIAMETER OF HOLE 5.00 inches
0.417 feet
GROSS AREA OF HOLE 19.63 square inches
0.136 square feet
NET AREA OF HOLE 11.17 square inches
Corrected for volume of gravel 0.078 square feet
CIRCUMFERENCE OF HOLE 15.71 inches
1.31 feet

DATE	CLOCK TIME	ELAPSED TIME	VESSEL WATER LEVEL				POSITION VOLUME	VOLUME CHANGE	WALL AREA	DURATION	ABSORPTION RATE				TAFT PERCOLATION RATES Relative to a fall in 6 inch diameter tube Per 1.24 square foot of wall area				APPLICATION RATE Based on a Safety Factor of 7.9
											cubic feet per sqr. foot per minute	gallons per sqr. foot per minute	O gallons per sqr. foot per day	inches per sqr. inch per hour	feet fall per minute	inches fall per minute	minutes per inch of fall	inches per hour	gal per sqr. foot per day
		minutes	feet	inches	sixtenths	decimal inches	total cubic feet	cubic feet	sq. feet	minutes									
12/28/2016	08:44:32 AM	0.00	0.00	175.00	0.00	35.00000	5.844258												
12/28/2016	09:49:15 AM	64.72	0.00	173.00	12.00	33.75000	5.656153	0.286	1.806	64.72	0.0024	0.0183	26.36	1.7621	0.018	0.217	4.60	13.036	3.337
12/28/2016	10:29:20 AM	40.08	0.00	173.00	0.00	33.00000	5.482051	0.176	1.806	40.08	0.0024	0.0182	26.20	1.7512	0.018	0.216	4.63	12.955	3.316
12/28/2016	11:00:42 AM	31.37	0.00	172.00	7.00	32.43750	5.349102	0.133	1.806	31.37	0.0023	0.0176	25.27	1.6895	0.017	0.208	4.80	12.498	3.199
12/28/2016	11:29:40 AM	28.97	0.00	171.00	14.00	31.87500	5.221848	0.127	1.806	28.97	0.0024	0.0182	26.19	1.7511	0.018	0.216	4.63	12.954	3.316
12/28/2016	11:46:46 AM	17.10	0.00	171.00	9.00	31.56250	5.152056	0.070	1.806	17.10	0.0023	0.0169	24.34	1.6268	0.017	0.201	4.99	12.035	3.080
12/28/2016	12:09:00 PM	22.23	0.00	171.00	2.00	31.12500	5.055139	0.097	1.806	22.23	0.0024	0.0180	25.99	1.7375	0.018	0.214	4.67	12.854	3.290
12/28/2016	12:33:20 PM	24.33	0.00	170.00	11.00	30.68750	4.958538	0.097	1.806	24.33	0.0022	0.0164	23.67	1.5824	0.016	0.195	5.13	11.706	2.996
12/28/2016	12:58:33 PM	25.22	0.00	170.00	5.00	30.31250	4.848630	0.110	1.806	25.22	0.0024	0.0180	25.99	1.7373	0.018	0.214	4.67	12.852	3.290
12/28/2016	01:33:40 PM	35.12	0.00	169.00	10.00	29.62500	4.706691	0.142	1.806	35.12	0.0022	0.0167	24.10	1.6111	0.017	0.199	5.03	11.919	3.051
AVERAGE		289.13						1.236	1.806	289.13	0.0024	0.0177	25.52	1.7061	0.018	0.210	4.75	12.621	3.231



FILE No. 6726-16.11
JOB NAME: Rajagopalan Residence
CLIENT: Rajagopalan

DATE DRILLED: 12/20/2016
DATE PRESOAKED: 12/27/2016
DATE PERC'ED: 12/28/2016

PERFORMED BY:
LAWRENCE E. GRICE
GRICE ENGINEERING INC.

WITNESSED BY:
None
MONTEREY COUNTY HEALTH DEPT.

DURATION OF TEST 251.77 minutes
4.20 hours

BORING No. 11
HOLE DEPTH FROM GROUND SURFACE 2.73 feet
ELEVATION OF BORING NA feet

REFERANCE FOR GROUNDWATER NA
ELEVATION OF GROUNDWATER NA feet
TOP OF HOLE TO GRND WATER NA feet

DEPTH TO PRESOAK WATER LEVEL 0.280 feet
DEPTH TO RESIDUAL WATER LEVEL WET 0.280 feet

GROSS FIELD MEASUREMENTS

	decimal feet	inches 12ths foot	16ths inch
top pipe to bot hole	5.53	0	0
top of pipe to presoak water	3.08	0	0
top pipe to res. water	3.08	0	0
top pipe to test water level	3.08	0	0
REFERENCE POINT			
top pipe to grnd srfce	2.8	0	0

Depth of bore used in test 2.4500 feet
Wall area of tested depth includes bottom 2.5864 square feet

DEPTHS FROM GRADE

decimal feet
2.7300 bot hole
0.2800 presoak level
0.2800 res water level
0.2800 test water level

APPLICATION RATE FACTOR OF SAFETY 7.9

5.5300	TAFT BORE DEPTH	6 inches
3.0800	TAFT BORE DIAMETER	6 inches
3.0800	TAFT BORE AREA	28.274 sq.inches
3.0800		0.196 sq.feet
3.0800	TAFT WALL AREA	179.0708 sq.inches
		1.243547 sq.feet
2.8000		

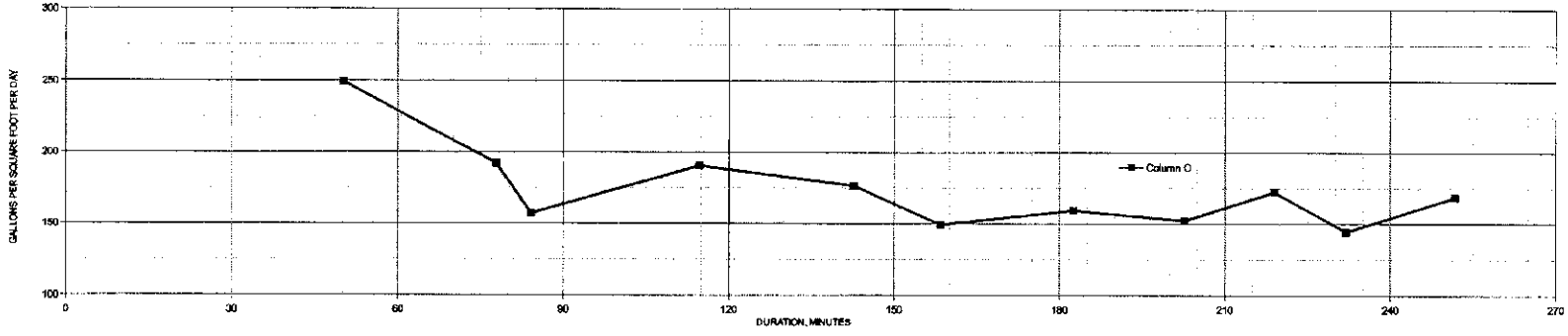
VOLUME CHANGE PER 1 INCH FALL IN AN UNLINED HOLE
19.6349541 cubic inches
0.01136282 cubic feet
0.0849939 gallons

PREPARATION OF HOLE Lined
DIAMETER OF PIPE 3 inch
0.25 feet
AREA OF PIPE 7.07 square inches
0.049 square feet

ANNULAR FILL Pea Gravel
POROSITY OF FILL 0.33 percent

DIAMETER OF HOLE 5.00 inches
0.417 feet
GROSS AREA OF HOLE 19.63 square inches
0.136 square feet
NET AREA OF HOLE 11.17 square inches
Corrected for volume of gravel 0.078 square feet
CIRCUMFERENCE OF HOLE 15.71 inches
1.31 feet

DATE	CLOCK TIME	ELAPSED TIME	VESSEL WATER LEVEL				POSITION VOLUME	VOLUME CHANGE	WALL AREA	DURATION	ABSORPTION RATE				TAFT PERCOLATION RATES Relative to a fall in 6 inch diameter tube Per 1.24 square foot of wall area				APPLICATION RATE Based on a Safety Factor of 7.9
		minutes	feet	inches	sixtenths	decimal inches	total cubic feet	cubic feet	sq. feet	minutes	cubic feet per sqr. foot per minute	gallons per sqr. foot per minute	gallons per sqr. foot per day	inches per sqr. inch per hour	feet fall per minute	inches fall per minute	minutes per inch of fall	inches per hour	gal per sqr. foot per day
12/28/2016	09:03:21 AM	0.00	0.00	139.00	2.00	34.06250	5.730849												
12/28/2016	09:53:32 AM	50.18	0.00	125.00	4.00	20.18750	2.725864	3.005	2.586	50.18	0.0232	0.1732	249.36	16.6697	0.245	2.943	0.34	176.573	31.585
12/28/2016	10:21:11 AM	27.65	0.00	118.00	11.00	13.62500	1.449357	1.277	2.586	27.65	0.0179	0.1335	192.25	12.8521	0.189	2.269	0.44	136.135	24.336
12/28/2016	10:26:00 AM	4.82	0.00	140.00	1.00	35.00000	5.944258												
12/28/2016	10:27:30 AM	1.50	0.00	139.00	13.00	34.75000	5.887661	0.057	2.586	1.50	0.0146	0.1091	157.12	10.5038	0.155	1.854	0.54	111.260	19.889
12/28/2016	10:58:00 AM	30.50	0.00	133.00	11.00	28.62500	4.490087	1.398	2.586	30.50	0.0177	0.1325	190.82	12.7561	0.188	2.252	0.44	135.119	24.154
12/28/2016	11:26:00 AM	28.00	0.00	128.00	1.00	23.00000	3.301845	1.188	2.586	28.00	0.0164	0.1227	176.72	11.8138	0.174	2.086	0.48	125.137	22.370
12/28/2016	11:41:44 AM	15.73	0.00	125.00	5.00	20.25000	2.737899	0.564	2.586	15.73	0.0139	0.1037	149.27	9.9784	0.147	1.762	0.57	105.696	18.894
12/28/2016	12:05:50 PM	24.10	0.00	120.00	8.00	15.43750	1.815367	0.923	2.586	24.10	0.0146	0.1107	159.41	10.6564	0.157	1.881	0.53	112.877	20.178
12/28/2016	12:26:00 PM	20.17	0.00	116.00	11.00	11.62500	1.078808	0.737	2.586	20.17	0.0141	0.1056	152.10	10.1676	0.150	1.795	0.56	107.699	19.253
12/28/2016	12:29:45 PM	3.75	0.00	140.00	1.00	35.00000	5.944258												
12/28/2016	12:42:20 PM	12.58	0.00	137.00	13.00	32.75000	5.422963	0.521	2.586	12.58	0.0160	0.1196	172.52	11.5327	0.170	2.036	0.49	122.160	21.836
12/28/2016	12:55:20 PM	13.00	0.00	135.00	13.00	30.75000	4.972338	0.451	2.586	13.00	0.0134	0.1002	144.36	9.6497	0.142	1.704	0.59	102.214	18.272
12/28/2016	01:15:07 PM	19.78	0.00	132.00	5.00	27.25000	4.170360	0.802	2.586	19.78	0.0157	0.1172	168.81	11.2852	0.166	1.992	0.50	119.537	21.369
AVERAGE		251.77						10.921	2.586	251.77	0.0168	0.1254	180.63	12.0754	0.178	2.132	0.47	127.906	22.865



FILE No. 6725-16.11
JOB NAME: Rajagopalan Residence
CLIENT: Rajagopalan

DATE DRILLED: 12/20/2016
DATE PRESOAKED: 12/27/2016
DATE PERC'ED: 12/28/2016

PERFORMED BY:
LAWRENCE E. GRICE
GRICE ENGINEERING INC.

WITNESSED BY:
None
MONTEREY COUNTY HEALTH DEPT.

DURATION OF TEST 257.97 minutes
4.30 hours

BORING No. 12
HOLE DEPTH FROM GROUND SURFACE 2.32 feet
ELEVATION OF BORING NA feet

REFERANCE FOR GROUNDWATER NA
ELEVATION OF GROUNDWATER NA feet
TOP OF HOLE TO GRND WATER NA feet

DEPTH TO PRESOAK WATER LEVEL 0.330 feet
DEPTH TO RESIDUAL WATER LEVEL WET 0.330 feet

GROSS FIELD MEASUREMENTS

	decimal feet	inches 12ths foot	16ths inch	
top pipe to bot hole	5.07	0	0	5.0700
top of pipe to presoak water	3.08	0	0	3.0800
top pipe to res. water	3.08	0	0	3.0800
top pipe to test water level	3.08	0	0	3.0800
REFERENCE POINT				
top pipe to grnd srfce	2.75	0	0	2.7500

Depth of bore used in test 1.9900 feet
Wall area of tested depth includes bottom 2.1264 square feet

DEPTHS FROM GRADE

decimal feet	
2.3200	bot hole
0.3300	presoak level
0.3300	res water level
0.3300	test water level

APPLICATION RATE FACTOR OF SAFETY 7.9

TAFT BORE DEPTH 8 inches
TAFT BORE DIAMETER 6 inches
TAFT BORE AREA 28.274 sq.inches
0.196 sq.feet
TAFT WALL AREA 179.0708 sq.inches
1.243547 sq.feet

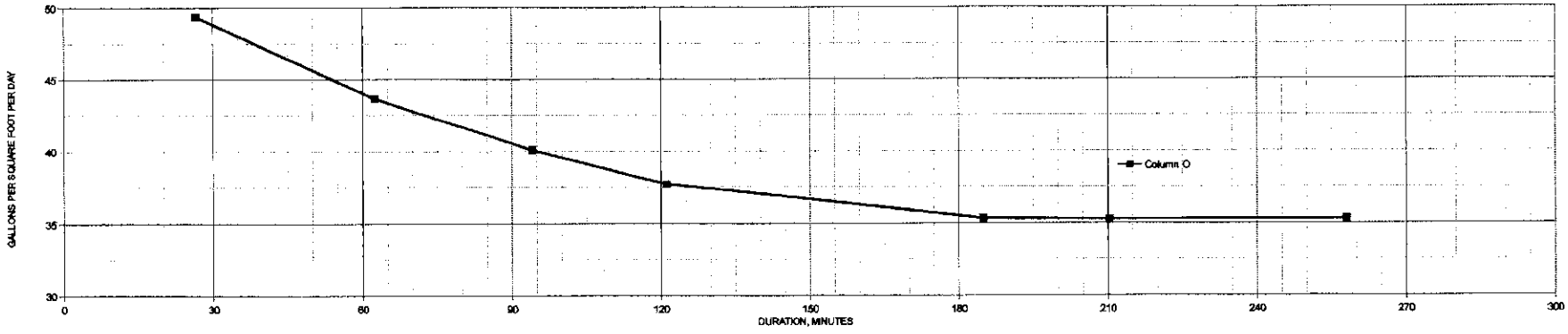
VOLUME CHANGE PER 1 INCH FALL IN AN UNLINED HOLE
19.6349541 cubic inches
0.01136282 cubic feet
0.0849939 gallons

PREPARATION OF HOLE Lined
DIAMETER OF PIPE 3 inch
0.25 feet
AREA OF PIPE 7.07 square inches
0.049 square feet

ANNULAR FILL Pea Gravel
POROSITY OF FILL 0.33 percent

DIAMETER OF HOLE 5.00 inches
0.417 feet
GROSS AREA OF HOLE 19.63 square inches
0.136 square feet
NET AREA OF HOLE 11.17 square inches
Corrected for volume of gravel 0.078 square feet
CIRCUMFERENCE OF HOLE 15.71 inches
1.31 feet

DATE	CLOCK TIME	ELAPSED TIME	VESSEL WATER LEVEL				POSITION VOLUME	VOLUME CHANGE	WALL AREA	DURATION	ABSORPTION RATE				TAFT PERCOLATION RATES Relative to a fall in 6 inch diameter tube Per 1.24 square foot of wall area				APPLICATION RATE Based on a Safety Factor of 7.9
											cubic feet per sqr. foot per minute	gallons per sqr. foot per minute	gallons per sqr. foot per day	inches per sqr. inch per hour	feet fall per minute	inches fall per minute	minutes per inch of fall	inches per hour	gal per sqr. foot per day
		minutes	feet	inches	sixtenths	decimal inches	total cubic feet	cubic feet	sq. feet	minutes									
12/28/2016	09:30:52 AM	0.00	0.00	32.00	12.00	34.75000	5.887681												
12/28/2016	09:57:23 AM	26.52	0.00	31.00	10.00	33.62500	5.629074	0.259	2.126	26.52	0.0046	0.0343	49.40	3.3021	0.040	0.479	2.09	28.756	6.253
12/28/2016	10:33:19 AM	35.93	0.00	30.00	5.00	32.31250	5.319558	0.310	2.126	35.93	0.0041	0.0303	43.63	2.9166	0.035	0.423	2.36	25.400	5.523
12/28/2016	11:05:00 AM	31.68	0.00	29.00	3.00	31.18750	5.068939	0.251	2.126	31.68	0.0037	0.0278	40.07	2.6784	0.032	0.389	2.57	23.325	5.072
12/28/2016	11:32:00 AM	27.00	0.00	28.00	6.00	30.37500	4.867852	0.201	2.126	27.00	0.0035	0.0262	37.72	2.5218	0.031	0.366	2.73	21.961	4.775
12/28/2016	12:35:50 PM	63.83	0.00	26.00	5.00	28.31250	4.422398	0.445	2.126	63.83	0.0033	0.0245	35.35	2.3629	0.029	0.343	2.92	20.578	4.474
12/28/2016	01:01:10 PM	25.33	0.00	25.00	9.00	27.56250	4.246000	0.176	2.126	25.33	0.0033	0.0245	35.27	2.3578	0.029	0.342	2.92	20.533	4.464
12/28/2016	01:46:50 PM	47.67	0.00	24.00	0.00	26.00000	3.913783	0.332	2.126	47.67	0.0033	0.0245	35.30	2.3600	0.029	0.343	2.92	20.552	4.469
AVERAGE		257.97						1.974	2.126	257.97	0.0036	0.0269	38.76	2.5909	0.031	0.376	2.66	22.563	4.906



FILE No. 6725-16.11
JOB NAME: Rajagopalan Residence
CLIENT: Rajagopalan

DATE DRILLED: 12/20/2016
DATE PRESOAKED: 12/27/2016
DATE PERC'ED: 12/28/2016

PERFORMED BY:
LAWRENCE E. GRICE
GRICE ENGINEERING INC.

WITNESSED BY:
None
MONTEREY COUNTY HEALTH DEPT.

DURATION OF TEST 169.88 minutes
2.83 hours

BORING No. 13
HOLE DEPTH FROM GROUND SURFACE 1.70 feet
ELEVATION OF BORING NA feet

REFERANCE FOR GROUNDWATER NA
ELEVATION OF GROUNDWATER NA feet
TOP OF HOLE TO GRND WATER NA feet

DEPTH TO PRESOAK WATER LEVEL 0.250 feet
DEPTH TO RESIDUAL WATER LEVEL DRY 1.700 feet

GROSS FIELD MEASUREMENTS

	decimal feet	inches 12ths foot	16ths inch	
top pipe to bot hole	4.45	0	0	4.4500
top of pipe to presoak water	3	0	0	3.0000
top pipe to res. water	4.45	0	0	4.4500
top pipe to test water level	3	0	0	3.0000
REFERENCE POINT				
top pipe to grnd srfce	2.75	0	0	2.7500

Depth of bore used in test 1.4500 feet
Wall area of tested depth includes bottom 1.5864 square feet

DEPTHS FROM GRADE
decimal feet
1.7000 bot hole
0.2500 presoak level
1.7000 res water level
0.2500 test water level

APPLICATION RATE FACTOR OF SAFETY
7.9

TAFT BORE DEPTH 6 inches
TAFT BORE DIAMETER 6 inches
TAFT BORE AREA 28.274 sq.inches
0.196 sq.feet
TAFT WALL AREA 179.0708 sq.inches
1.243547 sq.feet

VOLUME CHANGE PER 1 INCH FALL IN AN UNLINED HOLE
19.6349541 cubic inches
0.01136282 cubic feet
0.0849939 gallons

PREPARATION OF HOLE Lined
DIAMETER OF PIPE 3 inch
0.25 feet
AREA OF PIPE 7.07 square inches
0.049 square feet

ANNULAR FILL Pea Gravel
POROSITY OF FILL 0.33 percent

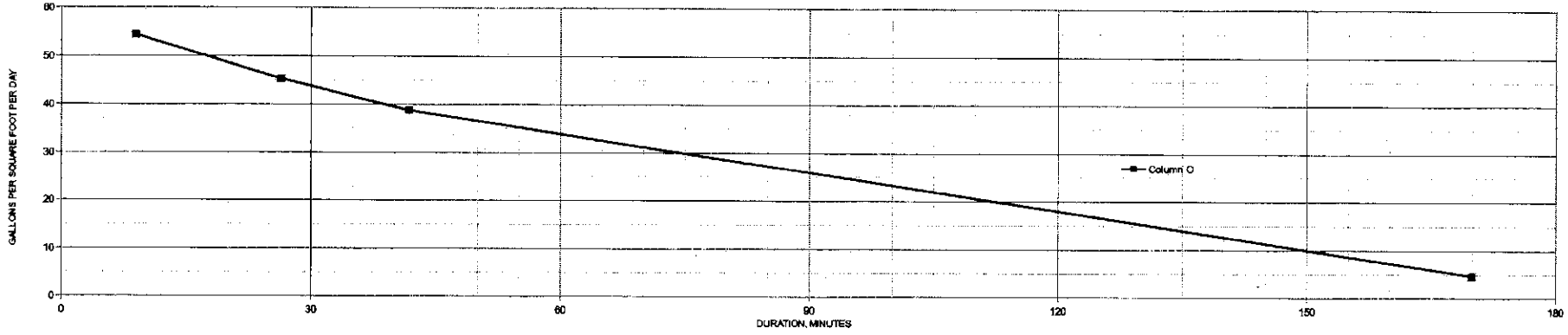
DIAMETER OF HOLE 5.00 inches
0.417 feet

GROSS AREA OF HOLE 19.63 square inches
0.136 square feet

NET AREA OF HOLE 11.17 square inches
Corrected for volume of gravel 0.078 square feet

CIRCUMFERENCE OF HOLE 15.71 inches
1.31 feet

DATE	CLOCK TIME	ELAPSED TIME	VESSEL WATER LEVEL			POSITION VOLUME	VOLUME CHANGE	WALL AREA	DURATION	ABSORPTION RATE				TAFT PERCOLATION RATES Relative to a fall in 6 inch diameter tube Per 1.24 square foot of wall area				APPLICATION RATE Based on a Safety Factor of 7.9
										cubic feet per sqr. foot per minute	gallons per sqr. foot per minute	gallons per sqr. foot per day	inches per sqr. inch per hour	feet fall per minute	inches fall per minute	minutes per inch of fall	inches per hour	gal per sqr. foot per day
		minutes	feet	inches	sixtenths	decimal inches	total cubic feet	cubic feet	sq. feet	minutes								
12/28/2016	11:11:20 AM	0.00	0.00	69.00	11.00	34.43750	5.816915											
12/28/2016	11:20:15 AM	8.92	0.00	69.00	6.00	34.12500	5.745389	0.072	1.586	8.92	0.0051	0.0378	54.46	3.6408	0.033	0.394	2.54	23.654	6.894
12/28/2016	11:37:40 AM	17.42	0.00	68.00	14.00	33.62500	5.629074	0.116	1.586	17.42	0.0042	0.0315	45.34	3.0311	0.027	0.328	3.05	19.693	5.740
12/28/2016	11:53:04 AM	15.40	0.00	68.00	8.00	33.25000	5.541139	0.088	1.586	15.40	0.0036	0.0269	38.77	2.5916	0.023	0.281	3.56	16.838	4.907
12/28/2016	02:01:13 PM	128.15	0.00	68.00	2.00	32.87500	5.452507	0.089	1.586	128.15	0.0004	0.0033	4.70	0.3139	0.003	0.034	29.42	2.039	0.594
AVERAGE		169.88						0.364	1.586	169.88	0.0014	0.0101	14.56	0.9736	0.009	0.105	9.49	6.325	1.843



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SOIL CLASSIFICATION CHART
conforms to Unified Soils Classification
and ASTM D2487

UNIFIED SOIL CLASSIFICATION & ASTM D2487: INCLUDING IDENTIFICATION AND DESCRIPTION

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 3 inches and basing fractions on estimated weights)				GROUP SYMBOLS N.	TYPICAL NAMES	INFORMATION REQUIRED FOR DESCRIBING SOILS
COARSE GRAINED SOILS More than half of material is larger than No. 200 sieve size is the smallest particle visible to the naked eye)	GRAVELS More than half of coarse fraction is larger than No. 4 sieve size	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.	GW	Well graded gravels, gravel-sand mixtures, little or no fines.	Give typical name, indicate approximate percentages of sand and gravel, max. size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information, and symbol in parentheses. For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics. EXAMPLE: **Silty Sand,** gravelly; about 20% hard, angular gravel particles ½ inch maximum size; rounded and subangular sand grains coarse to fine, about 15 % non-plastic fines with low dry strength, well compacted and moist in place, alluvial sand; (SM).
			Predominantly one size or a range of sizes with some intermediate sizes missing.	GP	Poorly graded gravels, gravel-sand mixtures, little or no fines.	
		GRAVELS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).	GM	Silty gravels, poorly graded gravel-sand-silt mixtures.	
			Plastic fines (for identification procedures see CL below).	GC	Clayey gravels, poorly graded gravel-sand-clay mixtures.	
	SANDS More than half of coarse fraction is smaller than No. 4 sieve size (For visual classifications, the 1/4" size may be used as equivalent to the No. 4 sieve size.)	CLEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes.	SW	Well graded sands, gravelly sands, little or no fines.	
			Predominantly one size or a range of sizes with some intermediate sizes missing.	SP	Poorly graded sands, gravelly sands, little or no fines.	
		SANDS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).	SM	Silty sands, poorly graded sand-silt mixtures.	
			Plastic fines (for identification procedures see CL below).	SC	Clayey sands, poorly graded sand-clay mixtures.	
	IDENTIFICATION PROCEDURES ON FRACTION SMALLER THAN No. 40 SIEVE SIZE					
		DRY STRENGTH (CRUSHING CHARACTERISTICS)	DILATANCY (REACTION TO SHAKING)	TOUGHNESS (CONSISTENCY NEAR PLASTIC LIMIT)		
FINE GRAINED SOILS More than half of material is smaller than No. 200 sieve size (The No. 200 sieve size is about the smallest particle visible to the naked eye)	SILTS AND CLAYS Liquid limit less than 50	None to slight	Quick to slow	None	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands withg slight plasticity.	Give typical name, indicate degree and character of plasticity, amount and maximum size of coarse grains, color in wet conditions, odor if any, local or geologic name, and other pertinent descriptive information, and symbol in parentheses. For undisturbed soils add information or structure, stratification, consistency in undisturbed and remolded states, moisture and drainage conditions. EXAMPLE: **Clayey silt**, brown, slightly plastic, small percentage of fine sand, numerous vertical root holes, firm and dry in place, loess; (ML).
		Medium to high	None to very slow	Medium	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.	
		Slight to medium	Slow	Slight	OL	Organic silts and organic silt-clays of low plasticity.	
	SILTS AND CLAYS Liquid limit greater than 50	Slight to medium	Slow to none	Slight to medium	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.	
		High to very high	None	High	CH	Inorganic clays of high plasticity, fat clays.	
		Medium to high	None to very slow	Slight to medium	OH	Organic clays of medium to high plasticity.	
HIGHLY ORGANIC SOILS		Readily identified by color, odor, spongy feel and frequently by fibrous texture.			Pt	Peat and other highly organic soils.	

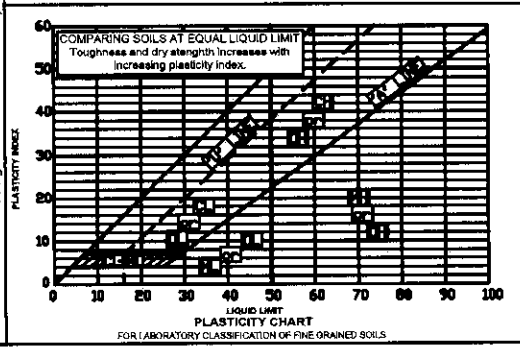
LABORATORY CLASSIFICATION CRITERIA

Use grain size curve in identifying the fractions as given under field identification.

Determine percentages of gravel and sand from grain size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size) coarse grained soils are classified as follows:

Less than 5% — GW,GP, SW, SP
More than 12 % — GM, GC, SW, SC
5% to 12% — **Borderline** cases requiring use of dual symbols.

$C_u = \frac{D_{60}}{D_{10}}$ Greater than 4 $C_c = \frac{(D_{30})^2}{(D_{10} \times D_{60})}$ Between one and 3	
Not meeting all gradation requirements for GW	
Atterberg limits below "A" line or PI less than 4	Above "A" line with PI between 4 and 7 are **borderline cases** requiring use of dual symbols
Atterberg limits above "A" line or PI greater than 7	
$C_u = \frac{D_{60}}{D_{10}}$ Greater than 6 $C_c = \frac{(D_{30})^2}{(D_{10} \times D_{60})}$ Between one and 3	
Not meeting all gradation requirements for SW	
Atterberg limits below "A" line or PI less than 4	Above "A" line with PI between 4 and 7 are **borderline cases** requiring use of dual symbols
Atterberg limits above "A" line or PI greater than 7	



PLASTICITY CHART
FOR LABORATORY CLASSIFICATION OF FINE GRAINED SOILS

N. Boundary classifications: Soils possessing characteristics of two groups are designated by combinations of group symbols. For example GW-GC, well graded gravel-sand mixture with clay binder.
N. All sieve sizes on this chart are U.S. Standard.

FIELD IDENTIFICATION PROCEDURES FOR FINE GRAINED SOILS OR FRACTIONS

These procedures are to be performed on the minus No. 40 sieve size particles, approximately ¹/₆₄ inches. For field classification purposes, screening is not intended; simply remove by hands the coarse particles that interfere with the test.

DILATANCY (Reaction to shaking)

After removing portions larger than No. 40 sieve size, prepare a pot of moist soil with a volume of about one-half cubic inch. Add enough water if necessary to make the soil soft but not sticky.

Place the pot in the open palm of one hand and shake horizontally, sticking vigorously against the other hand several times. A positive reaction consists of the appearance of water on the surface of the pot which changes to a livery consistency and becomes glossy. When the sample is squeezed between the fingers, the water and gloss disappear from the surface, the pot stiffens and finnally it crackes or crumbles. The rapidity of appearance of water during shaking and of its disappearance during squeezing assist in identifying the character of the fines in a soil.

Very fine clean sands give the quickes and most distinct reactoin whereas a plastic clay has no reaction. Inorganic silts, such as a typical rock flour, show a moderately quick reaction.

DRY STRENGTH (Crushing characteristics)

After removing particles larger than No. 40 sieve size, mold a pat of soil to the consistency of putty, adding water if necessary. Allow the pat to dry completely by oven, sun, or air drying, and then test its strength by breaking and crumbling between the fingers. This strength is a measure of the character and quality of the colloidal fraction contained in the soil. The dry strength increases with increasing plasticity.

High dry strength is characteristic for clays of the CH group. A typical inorganic silt possesses only very slight dry strength. Silty fine sand and silts have about the same slight dry strength, but can be distinguished by the feel when powdering the dried specimen. Fine sand feels gritty whereas a typical silt has the smooth feel of flour.

TOUGHNESS (Consistency near plastic limit)

After removing particles larger that the No. 40 sieve size, a specimen of soil about one-half inch cube in size is molded to the consistency of putty. If too dry, water must be added and if sticky, the specimen should be spread out in a thin layer and allowed to lose some moisture by evaporation. Then the specimen is rolled out by hand on a smooth surface of between the palms into a thread about one-eight inch in diameter . The thread is then folded and rerolled repeatedly. Durning this manipulation the moisture content is gradually reduced and the specimen stiffens, finally loses its plasticity, and crumbles when the plastic limit is reached.

After the thread crumbles, the pieces should be lumped together and a slight kneading action continued until the lump crumbles.

The tougher the thread near the plastic limit and the stiffer the lump when it finally crumbles, the more potent is the colloidal clay fraction in the soil. Weakness of the thread at the plastic limit and quick loss of coherence of the lump below the plastic limit indicate either inorganic clay of low plasticity, or materials such as kaolin-type clays and organic clays which occure below the A-line.

Highly organic clays have a very weak and spongy feel at the plastic limit.

ADOPTED BY: CORPS OF ENGINEERS AND BUREAU OF RECLAMATION-JANUARY 1962

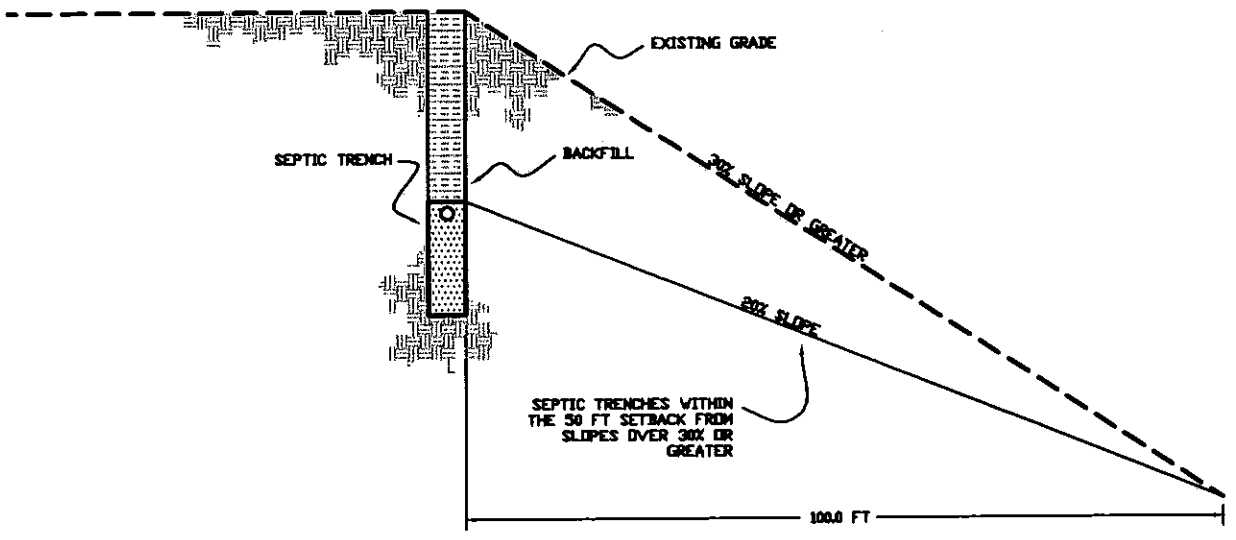
103-D-347

APPENDIX C

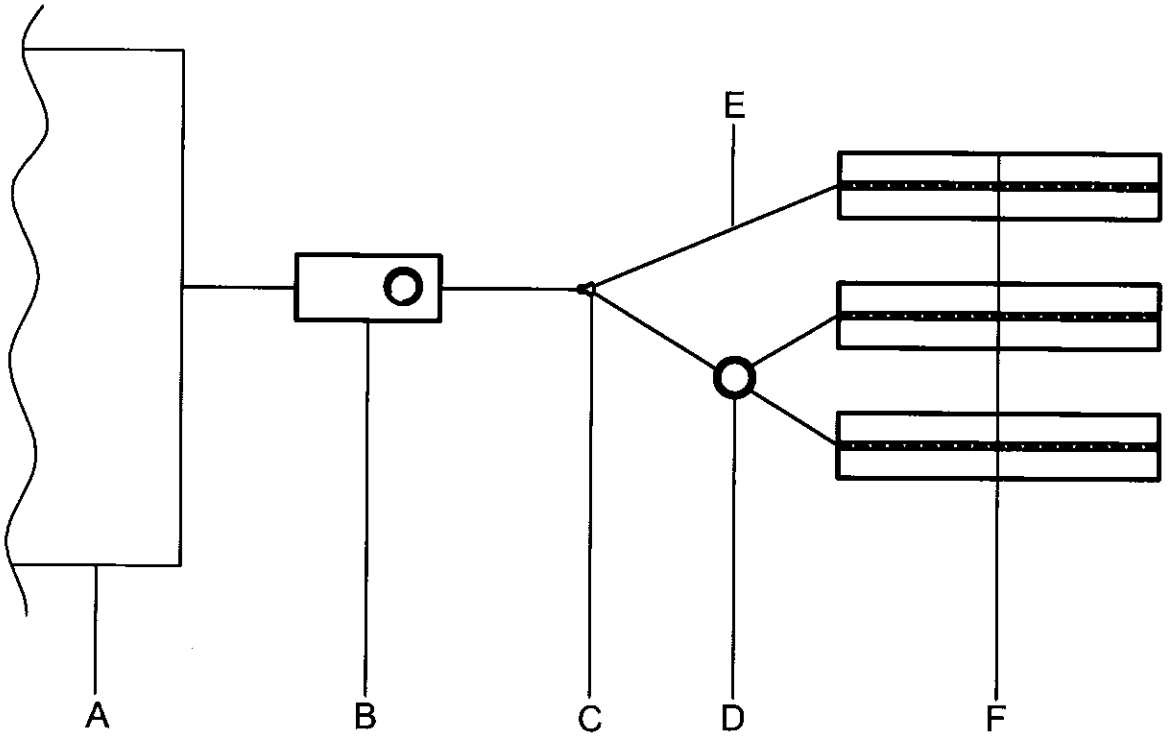
SEPTIC SYSTEM PLACEMENT TABLE	Minimum Horizontal Setback, feet		
	Septic Tank	Disposal Field	Seepage Pit
Buildings, Structures or Moble Homes	5	10	10
Property Lines	10	10	10
Domestic Water Supplies	100	100	150
Ocean, Stream, Lakes & Natural Drainage Channels, Measured from high water mark	100	100	150
Large Trees	10	10	10
Potable Water Lines	10	10	10
Downhill Embankments, greater than 30% *Note 1	25	50	50
Minimum Vertical Distance of Disposal Field Bottom above Groundwater	10	10	10

From: Monterey County Code, Chapter 15.20,
Title 15-34, Sewage Disposal.

*Note:
1. Other factors may adjust value.

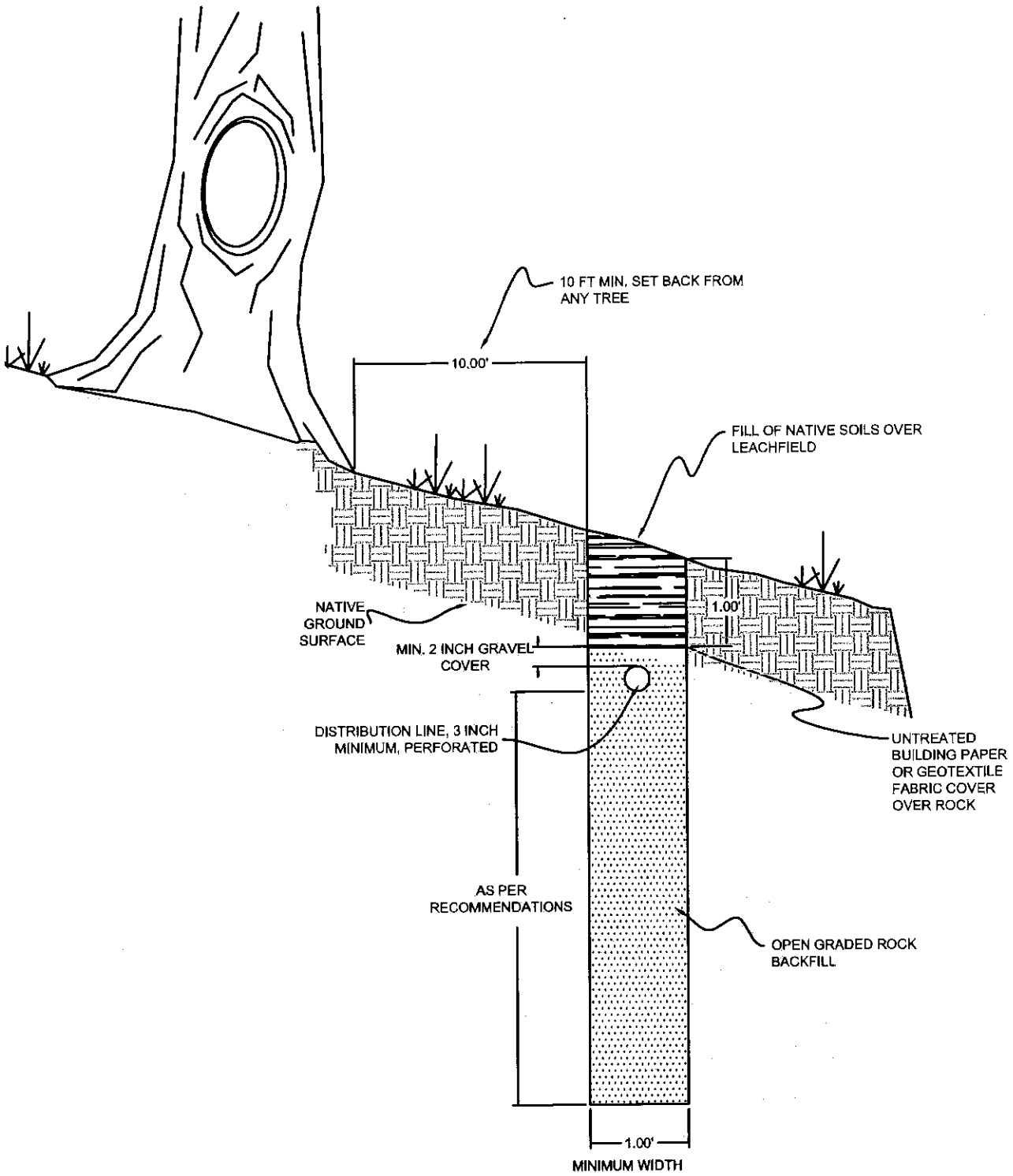


TYPICAL SPETIC SETBACKS FROM SLOPES 30% OR GREATER



TYPICAL SEPTIC SYSTEM

A. Residence
B. Septic Tank. Size as per recommendations
C. Diversion Valve. if required.
D. Equal Distribution Box, for more than one trench.
E. Typical for single trench system.
F. Trench depth and length as per recommendations



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TYPICAL TRENCH DETAIL

SPECIFICATIONS FOR LEACHFIELD ROCK

Definition

Graded grave or crushed rock for use in septic leachfields. Shall consist of a minimum dimension of mineral aggregate placed in accordance with these specifications and in conformity with the dimensions shown on the plans. The minimum dimensions are specified in the accompanying report.

Material

The mineral aggergate for use in septic leachfields shall consist of broken stone, crushed or uncrushed gravel, quarry waste, or a combination thereof. the aggregate shall be free from clays and silts, vegatable matter, volcanic tuff, and other deleterious substances. It shall be of such quality that the absorption of water in a saturated dry condition does not exceed 3 percent of the oven dry weight of the sample.

Grading

The material aggregrate shall be sized so that the percentage composition by dry weight as deteremined by laboratory sieves (U.S. Sieves) will conform to the following grading.

SIEVE SIZE	PERCENTAGE PASSING SIEVE
$2\frac{1}{2}$ inch	100 %
$1\frac{1}{2}$ inch	0 - 5 %
No. 200	0 - 2 %

Placing

The trench or bed, prior to placing, shall conform to those dimension shown on the typical section and be free and clear of deleterious material.

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