CALIFORNIA COASTAL COMMISSION
NORTH COAST DISTRICT OFFICE
1385 EIGHTH STREET, SUITE 130
ARCATA, CA 95521
VOICE (707) 826-8950
FAX (707) 826-8960

F9a

1-90-113-A2

(BRENNAN)

MARCH 12, 2021

EXHIBITS

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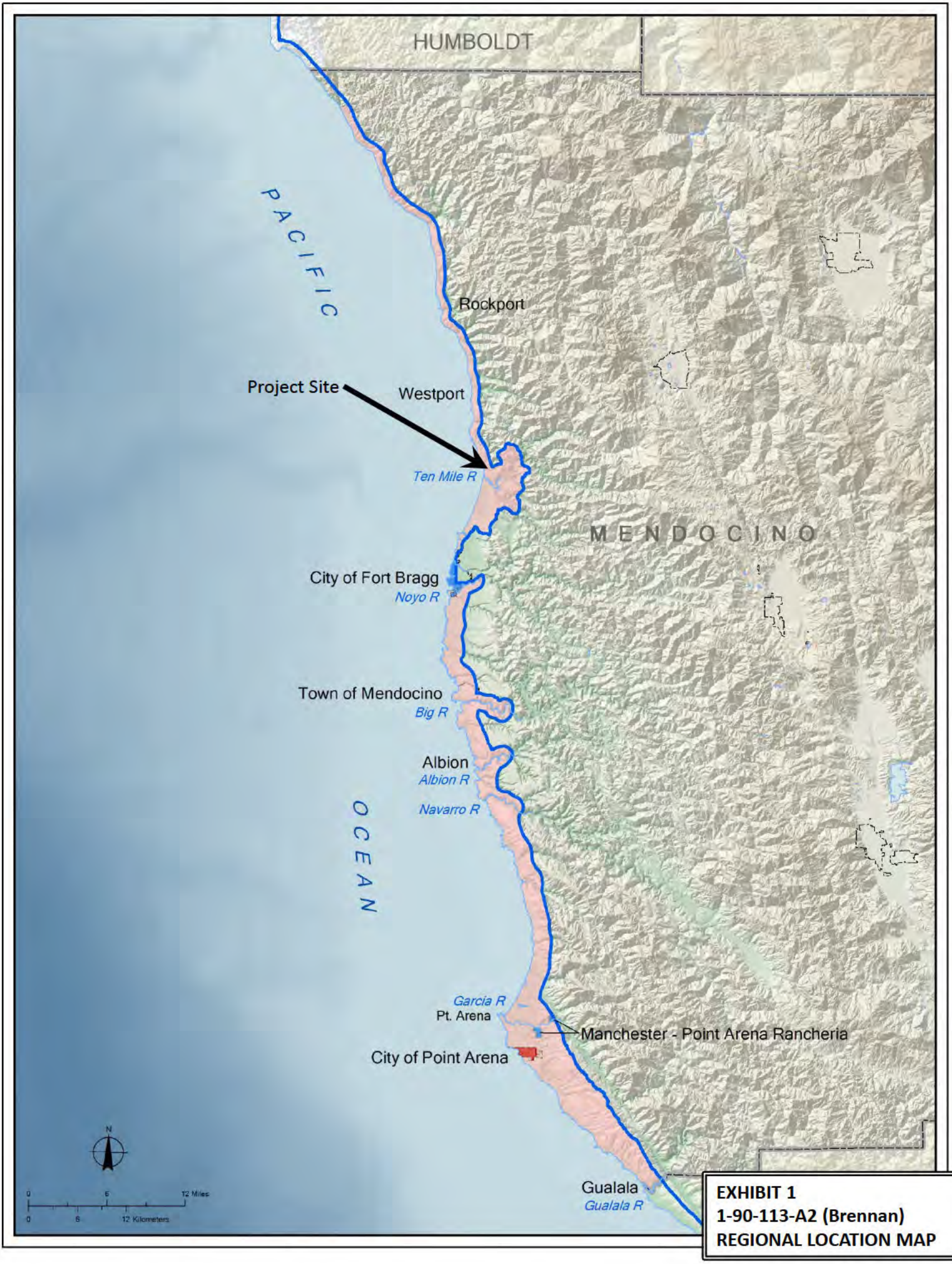


EXHIBIT 1
1-90-113-A2 (Brennan)
REGIONAL LOCATION MAP

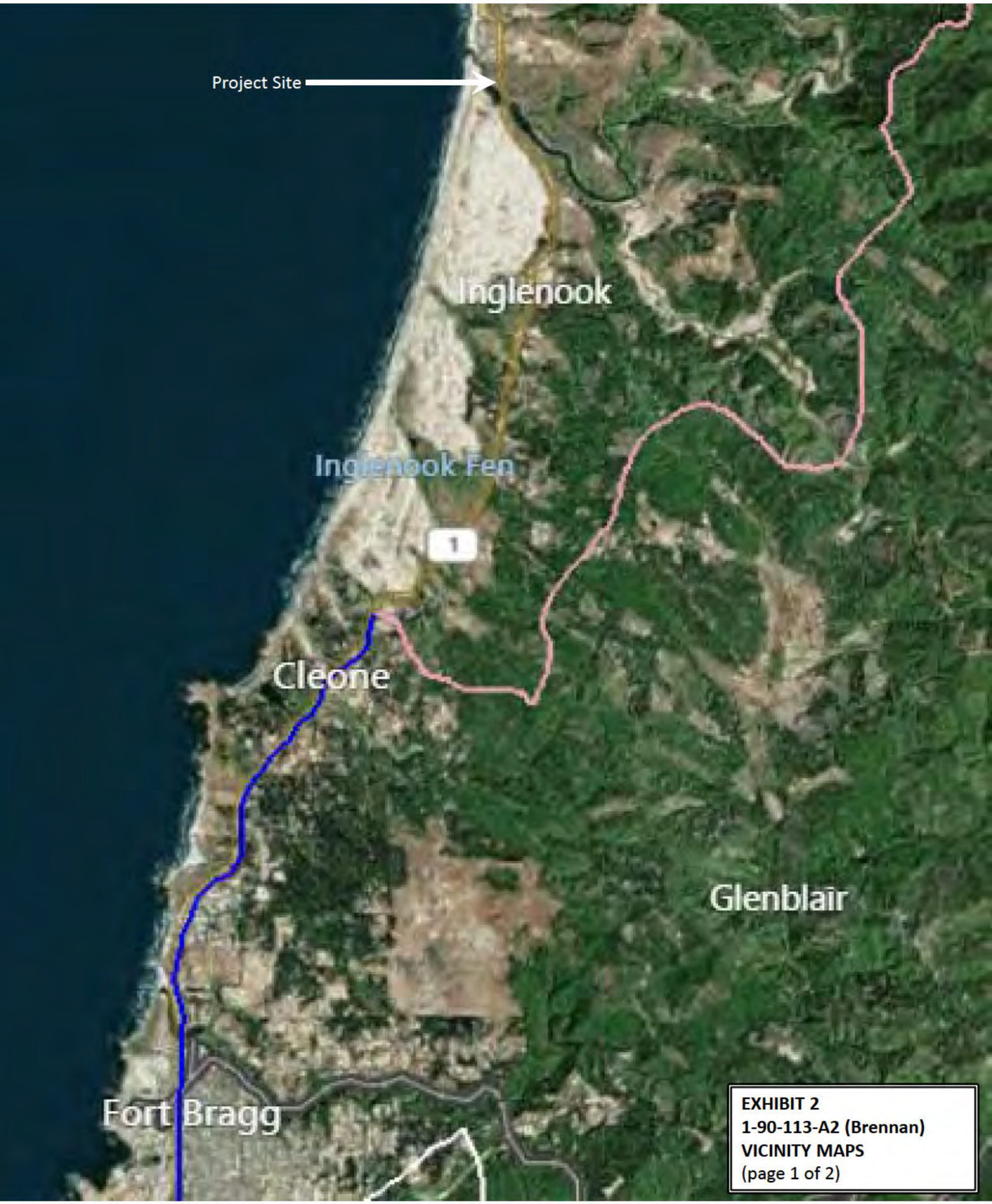
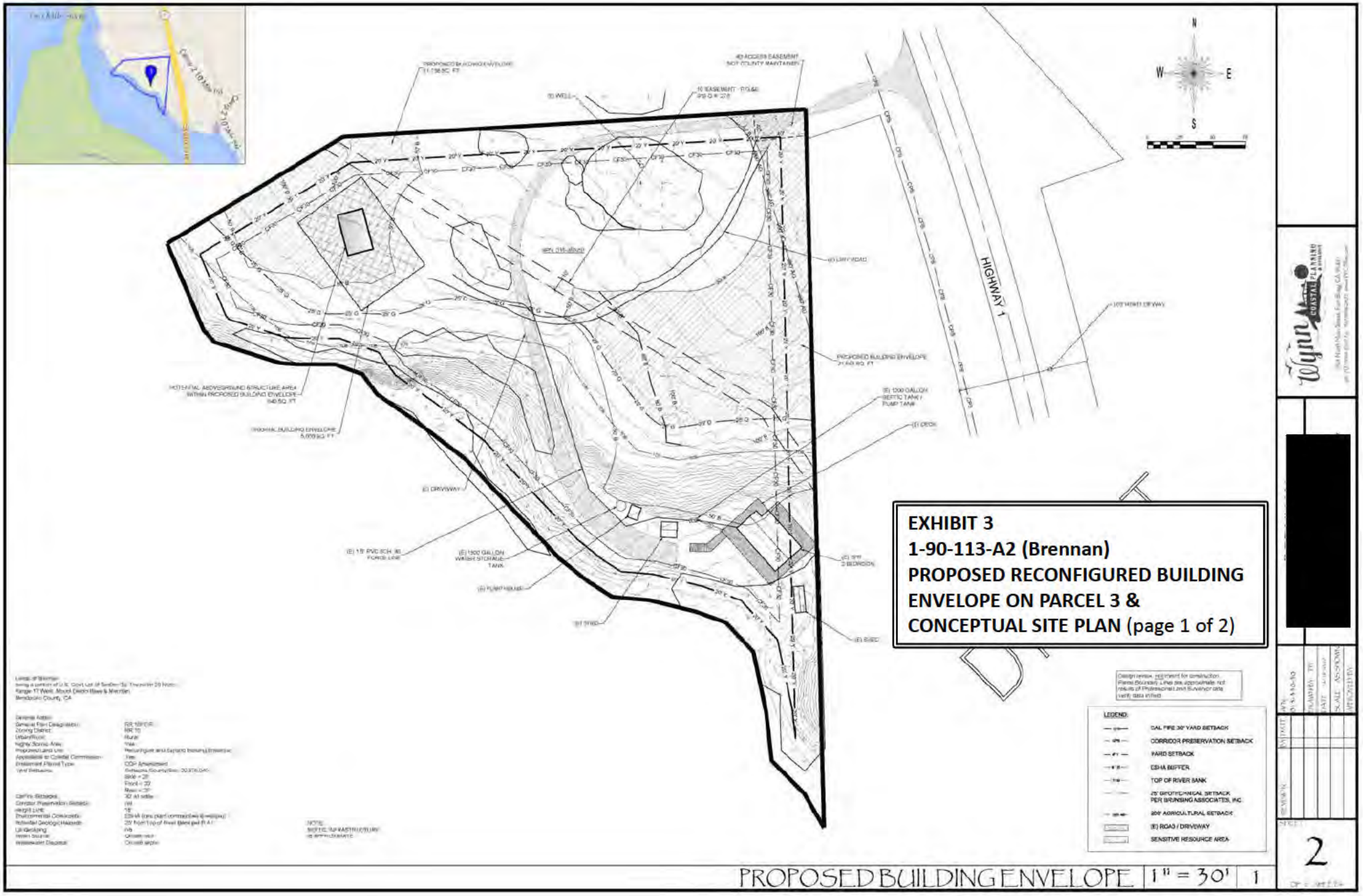


EXHIBIT 2
1-90-113-A2 (Brennan)
VICINITY MAPS
(page 1 of 2)

EXHIBIT 2
1-90-113-A2 (Brennan)
VICINITY MAPS
(page 2 of 2)


HIGHWAY 1
N
S
E
W
PROPOSED BUILDING ENVELOPE
(E) DRIVEWAY
(E) DECK
(E) 1200 GALLON SEPTIC TANK / PUMP TANK
(E) 1500 GALLON WILBERT STORAGE TANK
(E) PUMP HOUSE
(E) SHED
(E) WELL
(E) LONG ROAD
40' ACCESS EASEMENT NOT COUNTY MAINTAINED
10' EASEMENT - PG&E
EXHIBIT 3
1-90-113-A2 (Brennan)
PROPOSED RECONFIGURED BUILDING ENVELOPE ON PARCEL 3 & CONCEPTUAL SITE PLAN (page 1 of 2)
LEGEND
CAL FIRE 30' YARD SETBACK
CORRIDOR PRESERVATION SETBACK
YARD SETBACK
ESHA BUFFER
TOP OF RIVER BANK
25' GEOTECHNICAL SETBACK PER BRUNSING ASSOCIATES, INC.
200' AGRICULTURAL SETBACK
(E) ROAD / DRIVEWAY
SENSITIVE RESOURCE AREA
PROPOSED BUILDING ENVELOPE
1" = 30'
1
2

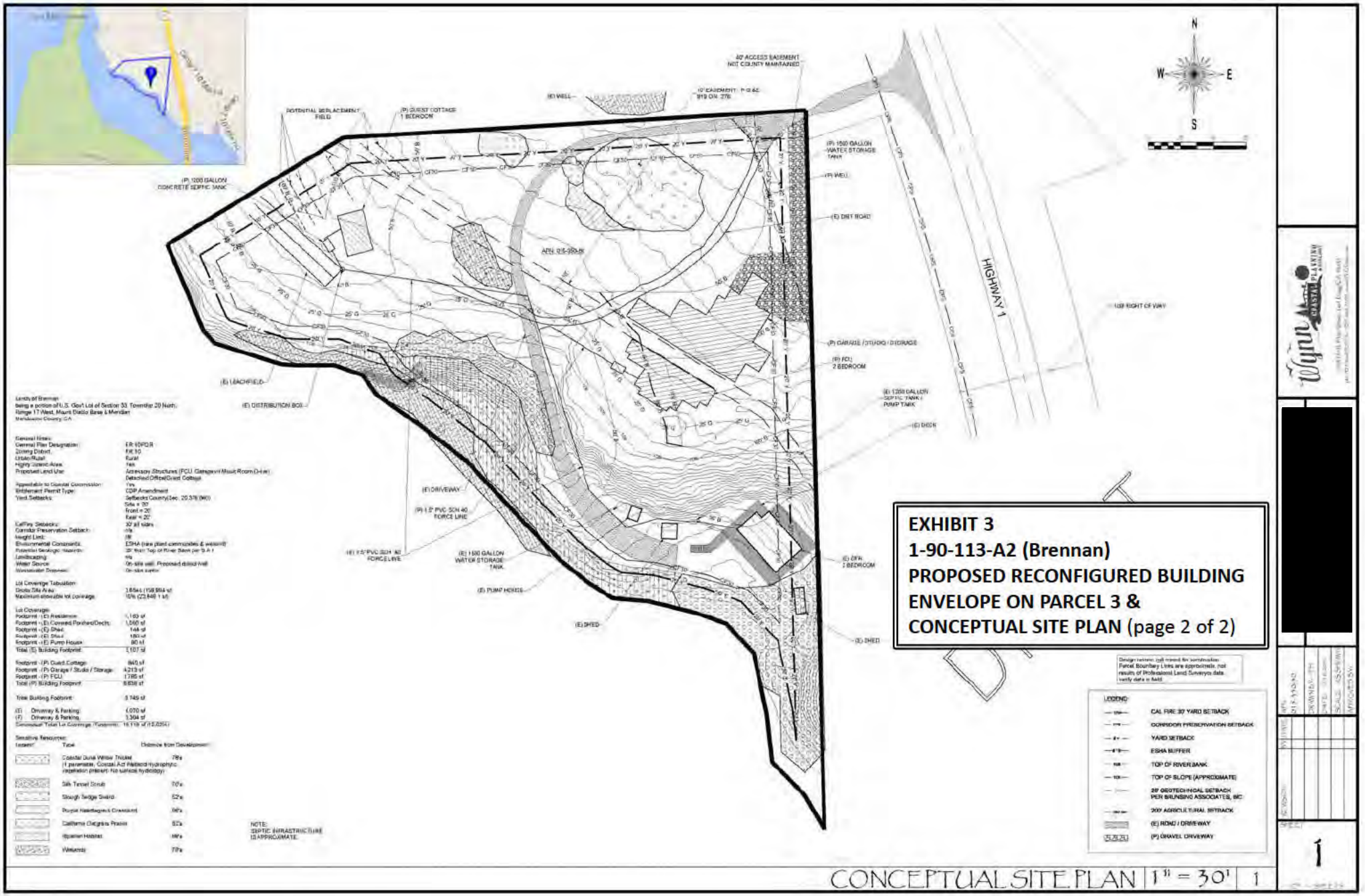
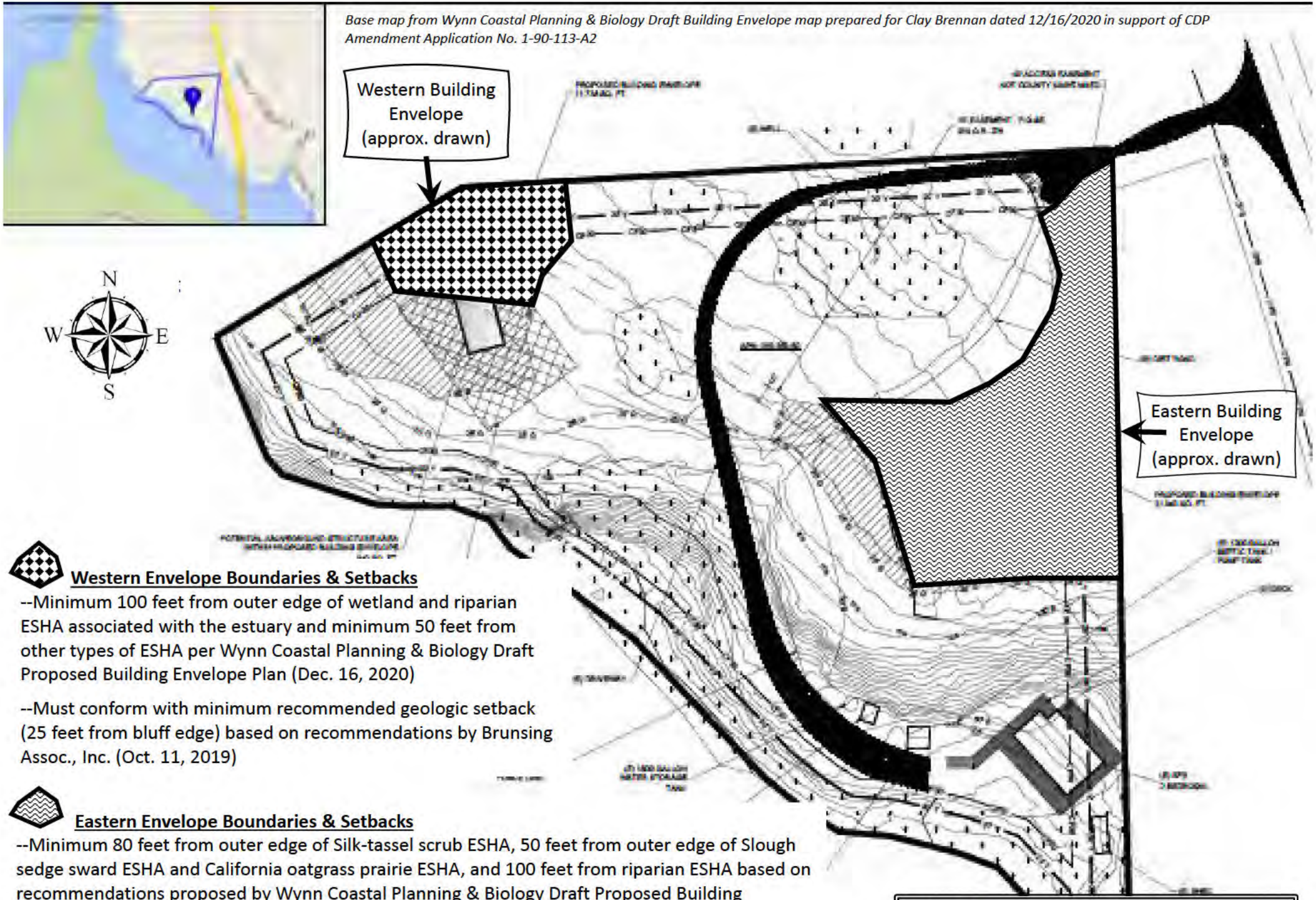


EXHIBIT 3
1-90-113-A2 (Brennan)
PROPOSED RECONFIGURED BUILDING ENVELOPE ON PARCEL 3 &
CONCEPTUAL SITE PLAN (page 2 of 2)
HIGHWAY 1
40' ACCESS EASEMENT NOT COUNTY MAINTAINED
POTENTIAL REPLACEMENT FIELD
(P) GUEST COTTAGE 1 BEDROOM
(E) WELL
(P) 1200 GALLON CONCRETE SEPTIC TANK
(P) 1500 GALLON WATER STORAGE TANK
(P) WELL
(E) DIRT ROAD
APN: 015-350-05
(P) GARAGE / STUDIO / STORAGE
(P) FCU 2 BEDROOM
(E) LEACHFIELD
(E) DISTRIBUTION BOX
(E) 1200 GALLON SEPTIC TANK / PUMP TANK
(E) DECK
(E) DRIVEWAY
(P) 1.5" PVC SCH 40 FORCE LINE
(E) 1.5" PVC SCH 40 FORCE LINE
(E) 1500 GALLON WATER STORAGE TANK
(E) PUMP HOUSE
(E) SHED
(E) OFA 2 BEDROOM
(E) SHED
USE RIGHT OF WAY
N
S
E
W
LEGEND
CAL FIRE 30' YARD SETBACK
CORRIDOR PRESERVATION SETBACK
YARD SETBACK
ESHA BUFFER
TOP OF RIVER BANK
TOP OF SLOPE (APPROXIMATE)
20' GEOTECHNICAL SETBACK PER BRUNSING ASSOCIATES, INC.
200' AGRICULTURAL SETBACK
(E) ROAD / DRIVEWAY
(P) GRAVEL DRIVEWAY
NOTE: SEPTIC INFRASTRUCTURE IS APPROXIMATE.
CONCEPTUAL SITE PLAN | 1" = 30' | 1


Base map from Wynn Coastal Planning & Biology Draft Building Envelope map prepared for Clay Brennan dated 12/16/2020 in support of CDP Amendment Application No. 1-90-113-A2
Western Building Envelope (approx. drawn)
Eastern Building Envelope (approx. drawn)
N
W
E
S
Western Envelope Boundaries & Setbacks
--Minimum 100 feet from outer edge of wetland and riparian ESHA associated with the estuary and minimum 50 feet from other types of ESHA per Wynn Coastal Planning & Biology Draft Proposed Building Envelope Plan (Dec. 16, 2020)
--Must conform with minimum recommended geologic setback (25 feet from bluff edge) based on recommendations by Brunsing Assoc., Inc. (Oct. 11, 2019)
Eastern Envelope Boundaries & Setbacks
--Minimum 80 feet from outer edge of Silk-tassel scrub ESHA, 50 feet from outer edge of Slough sedge sward ESHA and California oatgrass prairie ESHA, and 100 feet from riparian ESHA based on recommendations proposed by Wynn Coastal Planning & Biology Draft Proposed Building Envelope Plan (Dec. 16, 2020)
--Must conform with minimum recommended geologic setback (25 feet from bluff edge) based on recommendations by Brunsing Assoc., Inc. (Oct. 11, 2019)
EXHIBIT 4
1-90-113-A2 (Brennan)
BUILDING ENVELOPE RESTRICTIONS AND SETBACKS IMPOSED BY THE COMMISSION

Base map from Wynn Coastal Planning & Biology Draft Building Envelope map prepared for Clay Brennan dated 12/16/2020 in support of CDP Amendment Application No. 1-90-113-A2

Western Building Envelope (approx. drawn)

N
W E
S

Area subject to Open Space restrictions pursuant to CDP Amendment 1-90-113-A2 (shaded balance of property outside of building envelopes)

Eastern Building Envelope (approx. drawn)

Note: Areas outside of approved building envelopes shall be restricted to open space where only repair and maintenance of existing legal development and other limited development is allowed under the terms of CDP Amendment 1-90-113-A2 due to the presence of ESHA, minimum required ESHA buffers/and or geologic hazards.

EXHIBIT 5
1-90-113-A2 (Brennan)
AREAS SUBJECT TO OPEN SPACE RESTRICTIONS ON PARCEL 3

Google Maps Existing and Proposed (Conceptual) Northbound Visual

Image capture: Oct 2017 © 2020 Google

EXHIBIT 6
1-90-113-A2 (Brennan)
VISUAL ANALYSIS PROVIDED BY APPLICANT
(page 1 of 11)

Existing Southbound Visual

Image capture: Oct 2017 © 2020 Google

EXHIBIT 6
1-90-113-A2 (Brennan)
VISUAL ANALYSIS PROVIDED BY APPLICANT
(page 2 of 11)

Proposed (Conceptual) Southbound Visual

EXHIBIT 6
1-90-113-A2 (Brennan)
VISUAL ANALYSIS PROVIDED BY APPLICANT
(page 3 of 11)

Existing Ten Mile Visual

Image capture: Jan 2015 © 2020 Google

EXHIBIT 6
1-90-113-A2 (Brennan)
VISUAL ANALYSIS PROVIDED BY APPLICANT
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Proposed (Conceptual) Ten Mile Visual

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VISUAL ANALYSIS PROVIDED BY APPLICANT
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EXHIBIT 6
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VISUAL ANALYSIS PROVIDED BY APPLICANT
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EXHIBIT 6
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EXHIBIT 6
1-90-113-A2 (Brennan)
VISUAL ANALYSIS PROVIDED BY APPLICANT
(page 8 of 11)

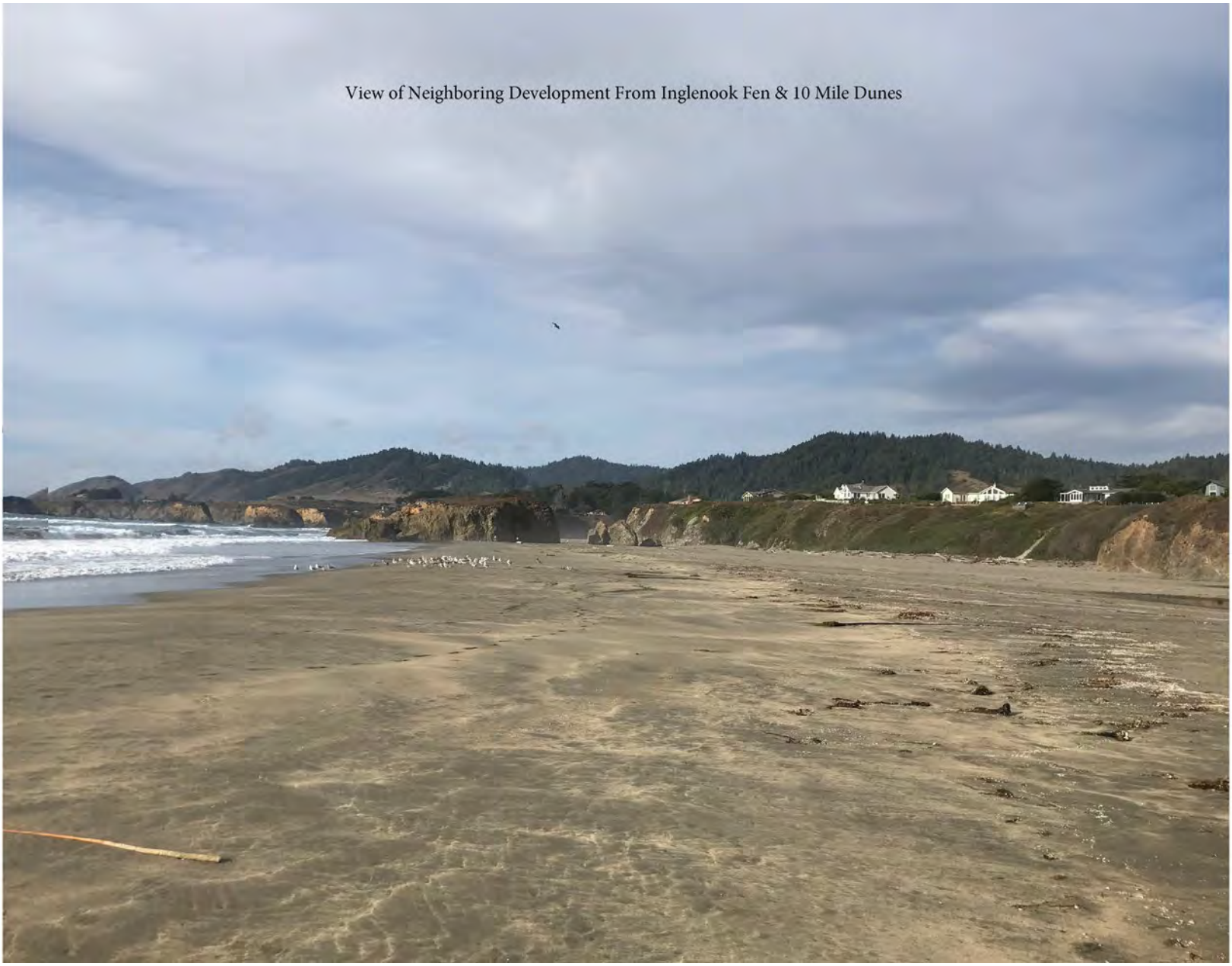

EXHIBIT 6
1-90-113-A2 (Brennan)
VISUAL ANALYSIS PROVIDED BY APPLICANT
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VISUAL ANALYSIS PROVIDED BY APPLICANT
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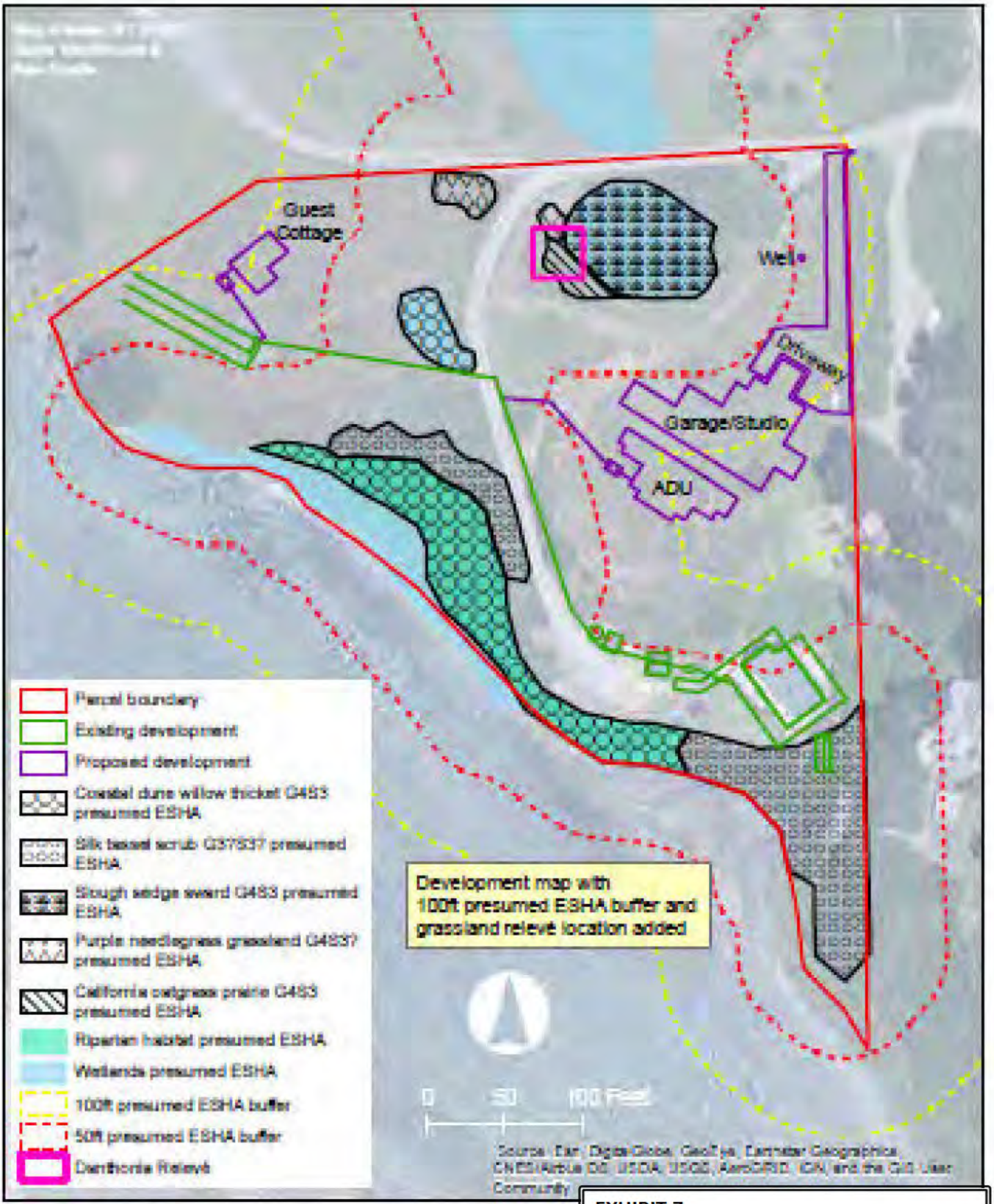

EXHIBIT 7
1-90-113-A2 (Brennan)
FUTURE CONCEPTUAL DEVELOPMENT IN RELATION TO ESHA AND ESHA BUFFERS

[redacted]

Figure 1. Presumed ESHA Map with Proposed Development, 50ft and 100ft presumed ESHA buffers depicted. This map also shows the location where a 100-square meter relevé was conducted.

BIOLOGICAL SCOPING, WETLAND DELINEATION, BOTANICAL & LOTIS BLUE BUTTERFLY SURVEY REPORT

for

29020 North Highway 1
Fort Bragg, CA 95437
APN 015-350-50
Mendocino County

Property Owner:

[redacted]

Report Prepared By:
Suzie Woolhouse, Biologist
Karen Youngblood, Biologist
Asa B. Spade, Senior Biologist

June 16, 2020

703 North Main Street, Fort Bragg CA 95437
ph: 707-964-2537 fx: 707-964-2622
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1. PROJECT SUMMARY

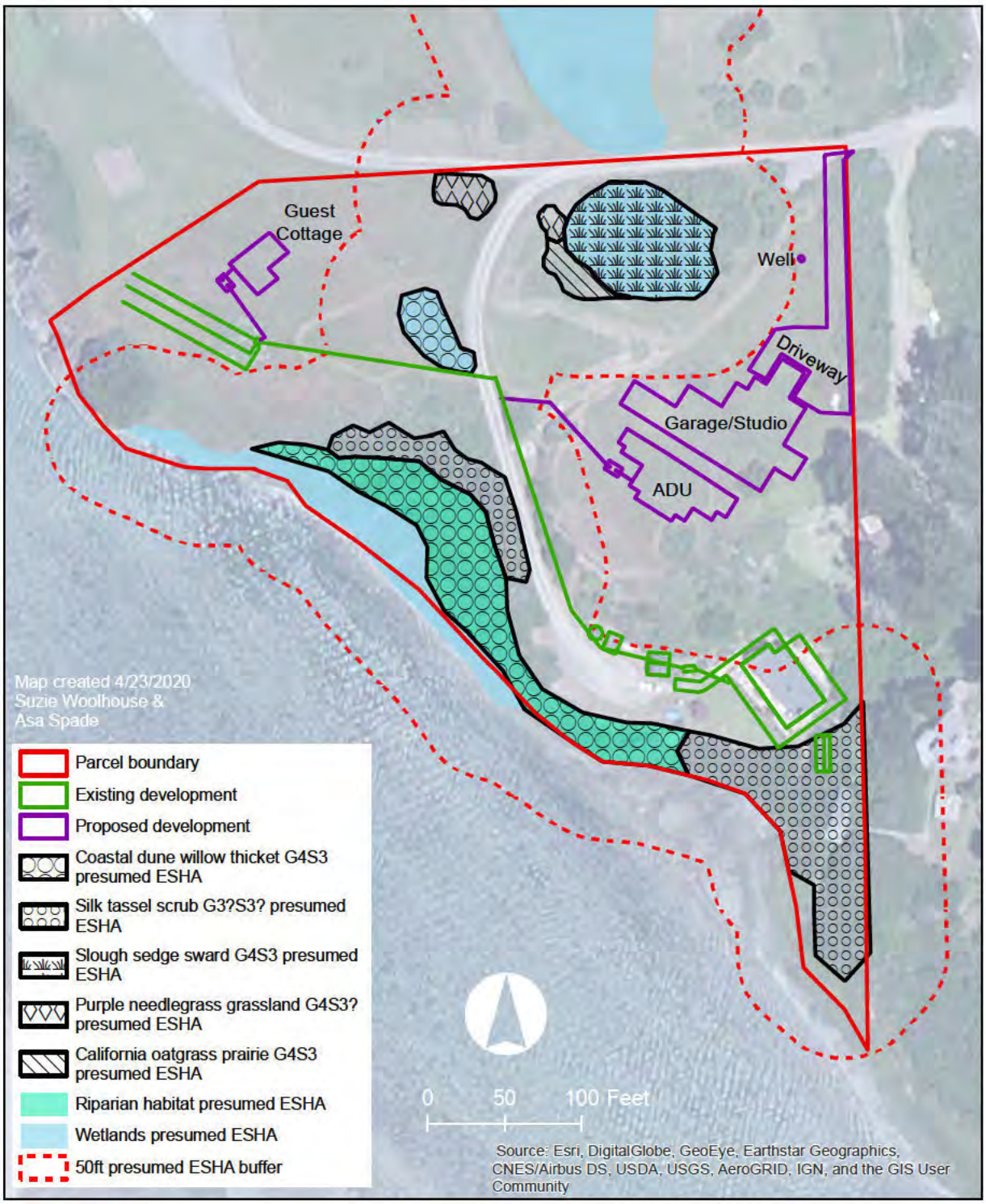
A biological survey, wetland delineation, and Lotis blue butterfly survey was conducted on parcel APN 015-350-50 by Wynn Coastal Planning & Biology to locate potential Environmentally Sensitive Habitat Areas (ESHAs) - special status plants and communities, wetlands and riparian areas, and special status animals and/or their habitats and to determine if they would be directly or indirectly impacted by the proposed development. The proposed development consists of building a guest cottage, family care/accessory dwelling unit, a small garage/studio served by an additional driveway, and new production well. The existing septic system leach field is adequately sized to accommodate the proposed additional use but it will be necessary to install additional septic and pump tanks and to connect pipes from the new buildings to the existing system.
The study area (**Figure 1**) is located approximately 6 miles south of the town of Westport and 8.5 miles north of Fort Bragg. The 3.65 acre property sits on the west side of the highway and the north side of the 10 Mile River Estuary 0.25 miles upstream from the mouth of the river just facing MacKerricher Beach. The parcel is accessed by a driveway from Highway One and is bordered by the Ten-Mile River to the south and west and by residential parcels with single family residences to the north and east.

Wynn Coastal Planning and Biology's staff biologists conducted floristic and potential ESHA surveys on June 14, 2016, April 10, 2018 and July 22, 2018. Lotis Blue Butterfly surveys were conducted on April 19, May 21, June 4, 8, 14, 19, 25 and July 9 of 2018. A wetland delineation survey was also conducted on July 27, 2016. Two types of potential ESHAs were identified within the study area according to the definitions by the California Coastal Act (CCA) and Mendocino County Local Coastal Plan (LCP) (**Figure 2**).

> **Wetland ESHA** – Two areas of freshwater emergent wetland totaling ~0.2 acres were delineated within the interior of the subject parcel. The southern boundary of the parcel is the Ten-Mile River; estuarine wetland occurs along the river bank.
>
> **Riparian Habitat ESHA** – Riparian vegetation primarily consisting of willow scrub occurred adjacent to the Ten-Mile River which is the southern boundary of the subject parcel.
>
> **Rare Plant Community ESHA –** Five rare plant communities were observed on the property and warrant protection. **Slough sedge sward** (*Carex obnupta* Herbaceous Alliance G4S3) **coastal dune willow thicket** (*Salix hookeriana* Shrubland Alliance G4S3), **coastal silk tassel scrub** (Garrya elliptica Provisional Shrubland Alliance G3?S3?), **California oatgrass prairie (***Danthonia californica* Herbaceous Alliance) and **Purple needle grass meadow** (*Stipa pulchra* Herbaceous Alliance G4S3? presumed ESHA).

In addition to the ESHAs documented, one additional type of potential ESHA was considered. The presumed larval host plant for the Federally Endangered lotis blue butterfly (*Lycaeides argyrognomon lotis*) is **harlequin lotus** (*Hosackia gracilis* CNPS 4.2), which was found in one location within grassland near wetlands. Lotis blue butterfly surveys were conducted and resulted in a conclusion that the butterfly does not occur on the parcel. Harlequin lotus plants are relatively common and do not constitute an ESHA by themselves.

This analysis has been performed by Wynn Coastal Planning, and is the culmination of our professional opinion, research, and data collection. The County of Mendocino (County), California Department of Fish and Wildlife (CDFW), and U.S. Fish and Wildlife Service (USFWS) should also be consulted regarding this project to obtain all necessary permits and obtain their concurrence with our findings and recommendations, and to make recommendations of their own, including concurrence of the boundaries of the sensitive areas and appropriate avoidance and protective measures.



Wynn COASTAL PLANNING BIOLOGY

[redacted]

Presumed ESHA Map with Proposed Development

Figure 2. Presumed ESHAs, their buffers, and proposed development locations.

1. PROJECT DESCRIPTION

Proposed development on this parcel is to build a guest cottage, family care/accessory dwelling unit, a small garage/studio served by a new portion of driveway, septic and pump tanks to connect the proposed buildings to the existing leach fields, and new production well.

2. STUDY AREA DESCRIPTION

2.1. General Site Description

The parcel is 3.65 acres and sits on a southward sloping bluff just north of the Ten-Mile River estuary. There is approximately 0.2-acres of delineated freshwater emergent wetland within the parcel boundaries as well as estuarine wetland and riparian habitat along the Ten-Mile River. The majority of the parcel is non-native grassland with a small patch of harlequin lotus (*Hosackia gracilis*) within this habitat. Two areas with significant cover of native grass species were identified, described and mapped.

2.2. Land-Use History

The Ten-Mile River watershed has a long history of ranching and logging. Historic T-sheet maps from the turn of the last century were examined but did not show any particular land use in the area of the subject parcel. 1998 Google Earth aerial imagery (**Figure 3**) shows that no major changes have occurred in the past 20 years.

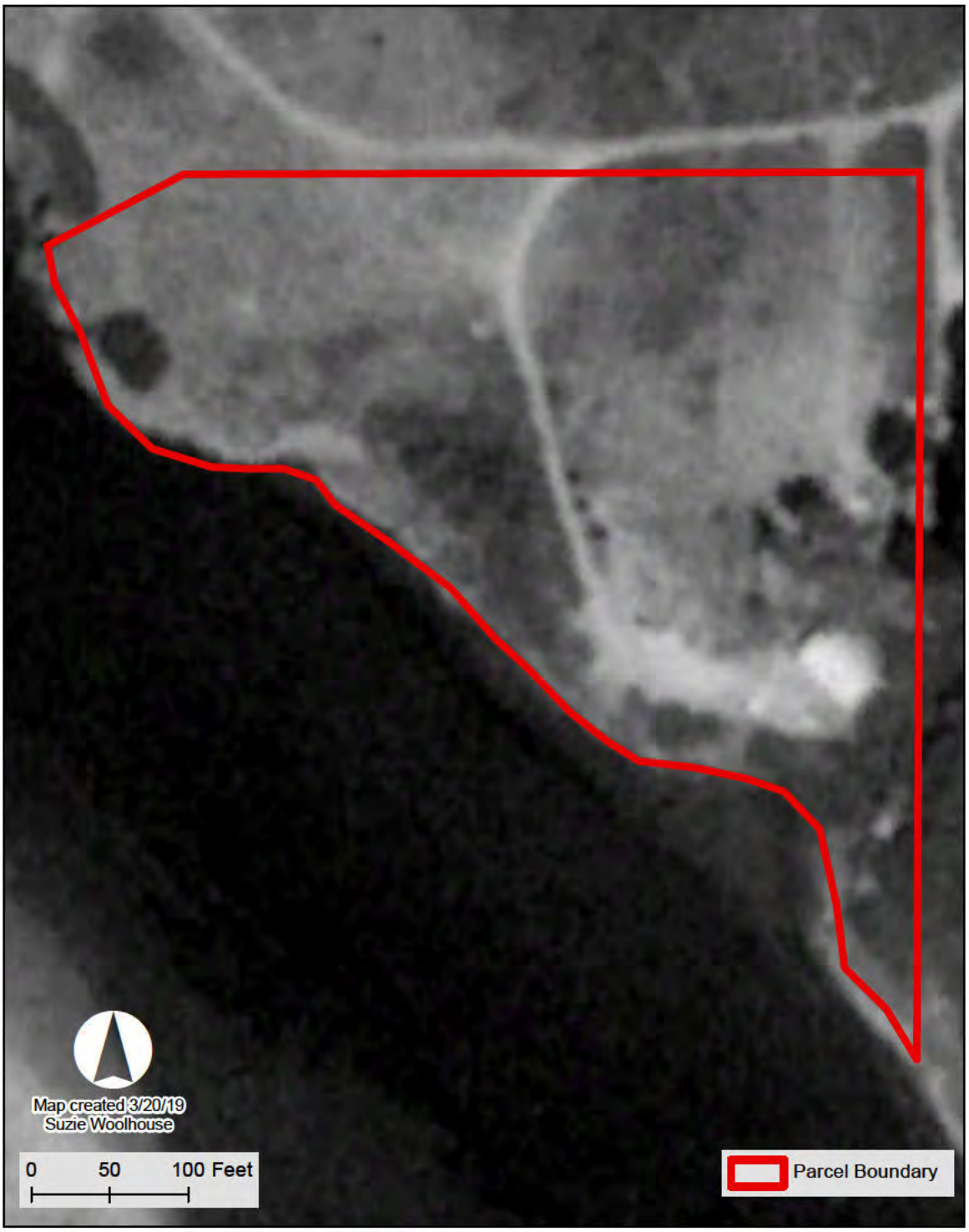


Figure 3. Map of Study Area with 1998 Aerial Photo.

2.3. Topography and Soils

The elevation of the study area is approximately 55 feet above sea level, although the current residence is located at 20 feet above sea level. The only soil type mapped by the Natural Resource Conservation Service in the study area is Abalobadiah-Bruhel-Vizcaino complex at 30% to 50% slopes. The availability of water storage is low (about 5 inches) for Abalobadiah, moderate (about 6.1 inches) for Bruhel and very low (about 2.5 inches) for Vizcaino. None of the soil types on the property are mapped as having a hydric soil rating by NRCS (USDA Natural Resource Conservation Service, 2001; **Appendix A**). It should be noted that when a given soil is listed on the National Hydric Soils List as a hydric soil, that does not necessarily mean a wetland is present. Soil complexes are mapped at a coarse resolution and contain a number of components, any one of which may or may not be hydric, and may or may not be present in the particular mapped location.

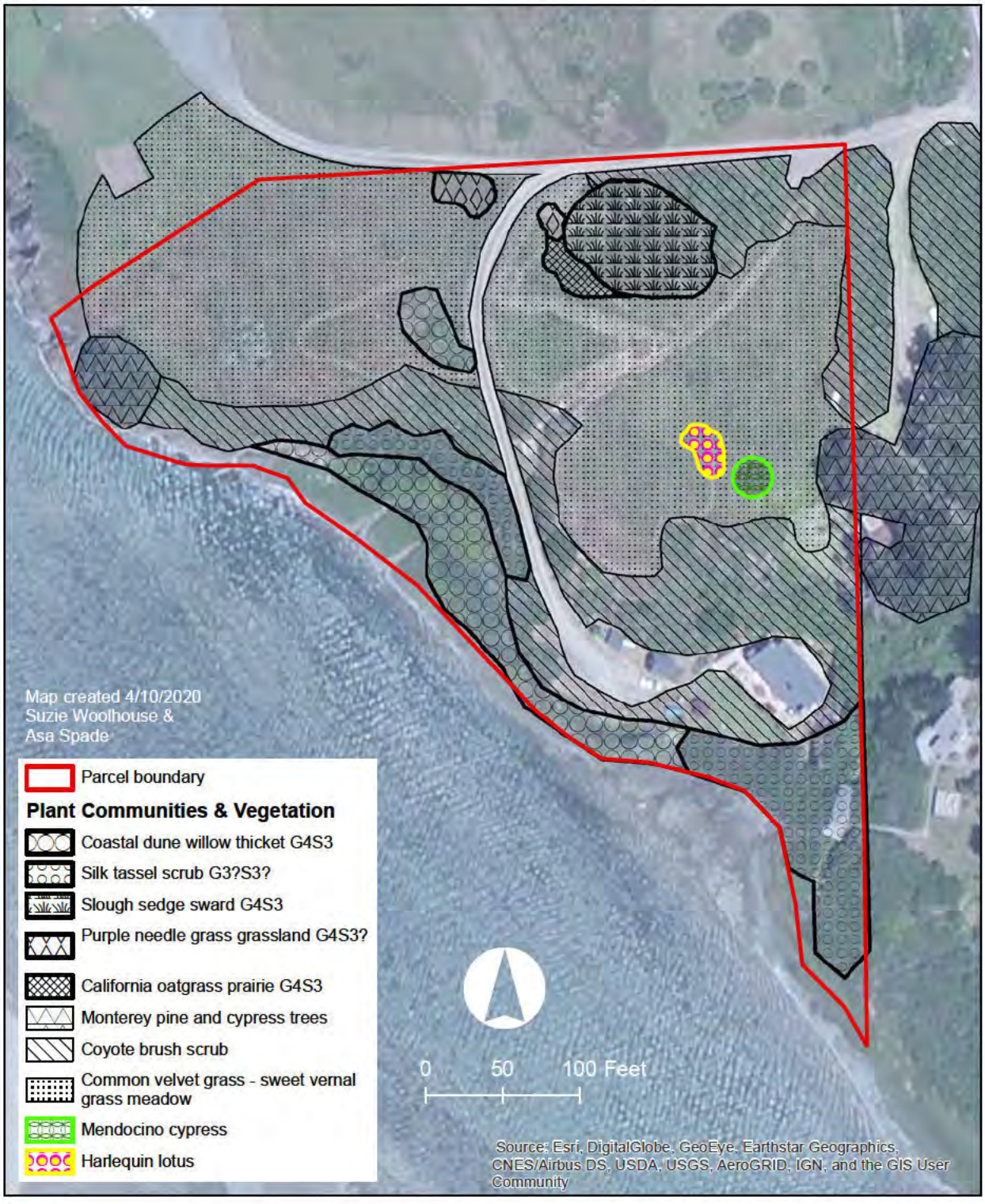
2.4. Climate and Hydrology

The Mendocino Coast has a Mediterranean climate with average annual precipitation of 40.24 inches (WRCC, Station Fort Bragg 5N, average for years 1895-2016), with the majority of rain occurring in winter months (November through March).

The USFWS National Wetlands Inventory shows freshwater emergent wetland across the southern corner of the subject parcel, just south of the existing residence. It shows a large patch of freshwater emergent wetland just north of the subject parcel, which is likely hydrologically connected to the wetland delineated at the northern edge of the subject parcel. In addition, the NWI map depicts the estuarine wetland that is the Ten-Mile River, along the southern edge of the subject parcel (**Appendix B**).

2.5. Vegetation and Natural Communities

The majority of the parcel is vegetated with introduced perennial grassland (**Figure 4**). Along the Ten-Mile River and to the southwest of the parcel, there is a large patch of riparian coastal willow (*Salix hookeriana*) and silk tassel bush (*Garrya elliptica*) habitat. To the east and surrounding the existing residence is a patch of coastal scrub dominated by coyote brush (Baccharis pilularis). There is one small patch of Harlequin lotus (*Hosackia gracilis*), the presumed host plant for the endangered Lotus blue butterfly and one single Mendocino Cypress (*Hesperocyparis pygmaea*) tree, both found in the eastern section of the parcel.



Wynn Coastal Planning Biology

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Plant Communities and Vegetation Map

Figure 4. Plant communities and vegetation map.

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Biological Information (excerpt)
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2.6. Adjacent Lands

Lands surrounding the study area include: the Pacific Ocean to the west, Ten-Mile Dunes and State Park property to the south, a residential parcel with planted pine trees to the east, and a similarly developed residential parcel with open areas to the north.

2.7. Existing Development

Current development existing on the property includes a single family residence, two storage sheds, ground water well, driveway, and septic system large enough to serve the current residence and the proposed development.

3. SURVEY METHODOLOGY

3.1. Scoping Tables

Scoping tables were created for the special-status plant species and wildlife with the potential to occur in the Study Area by reviewing the most up-to-date species lists for the California Department of Fish and Wildlife (CDFW), California Natural Diversity Database (CNDDB) and the California Native Plant Society (CNPS).

For purposes of this evaluation, special-status plant species are vascular plants that are (1) designated as rare, threatened, or endangered by the state or federal governments; or (2) are proposed for rare, threatened, or endangered status; and/or (3) are state or federal candidate species, and/or (4) considered species of concern by the USFWS and/or (5) are included on the California Native Plant Society (CNPS) List 1A, 1B, & 2.

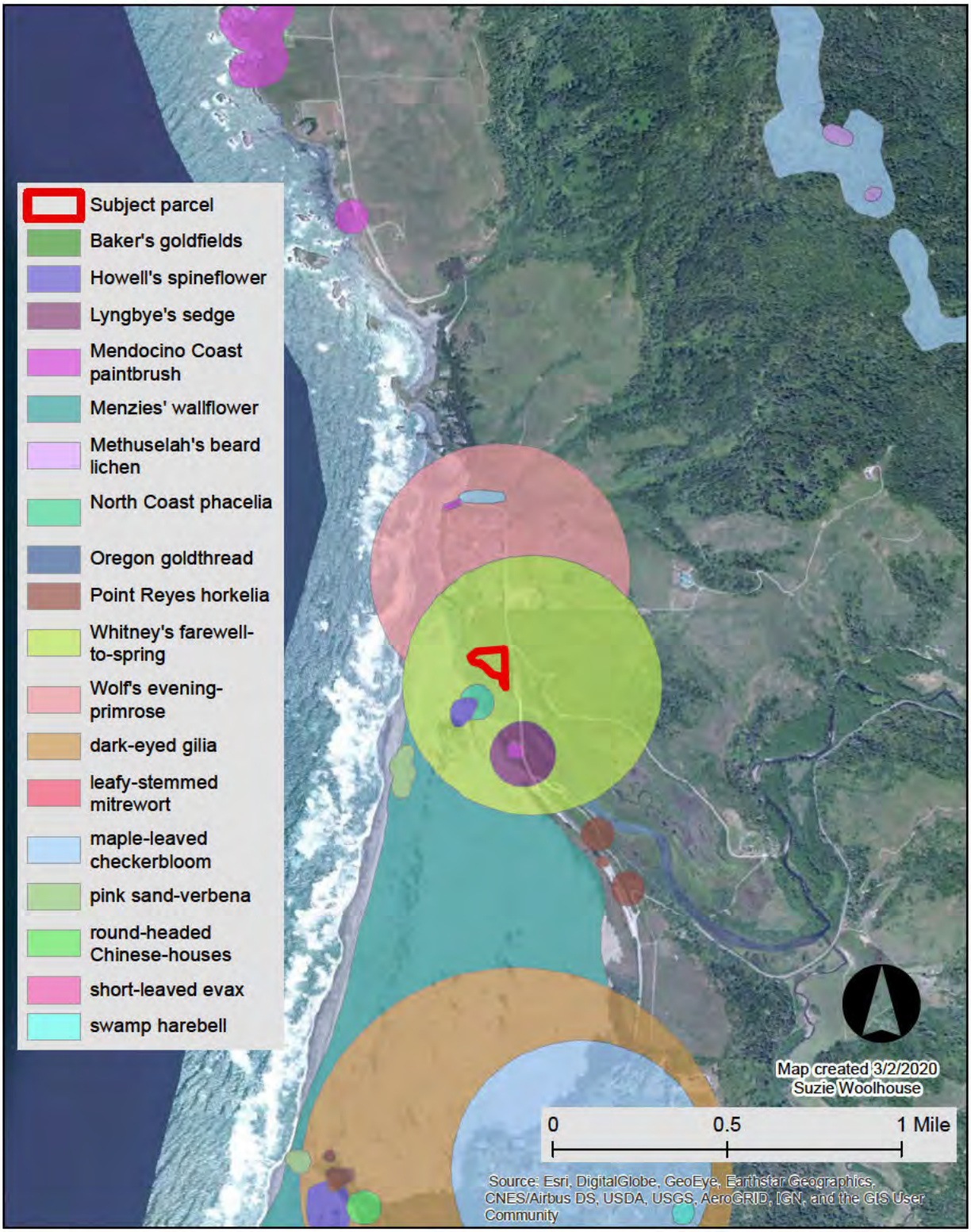
Maps were created using the California Natural Diversity Database CNDDB for records within 1 mile of the study area (**Figure 5** & **6**). The CNDDB is a database consisting of historical observations of special-status plant species, wildlife species, and natural plant communities. CNDDB was used to help compile a list of special status plants and animals with potential to occur in the study area. This list was not limited to species presented in the maps, it includes all species indicated by a search of all quads with similar geology, habitats, and vegetation to those found in the project area. Because the CNDDB is limited to reported sightings, it is not a comprehensive list of plant species that may occur in a particular area. However, it is useful in refining the list of special-status plant species that have the potential to occur on a particular site.

A database search was performed using the CNPS *Electronic Inventory*, which allows users to query the *Inventory of Rare and Endangered Plants of California* using a set of search criteria (e.g., quad name, habitat type). A target list of special-status plant species with the potential to occur on the site was developed through interpretation of the CNDDB and CNPS query results. The biological scoping tables with special status resources potential occurrences in the study area are presented in **Appendix C: Tables 1, 2, and 3.** While directed by query results, surveys were not restricted only to those species indicated by this literature review. Field surveys and subsequent reporting were comprehensive and floristic in nature.

Additional information, (e.g. morphological characteristics, range, habitat and bloom period) was collected for each of the special-status plant species that had the potential to occur within the study area. Wynn Coastal Planning's staff botanist reviewed these characteristics for each of the plants on the target list prior to initiating fieldwork.

The botanical survey of the study area was conducted primarily adhering to the protocol described by the California Department of Fish and Wildlife in *Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities.*

Additional database review was conducted to assess the potential for wetlands to occur in the area prior to field work. Aerial photography was assessed for features with "wet" characteristics and the Inventory of National Wetlands database was viewed with the subject parcel boundaries to see if any predetermined wetlands occur in the study area.



[redacted]

Figure 5. Rare flora reported to CDFW in the proximity of the study area.

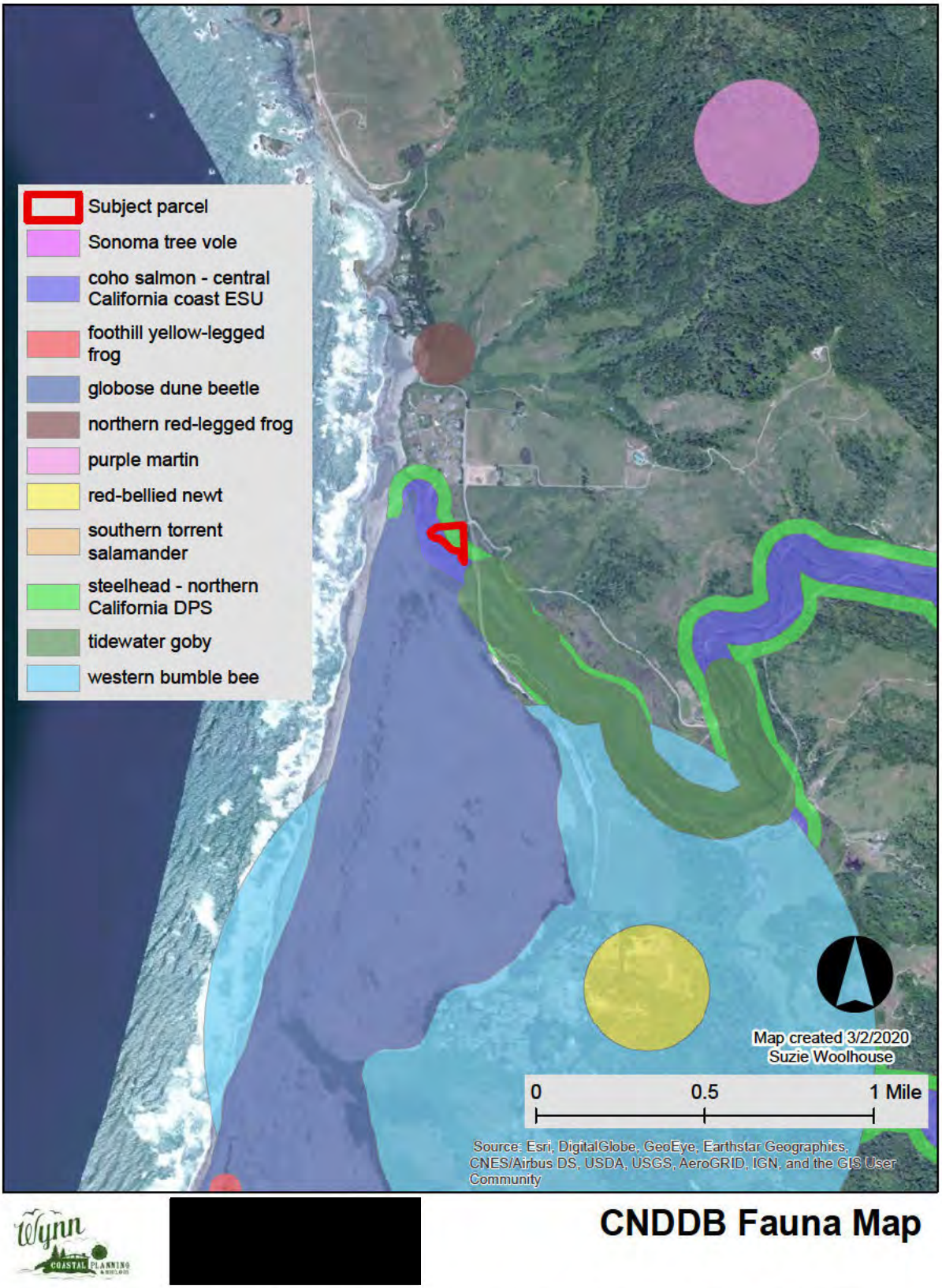


Figure 6. Rare fauna reported to CDFW in the proximity of the study area and recorded in the CNDDB database.

3.2. Field Surveys

Wynn Coastal Planning's staff biologists conducted floristic surveys and a wetland delineation on June 14, 2016 and April 10, July 22 and July 27, 2018. During the above listed surveys, biologists compiled a full floristic list of plants occurring in the study area and identified any rare resources having the potential to meet the LCP ESHA definitions. To ensure potential ESHA plants were evident and identifiable, offsite **reference plant populations** were visited prior to the project field surveys. Verified offsite reference site plants observed by WCPlan staff during the 2017/18 floristic seasons included: Point Reyes blennosperma (*Blennosperma nanum var. robustum*), Blasdale's bent grass *(Agrostis blasdalei*), seacoast angelica (*Angelica lucida),* swamp harebell (*Campanula californica),* Mendocino coast paintbrush (*Castilleja mendocinensis*), supple daisy (*Erigeron supple*x), headland wallflower (*Erysimum concinnum*), short-leaved evax (*Hesperevax sparsiflora var. brevifolia*), Point Reyes horkelia (*Horkelia marinensis*), thin-lobed horkelia (*Horkelia tenuiloba*), harlequin lotus (*Hosackia gracilis*), Baker's goldfields (*Lasthenia californica ssp. bakeri*), perennial goldfields (*Lasthenia californica ssp. macrantha*), coast lily (*Lilium maritimum*), coastal bluff morning glory (*Calystegia purpurata* ssp. *saxicola*), deceiving sedge (*Carex saliniformus*), great burnet (*Sanguisorba officinalis*), early blue violet (*Viola adunca*), and corn lily *(Veratrum fimbriatum*).

All identifiable plant species located during the surveys were identified to the lowest taxonomic level necessary to determine the presence of special status plant species and are listed in **Table 1 (Appendix C**). *The Jepson Manual: Vascular Plants of California* (Baldwin 2012) was used to determine the taxonomic nomenclature. *A Manual of California Vegetation Second Edition* (Sawyer 2009), *Classification of the Vegetation Alliances and Associations of Sonoma County, CA, V. 2* (Klein 2015) and the *List of Vegetation Alliances and Associations* (CDFW 2010) were used to classify and describe representative plant communities present. A potential for false negative survey results exists. For example, a rare plant could be eaten by deer around the time when they would have been evident and identifiable and therefore not be detected during surveys. Some plants remain dormant and do not become evident and identifiable every year. Climatic conditions are different each year and may have unpredictable effects on the bloom windows of each species. Heavy rains, for example, may cause one species to bloom early and another species to bloom later than in normal years. Well timed site visits and frequent observations at known reference sites reduce the chance of error.

3.3. Wetland and Riparian Delineation

Wetland delineation field work began with examination of the topography and searching for surface hydrology and plant species that can grow as hydrophytes. Further analyses were performed at six sample points where wetland soils, hydrophytic vegetation, and hydrology were inspected according to the US Army Corp of Engineers (ACOE) methodology for: Western Mountains, Valleys, and Coast Region (Version 2.0). Wetland data sheets for these sample points are presented in **Appendix D.** Sampling points are marked in the field with 24-inch wooden stakes with colored flagging and labeled in Sharpie marker. Locations of sampling points are depicted on the Wetland Delineation Map in **Figure 7**. The ACOE recognizes wetlands where hydrophytic vegetation, hydric soils, and hydrology are all present. In the California Coastal Zone, wetlands are recognized if any one of the three ACOE parameters (hydrophytic vegetation, hydric soils, or hydrology) is present. Wetlands reported and mapped in this report are Coastal Act wetlands and may or may not be Army Corps wetlands; a distinction is made where important.

Wynn Coastal Planning Biology

[redacted]

Wetland and Riparian Map

Figure 7. Wetland delineation map depicting wetland Sample Points, delineated and presumed wetlands and riparian habitat.

EXHIBIT 8
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Biological Information (excerpt)
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3.4. Lotis Blue Butterfly Habitat Assessment and Survey

Harlequin lotus (*Hosackia gracilis*) is the presumed host plant of the Endangered Lotis Blue Butterfly (LBB), and a small patch was observed onsite in the northeast section of the parcel. Due to the presence of this plant, a habitat assessment and presence/absence survey was required for this endangered butterfly. The habitat assessment and surveys were based on Dr. Dick Arnold's Draft Protocol for Presence-Absence Surveys of the Endangered Lotis Blue Butterfly dated March 2018 (**Appendix E**). The Wynn Coastal Planning & Biology investigators, Asa Spade and Karen Youngblood, have both been given approval to perform these surveys under Dr. Dick Arnold and the USFWS recovery permit biologist Susie Tharatt.

3.5. Lotis Blue Butterfly Survey Period

Because of the proximity of the proposed development to the harlequin lotus, surveys were performed for both the host plant and butterflies.

Prior to surveys, coordination with both Susie Tharatt and Dr. Arnold took place to address the need and scope of the LBB surveys. Following the draft survey protocols, a minimum of six surveys are recommended during the butterfly's flight season, which is between mid-May through mid-July, with the surveys spaced at 7- to 10-day intervals (Dr. Dick Arnold 2008).

Per the LBB draft survey protocol, surveyors conducted surveys between 10am and 3:30pm on days that were warm, with relatively low wind, and when other butterflies were observed to be active. Surveyors recorded temperature, wind speed, weather conditions, survey start and end times, vegetation that was blooming, feeding damage to harlequin lotus, estimated percentage of harlequin lotus in bloom, and other species of butterflies seen. Butterflies that were seen at the site were photographed as often as possible with a 75–300mm telephoto lens. Positive identifications were made, and photographs were sent to both Susie Tharatt and Dr. Arnold to confirm identifications of butterflies.

Field surveys were conducted on eight (8) different days between April 19 & July 9 of 2018 by Asa Spade, Karen Youngblood, & Dr. Arnold. Surveys were conducted on April 19, May 21, June 4, 8, 14, 19 & 25 & July 9, 2018. Survey dates were chosen to occur at the 7- to 10-day intervals, targeting days that were 60 degrees Fahrenheit or warmer ideally with low wind speeds. During each survey, the biologists walked throughout the property searching for adult butterflies with their main focus being in the area populated with harlequin lotus. The population of harlequin lotus was examined for caterpillars and feeding damage. Dr. Arnold wrote a Lotis Blue Butterfly Report, dated July 18, 2018, separate from this document; Wynn Coastal Planning & Biology's data sheets for Lotis Blue Butterfly surveys are presented in **Appendix F**

4. SURVEY RESULTS

Biological Field Surveys were performed that identified the following: plants, plant communities, wetlands, special status animals and animal habitat in the study area.

4.1. Plants Observed

The CDFW's California Native Diversity Database (CNDDB) BIOS, *Version 5* (2016), was used to focus the search on special status flora previously reported in the vicinity of the project area. Two hundred and twenty-one species of herbs, grasses, sedges, rushes, ferns, shrubs, trees, and lichens were identified in the study area and are listed in **Appendix G**. One special status plant **Mendocino cypress (*Hesperocyparis pygmaea* CNPS 1B.2)** and one watch list plant **Harlequin lotus (*Hosackia gracilis* CNPS 4.2)** were found growing on the site.

4.1.1. Harlequin Lotus (*Hosackia gracilis* CNPS 4.2)

Harlequin lotus (**Figure 8**) was found in a small patch on the property in the eastern section. This small plant in the pea family (Fabaceae) is believed to be the larval host plant for the Endangered Lotis Blue Butterfly (*Lycaeides idas lotis*). The patch is surrounded heavily by non-native grasses within the common velvet grass – sweet vernal grass meadow. A Lotis Blue butterfly survey was conducted and no butterflies were observed. Through consultation with USFWS, it was determined

that protection of this plant on this parcel is not necessary to avoid take of the butterfly. The harlequin lotus population was not considered ESHA for the purpose of this report.

Figure 8. Hosackia gracilis within the study area.

4.1.2. Mendocino cypress (*Hesperocyparis pygmaea* CNPS 1B.2)

A single Mendocino cypress (**Figure 9**) occurred on the eastern side of the parcel, east of the patch of Harlequin lotus. It is likely that this individual will not grow in the stunted pygmy form as it is growing in rich prairie soils. The northernmost natural population of Mendocino cypress reported on CNDDB is on the northern side of Pudding Creek in Fort Bragg. This individual is growing approximately 7.5 miles north of its natural range. As this specimen is out of the normal range for this species, as there are no other Mendocino cypress trees around, and as this species is available for horticultural purchase locally, it is assumed that this specimen was horticulturally-planted and thus does not warrant protection. Therefore, this Mendocino cypress was not treated as an ESHA for the purpose of this report.

Figure 9. Presumed horticultural planting of Mendocino cypress.

4.2. Plant Communities Observed

4.2.1. Slough sedge sward (*Carex obnupta* Herbaceous Alliance G4S3 presumed wetland ESHA)

Along the driveway in the northeast portion of the parcel is a small patch of slough sedge sward wetland. This community is dominated by slough sedge (*Carex obnupta*) with approximately 40% cover of water parsley (*Oenanthe sarmentosa*). Other plants found growing here include California blackberry (*Rubus ursinus*), lady fern (*Athyrium filix-femina*), sword fern (*Polystichum munitum*) and Douglas iris (*Iris douglasiana*) along the edge of the community.

4.2.2. Coyote brush scrub (*Baccharis pilularis* Shrubland Alliance G5S5)

To the east of the slough sedge sward wetland is a small patch of coyote brush scrub (*Baccharis pilularis*) shrubland alliance. In addition to coyote brush, which is dominant in this area, other plants observed include California blackberry (*Rubus ursinus*), poison oak (*Toxicodendron* diversilobum), sword fern (*Polystichum munitum*), cleavers (*Galium aparine*) and a small amount of slough sedge. A wetland sample point was used to examine this area and to determine that it was an upland area.

On the southeast portion of the parcel, surrounding the existing residence, is a patch of coastal scrub plant community. This plant community consists of coyote brush (*Baccharis pilularis*), California wax myrtle (*Morella californica*), some stunted, shrubby Krummholz Douglas fir (*Pseudotsuga menziesii*), pampas grass (*Cortaderia jubata*), poison oak (*Toxicodendron* diversilobum), coast silk tassel (*Garrya elliptica*), bracken fern (*Pteridium aquilinum*), and riverbank lupine (*Lupinus rivularis*). This habitat, dominated by coyote brush, also runs along the northern edge of the shrubby vegetation extending northward from the river. Areas contiguous with this coyote brush scrub habitat but dominated by other species were classified and mapped separately.

4.2.3. Silk tassel scrub (Garrya elliptica Provisional Shrubland Alliance G3?S3? presumed ESHA)

Two areas were dominated by coastal silk tassel (*Garrya elliptica*). One was an area near the southern boundary of the middle of the parcel just north of a riparian area dominated by willow shrubs but south of coyote brush scrub habitat, and the second occurrence was within the south eastern portion of the parcel south of the existing residence. Both of these area were relatively inaccessible due to steep topography. Other species within the silk tassel scrub community included other common shrub species found within other areas of the parcel such as coyote brush, salal (*Gaultheria shallon*), and wax myrtle (*Morella californica*) as well as Oso berry (*Oemleria cerasiformis*), and twinberry (*Lonicera involucrata*).

4.2.4. California oatgrass prairie (*Danthonia californica* Herbaceous Alliance G4S3 potential ESHA)

Directly west of the slough sedge sward is a small patch of California Oatgrass prairie dominated by California Oatgrass (*Danthonia californica*). Other plants present here include rattlesnake grass (*Briza maxima*), cleavers (*Galium aparine*), rough cat's ear (*Hypochaeris radicata*), wild geranium (*Geranium dissectum*) and colonial bentgrass (*Agrostis capillaris*). This community was assessed and documented with a relevé data sheet that is presented after the wetland data sheets in **Appendix D**.

4.2.5. Purple needle grass grassland (*Stipa pulchra* Herbaceous Alliance G4S3? presumed ESHA)

On both sides of the driveway in the northernmost portion of the parcel are two patches of purple needle grass (*Stipa pulchra*). Other plants found in this community include common velvet grass (*Holcus lanatus*), sweet vernal grass (*Anthoxanthum odoratum*), shamrock (*Trifolium dubium*), rattlesnake grass (*Briza maxima*), English plantain (*Plantago lanceolata*) and silver hairgrass (*Aira caryophyllea*). Although mapped and classified separately, the California oatgrass prairie and purple needle grass grassland could also be classified and considered as *Danthonia californica* – *Nassella pulchra* Provisional Association which has a ranking estimated by the CDFW as G3?S3?.

Either way, this area was treated as a presumed ESHA for the purpose of designing the project and this report.

4.2.6. Common velvet grass – sweet vernal grass meadows (*Holcus lanatus* – *Anthoxanthum odoratum* Herbaceous Semi-Natural Alliance)

A large proportion of the parcel is vegetated with non-native common velvet grass – sweet vernal grass meadow. The dominant species here were common velvet grass (*Holcus lanatus*) and sweet vernal grass (*Anthoxanthum odoratum)*. Other plants observed in this community include English daisy (*Bellis perennis*), English plantain (*Plantago lanceolata*), burclover (*Medicago arabica*), clustered clover (*Trifolium glomeratum*), Harlequin lotus (*Hosackia gracilis*), long-beaked filaree (*Erodium botrys*), hedge nettle (*Stachys ajugoides*), rough cat's ear (*Hypochaeris radicata*), purple awned wallaby grass (*Rytidosperma penicillatum*) and narrow leaved flax (*Linum bienne*). Areas mapped as this community did not have ≥10% cover of native grassland species.

4.2.7. Coastal dune willow thicket (*Salix hookeriana* Shrubland Alliance G4S3 presumed ESHA)

Along the southern portion of the parcel bordering the Ten-Mile River is a riparian plant community characterized by coastal willow (*Salix hookeriana*). Other plants growing in the shrubby riparian area included coyote brush, coast silk tassel, common velvet grass and sweet vernal grass.

To the west of the driveway and within the non-native grassland plant community is a small patch of coastal dune willow. In addition to coastal willow (*Salix hookeriana*) other plants found here include cleavers, common velvet grass and sweet vernal grass.

4.3. Wetland Delineation – (Coastal Act Wetland) presumed ESHA

A routine level study of hydrology, soils, and vegetation indicators was conducted within the study area. The results were recorded from sampling points on data sheets (**Appendix D**) from the Regional Supplement to the Army Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0). Locations of sampling points are depicted on the Wetland Delineation Map (**Figure 7**). The wetland hydrology, hydric soils, and hydrophytic vegetation indicators used to make wetland determinations are summarized below. Sampling points are marked in the field with 24-inch wooden stakes with colored flagging and labeled with permanent marker. A 30-foot plot size was studied for trees present, a 20-foot radius for shrubs present, a 10-foot radius for herbs present, and a 10-foot radius for vines present. Sample Point SP01, SP03, SP04 and SP06 were determined by the surveyors to be upland as no hydric soil, hydrology or hydrophytic vegetation were observed. Sample Point SP02 and SP05 were determined to be within a Coastal Act Wetland. None of the sample points were determined to occur within an ACOE three-parameter defined wetland. Two additional areas of presumed wetland are mapped and buffered, the first is off the subject parcel to the north and the second is habitat along the Ten Mile River.

4.3.1. Sampling Point SP01 - Upland

This sample point was 8 feet southwest of a power pole and around 25ft from an area of willow. The area was recently mowed. Dominant plant species at this sample point were purple awned wallaby grass (*Rytidosperma penicillatum* UPL), sweet vernal grass (*Anthoxanthum odoratum* FACU) and California blackberry (*Rubus ursinus* FACU). The hydrophytic vegetation parameter was not met. No wetland hydrology indicators and no hydric soil indicators were observed within the pit dug to 19-inches deep. As no wetland parameters were met, Sample Point SP01 was determined to be upland.

4.3.2. Sampling Point SP02 – Coastal Act Wetland - Presumed ESHA

This sample point was examined near the edge of a willow patch, about 30ft from the driveway. The surveyors took vegetation data and dug a soil pit just outside the willow patch because of the presence of poison oak and thick coverage of willow that would have made digging difficult. Dominant vegetation documented in the are examined, which include vegetation both outside and

inside the willow patch included coastal willow (*Salix hookeriana* FACW), common velvet grass (*Holcus lanatus* FAC), sweet vernal grass (*Anthoxanthum odoratum* FACU), and California blackberry (*Rubus ursinus* FACU). This does not meet the hydrophytic vegetation Dominance test. However, the surveyor stated that willow was "very dominant on half the plot". This meets the Rapid Test for Hydrophytic Vegetation because all dominant plants in that half of the plot were ranked FACW. A soil pit was dug to 18" and no hydric soil or wetland hydrology indicators were observed. Since one of the three wetland parameters (hydrophytic vegetation) was present, SP02 was determined by the surveyors to occur within a Coastal Act wetland.

4.3.3. Sampling Point SP03 – Upland

Dominant vegetation species were (*Baccharis pilularis* UPL), cleavers (*Galium aparine* FACU), Pacific aster (*Symphyotrichum chilense* FAC), slough sedge (*Carex obnupta* OBL), common velvet grass (*Holcus lanatus* FAC) and California blackberry (*Rubus ursinus* FACU). The hydrophytic vegetation parameter was not met at this sampling point. A soil pit was dug to 20" and no hydric soil indicators or wetland hydrology indicators were observed. As no wetland parameters were met, SP03 was determined by the surveyors to be upland.

4.3.4. Sampling Point SP04 – Upland

Dominant vegetation species were purple awned wallaby grass (*Rytidosperma penicillatum* UPL) and California blackberry (*Rubus ursinus* FACU). The hydrophytic vegetation parameter was not met. A soil pit was dug to 24" and no hydric soil indicators or wetland hydrology indicators were observed. As no wetland parameters were met, Sample Point SP04 was determined by the surveyors to be upland.

4.3.5. Sampling Point SP05 – Coastal Act Wetland – Presumed ESHA

This sample point was examined in the northeastern corner of the parcel, southeast of the existing well. Dominant vegetation species were slough sedge (*Carex obnupta* OBL), Pacific aster (*Symphyotrichum chilense* FAC), and California blackberry (*Rubus ursinus* FACU). The surveyors determined hydrophytic vegetation to be present at the sample point. A soil pit was dug to 18" and no hydric soil indicators or wetland hydrology indicators were observed. Due to the presence of hydrophytic vegetation, SP05 was determined by the surveyors to be within a Coastal Act wetland.

4.3.6. Sampling Point SP06 – Upland

This sample point was examined in an area outside the slough sedge patch sampled with SP05. Dominant vegetation species were purple awned wallaby grass (*Rytidosperma penicillatum* UPL) and California blackberry (*Rubus ursinus* FACU). No hydrophytic vegetation indicators were observed. A soil pit was dug to 20" and no hydric soil indicators or wetland hydrology indicators were observed. As no wetland parameters were met, SP04 was determined by the surveyors to be upland.

4.4. Wildlife - Potential Occurrences

The California Department of Fish and Wildlife (CDFW) California Native Diversity Database (CNDDB) BIOS, Version 5 (2016), was used to focus the search on fauna previously reported in the vicinity of the project area. No special status wildlife was observed during the field biological surveys but suitable habitat for several special status wildlife species was present. Descriptions below are for wildlife species with moderate to high potential to occur, and for State or Federally Endangered or Threatened Species with potential to occur. A complete list of special status wildlife with the potential to occur at the project site can be found in **Table 3 of Appendix C**.

4.4.1. Invertebrates

4.4.1.1. Lotis Blue butterfly (Lycaeides argyrognomon lotis) (G5TH SH)

This Federally Endangered butterfly species has not been seen since 1983, it is primarily from Mendocino County but historically recorded in northern Sonoma and possibly Marin Counties.

This species inhabits wet meadows, damp coastal prairie, and potentially bogs or poorly-drained sphagnum-willow bogs where soils are waterlogged and acidic. The presumed host plant is harlequin lotus (*Hosackia gracilis*), which was observed at one location within the study area. The area with Harlequin lotus was reported to the oversight agency, US Fish and Wildlife Service, who were consulted regarding appropriate avoidance measures and survey requirements.

Lotis Blue butterfly surveys were conducted by Wynn Coastal Planning Biologists in cooperation by entomologist, Dick Arnold, and no endangered butterflies were observed.

4.4.1.2. Behren's silverspot butterfly (*Speyeria zerene behrensii*) (G5T1 S1)

Behren's silverspot is known historically from the town of Mendocino, Mendocino County, south to the area of Salt Point State Park, Sonoma County. Now presumed to be from Manchester south to the Salt Point area. This species inhabits coastal terrace prairie with caterpillar host plant western dog violet (*Viola adunca*), and adult nectar sources such as thistles, asters, etc. No western dog violet was found in the study area and therefore no further surveys are recommended at this time.

4.4.1.3. Western Bumblebee (*Bombus occidentalis*) (G2G3 S1)

Western bumblebee (*Bombus occidentalis*) is not a Federal or State protected species but is listed as a California Natural Diversity Database S1 species, an indication that there are limited known occurrences in California. The project area is in the former historical range of this species. There were no bumblebees observed during field surveys that exhibited the markings of the western bumble bee (a conspicuous white tip on the abdomen). No further surveys are recommended at this time.

4.4.2. Fish

No aquatic habitat capable of supporting fish was observed directly within the study area but the parcel does boarder the Ten-Mile River. There is no proposed development within 100 feet of the river and mitigation measures are recommended below to prevent erosion into the river.

4.4.3. Amphibians

4.4.3.1. Northern red-legged frog (*Rana aurora aurora*) (G4T2T3 S2S3)

Northern red-legged frog (*Rana aurora*) is listed as a California Department of Fish and Wildlife Species of Special Concern. The range extends from the southwest British Colombia coast to central Mendocino County. Often found in woods adjacent to streams and stream sides with plant cover, northern red-legged frogs generally breed in permanent open water sources, including lakes, ponds, reservoirs, slow streams, marshes, bogs, and swamps. The wetlands that occurred on site did not have any open water and would therefore be unsuitable for breeding. The parcel has the potential for the presence of the frog during their overland movements between water sources. Avoidance mitigation is recommended to prevent incidental take of northern red-legged frogs moving through upland areas.

4.4.3.2. Southern Torrent Salamander (*Rhyacotriton variegatus*) (G3G4 S2S3)

This Species of Special Concern occurs primarily in cold, well-shaded permanent streams and spring seepages in redwood, Douglas fir, mixed conifer, montane riparian and montane hardwood-conifer habitats. On land, it normally occurs only within the splash zone or on moss-covered rock rubble with trickling water. The wetland areas within the study area are unlikely to be suitable habitat for this salamander, but it felt important to mention as it is found in the general area. No further studies are recommended for this species.

4.4.3.3. Red-bellied newt (*Taricha rivularis*) (G4 S2)

This Species of Special Concern inhabits primarily redwood forest, but also found within mixed

conifer, valley-foothill woodland, montane hardwood and hardwood-conifer habitats. Rapid-flowing, permanent streams are required for breeding and larval development. No suitable breeding habitat was present within the study area. This species may range up to a mile from streams and may therefore be found in upland habitat during some times of the year. Identification and avoidance training for construction workers should include a discussion of this species.

4.4.4. Birds

4.4.4.1. Nesting birds

Resident and migratory birds that are present during the nesting season may nest in the habitat present within the study area. Nesting requirements for different species of birds are highly variable. Some birds nest in burrows, others on the ground, in vegetation, brush, trees, rocky outcrops, or on man-made structures. The bird nesting season typically extends from February to August. The Migratory Bird Treaty Act protects special status and common birds and their nests while they are in the process of nesting. If construction is to occur during the breeding season (February to August), a pre-construction survey is recommended to ensure that no nesting birds will be disturbed during development (**Table 1**). No nesting surveys are recommended if activity occurs in the non-breeding season.

5. REDUCED BUFFER ANALYSIS SUMMARY

A Reduced Buffer Analysis (**Appendix H**) was conducted to assist in the determination of suitable protection for potential sensitive species and presumed sensitive habitat in the study area. Through the Reduced Buffer Analysis process, necessary mitigation and avoidance measures were created (**Section 6**) to ensure all impacts from proposed development will have a less than significant effect on sensitive resources.

6. AVOIDANCE MITIGATION MEASURES

The proposed project has been analyzed relative to its proximity to natural resources to determine its potential disturbance to sensitive species, utilizing the methods and results gathered above and the Reduced Buffer Analysis of the Mendocino County's Local Coastal Program (**Appendix H)**. As a result of those analyses, we believe that potential impacts to ESHA habitats (special status plant community, riparian, and wetland) can be minimized or avoided if the project utilizes the Avoidance Measures we recommend below.

The following avoidance measures are recommended to avoid impacts of development to Coastal Act wetlands, riparian habitat, special status plant communities and special status wildlife with potential to occur in the project area. These measures will serve to prevent negative impacts to potential resources located within 100 feet from the proposed development.

6.1. Potential Impact to Birds

Construction in the study area has the potential to disturb birds during the nesting season. Removal of vegetation and construction activity near trees and vegetated areas has the potential to disturb special status bird species.

6.1.1. Avoidance Measure: Seasonal avoidance

No nesting bird surveys are recommended if activity occurs in the **non-breeding season** (September to January). If development is to occur during the **breeding season** (February to August), a pre-construction survey is recommended within 14 days of the onset of construction to ensure that no nesting birds will be disturbed during development (**Table 1**).

6.1.2. Avoidance Measure: Nest buffer

If active special status bird nests are observed, no ground disturbance activities shall occur within

a 100-foot exclusion zone. These exclusion zones may vary depending on species, habitat and level of disturbance. The exclusion zone shall remain in place around the active nest until all young are no longer dependent upon the nest. A biologist should monitor the nest site weekly during the breeding season to ensure the buffer is sufficient to protect the nest site from potential disturbance.

6.1.3. Avoidance Measure: Construction activities only during daylight hours

Construction should occur during daylight hours to limit disturbing construction noise and minimize artificial lights.

6.2. Potential Impact to Bats

Construction in the study area has the potential to impact special status bat species. No special features such as hollow trees, abandoned buildings or other cave analogs, which could serve as roosting or hibernation refugium, are present; therefore, the potential for negative impacts to bats is minimal.

6.2.1. Avoidance Measure: Pre-construction surveys for bats

Construction will ideally occur between September 1st and October 31 after the young have matured and prior to the bat hibernation period. **If it is necessary to disturb potential bat roost sites between November 1 and August 31**, pre-construction surveys should be performed by a qualified biologist 14 days prior to the onset if development activities.

Pre-construction bat surveys involve surveying trees, rock outcrops, and buildings subject to construction for evidence of bat use (guano accumulation, or acoustic or visual detections). If evidence of bat use is found, then biologists shall conduct acoustic surveys under appropriate conditions using an acoustic detector, to determine whether a site is occupied. If bats are found, a minimum 50-foot buffer should be implemented around the roost tree.

Table 1 Months surveys are or are not needed for birds and bats.

Months During Which Pre-Construction Surveys Are Not Required For Birds & Bats

	January	February	March	April	May	June	July	August	September	October	November	December
Birds												
Bats												

	Pre-Construction Surveys Are NOT Needed
	Pre-Construction Surveys Are Needed

6.2.1. Avoidance Measure: Roost buffer

If active bat roosts are observed, no ground disturbance activities shall occur within a minimum 100-foot exclusion zone. These exclusion zones may vary depending on species, habitat and level of disturbance. The exclusion zone shall remain in place around the active roost until all young are no longer dependent upon the roost.

6.2.2. Avoidance measure: Construction activities only during daylight hours

Construction should occur during daylight hours to limit disturbing construction noise and minimize artificial lights.

6.3. Potential Impact to Special Status Amphibians

Construction activities will involve walking across areas where amphibians may be traveling. Staging of materials and removal of construction debris could also disturb special status amphibians that may

be hiding underneath these materials. To minimize impacts to amphibians, the following avoidance measures should be followed.

6.3.1. Avoidance Measure: Contractor education

Within two weeks prior to construction activities, project contractors will be trained by a qualified biologist in the identification of the frogs and salamanders that occur along the Mendocino County coast. Workers will be trained to differentiate between special status and common species and instructed on actions and communications required to be conducted in the event that special status amphibians are observed during construction.

6.3.2. Avoidance Measure: Pre-construction search

During ground disturbing activities, construction crews will begin each day with a visual search around the staging and impact area to detect the presence of amphibians.

6.3.3. Avoidance Measure: Careful debris removal

During construction and debris removal, any wood stockpiles should be moved carefully by hand in order to avoid accidental crushing or other damage to amphibians.

6.3.4. Avoidance Measure: No construction during rain event

If a rain event occurs during the ground disturbance period, all ground disturbing activities will cease for a period of 48 hours, starting after the rain stops.

Prior to resuming construction activities, trained construction crew member(s) will examine the site for the presence of special status amphibians.

If no special status amphibians are found during inspections, ground-disturbing activities may resume.

If a special status amphibian is detected, construction crews will stop all ground disturbing work and will contact the California Department of Fish and Wildlife (CDFW) or a qualified biologist. Clearance from CDFW will then be needed prior to reinitiating work. CDFW will need to be consulted and will need to be in agreement with protective measures needed for any potential special status amphibians.

6.4. Potential impact to special status slough sedge swards, coastal dune willow thicket, California oatgrass prairie, and purple needle grass Alliances and Associations

There is a potential for vegetation removal or construction within or adjacent to the slough sedge swards, coastal dune willow thicket, California oatgrass prairie, and purple needle grass plant communities to negatively impact these plant communities.

6.4.1. Avoidance Measure: 50ft buffer

A suitable buffer should be established between special status plant communities and proposed development. A reduced buffer analysis has been conducted and a buffer distance of 50ft was found to be suitable to protect the resources present. No construction or materials staging shall occur within 50ft of the special status plant communities identified and mapped as presumed ESHA. It is required that CDFW concurs that 50ft is an appropriate buffer distance.

6.5. Potential Impact to Soil and Vegetation

There is a potential for ground compaction and vegetation disturbance from materials and vehicles to occur during staging and construction.

6.5.1. Avoidance Measure: Staging area plan

Stage all building materials and construction vehicles in upland area greater than 50 feet from all ESHAs.

6.5.2. Avoidance Measure: Employ Best Management Practices (BMPs)

Standard Best Management Practices shall be employed to assure minimization of erosion resulting from construction. Ground disturbance shall be limited to the minimum necessary and disturbed soil areas shall be stabilized as soon as feasible. Areas of bare soil should be seeded with native erosion control seed mix.

6.6. Potential Impact to Wetlands and Riparian Areas

There is a potential for rain to carry sediment from construction areas into wetland or riparian habitat.

6.6.1. Avoidance Measure: Straw wattles and orange fencing

Orange construction fencing paired with straw wattles shall be installed between the the wetland and riparian buffer areas and the proposed development, separating the wetlands/riparian and their buffer zones from the construction related impact area. No materials storage, heavy equipment use or other impacts shall occur within the fenced off wetlands area. Straw wattles shall be properly installed to intercept liquids leaving the construction area. All fencing shall be maintained in a functional manner through the duration of construction and until all disturbed soil is stabilized. Fencing shall be checked and appropriate maintenance shall occur on a weekly basis and after every rain event.

7. DISCUSSION

It is the professional opinion of the biologists at Wynn Coastal Planning that the project, as proposed, will avoid all special status resources by at least 50ft, with the exception of approximately 25ft of pipe connecting one of the proposed buildings to the existing septic leach field in the least impacting location possible, and should not have a significant impact on the special status resources if avoidance mitigation measures outlined above are followed.

Three types of presumed ESHAs were identified within the study area:

Wetland ESHA – Freshwater emergent wetland habitat meeting the Coastal Act one-parameter criterion was delineated in two locations on the interior of the subject parcel. Presumed wetland off property to the north is also buffered and avoided. The Ten-Mile River is the southern boundary of the parcel and the associated estuarine wetland is present but more than 100ft from any proposed component of the project.

Riparian Habitat ESHA – Riparian vegetation occurred adjacent to the Ten-Mile River which is the southern boundary of the subject parcel.

Rare Plant Community ESHA – Five rare plant communities were observed on the property and warrant protection. **Coastal dune willow thicket** (*Salix hookeriana* Shrubland Alliance G4S3), **coastal silk tassel scrub** (Garrya elliptica Provisional Shrubland Alliance G3?S3?), **slough sedge sward** (*Carex obnupta* Herbaceous Alliance G4S3), **California oatgrass prairie (***Danthonia californica* Herbaceous Alliance), and **purple needle grass grassland** (*Stipa pulchra* Herbaceous Alliance G4S3?)**.**

Another type of potential ESHA, rare animal habitat, was considered. The presumed larval host plant for the Federally Endangered lotis blue butterfly (*Lycaeides argyrognomon lotis*), harlequin lotus (*Hosackia gracilis* CNPS 4.2), was present in one location within non-native grassland. Lotis blue butterfly presence/absence surveys were conducted and no butterflies of this species were observed. Lotis blue butterflies have not been observed since 1983. It is WCPB's professional opinion that Lotis blue butterflies do not occur within the habitat present on the subject parcel and that no incidental take of this species will occur due to the proposed project.

The project was designed to avoid all presumed ESHAs by at least 50ft. The one exception is that piping

must pass within about 30 feet of an area vegetated by willow which is therefore a one parameter Coastal Act wetland. The piping is proposed in a location that is the least impacting possible to connect the proposed ADU with the existing septic leach field. The impact from installing the buried pipe will be relatively temporary, will occur in an area where driveway already exists and is not expected to have any impact on the willow vegetation 30 feet away. Avoidance mitigation measures for each special status resource are recommended in this report and should be followed. The proposed development is not expected to have any significant negative impact on any of the special status natural resources present.

Mendocino County Coastal Zoning Code, Table 4. Section 20.496.020 ESHA – Development Criteria - BRENNAN	
(A)	***Buffer Areas.*** *A buffer area shall be established adjacent to all environmentally sensitive habitat areas. The purpose of this buffer area shall be to provide for a sufficient area to protect the environmentally sensitive habitat from degradation resulting from future developments and shall be compatible with the continuance of such habitat areas.*
	The proposed development consists of bulidng a guest cottage, accessory dwelling unit, workshop, garage, new septic tank for the ADU and guest cottage, with piping connecting to the existing septic leach field, and drilling a new production well. There are three types of presumed Environmental Sensitive Habitat Areas (ESHAs) within 100ft of the proposed development: • **Rare Plant Community Presumed ESHAs** – In the northern section of the parcel are five rare plant communities that are presumed ESHAs. **Slough sedge sward** (*Carex obnupta* Herbaceous Alliance G4S3), **California oatgrass prairie** (*Danthonia californica* Herbaceous Alliance G4S3), **coastal dune willow thicket** (*Salix hookeriana* Shrubland Alliance G4S3) and **purple needlegrass grassland** (*Nasella pulchra* Herbaceous Alliance G4S3?) and **coastal silk tassel scrub** (*Garrya elliptica* Provisional Shrubland Alliance G3?S4?. • **Coastal Act Wetland Presumed ESHA -** In the northern section of the parcel two patches of Coastal Act Wetland were delineated (both also within rare plant community ESHAs). Additional presumed wetland occurs on the parcel north of the subject parcel and along the Ten-Mile River. • **Riparian Presumed ESHAs** –and along the border with the Ten-Mile River there is a long patch of Riparian habitat dominated by coastal dune willow. This area is also a rare plant community presumed ESHA. Avoidance mitigation measures (**Section 7** of this study) address the potential impacts from proposed development of the structures and how they can be avoided so that impacts are less than significant.
(1)	***Width.*** *The width of the buffer area shall be a minimum of one hundred (100) feet, unless an applicant can demonstrate, after consultation and agreement with the California Department of Fish and Game, and County Planning staff, that one hundred (100) feet is not necessary to protect the resources of that particular habitat area from possible significant disruption caused by the proposed development. The buffer area shall be measured from the outside edge of the Environmentally Sensitive Habitat Areas and shall not be less than fifty (50) feet in width. New land division shall not be allowed which will create new parcels entirely within a buffer area. Developments permitted within a buffer area shall generally be the same as those uses permitted in the adjacent Environmentally Sensitive Habitat Area.*

Mendocino County Coastal Zoning Code, Table 4. Section 20.496.020 ESHA – Development Criteria - BRENNAN	
	Based on the analysis below, Wynn Coastal Planning & Biology recommends: • **Rare Plant Community Presumed ESHA** – 50-foot Buffer • **Wetland Presumed ESHA and Riparian Presumed ESHA** – 50-foot Buffer Buffer areas were measured based from the outside edge (dripline of trees and other vegetation) resulting from ground surveys and aerial photo interpretation. It is the professional opinion of Wynn Coastal Planning & Biology that a buffer area of 100 feet is not necessary to protect the special status resources from the proposed development and subsequent use of the property. The areas of Coastal Act wetland did not meet hydric soil or wetland hydrology parameters, only hydrophytic vegetation. Consultation with California Department of Fish and Wildlife should occur to obtain their opinion on the buffers recommended by Wynn Coastal Planning & Biology. The Department of Fish and Wildlife and County Planning Staff opinions will be needed to determine the final appropriate buffer widths between ESHA and proposed development. New land division will <u>not</u> be occurring for the proposed project.
1 (a)	***Biological Significance of Adjacent Lands.*** *Lands adjacent to a wetland, stream, or riparian habitat area vary in the degree to which they are functionally related to these habitat areas. Functional relationships may exist if species associated with such areas spend a significant portion of their life cycle on adjacent lands. The degree of significance depends upon the habitat requirements of the species in the habitat area (e.g., nesting, feeding, breeding, or resting).* *Where a significant functional relationship exists, the land supporting this relationship shall also be considered to be part of the ESHA, and the buffer zone shall be measured from the edge of these lands and be sufficiently wide to protect these functional relationships. Where no significant functional relationships exist, the buffer shall be measured from the edge of the wetland, stream, or riparian habitat that is adjacent to the proposed development.*
	The rare plant community, wetland and riparian presumed ESHAs that were observed on this parcel have the potential to host nesting birds or resting amphibians. The non-native grassland surrounding these ESHAs would not provide the same habitat or cover and thus should not be considered part of the ESHA. The buffer zone should remain to be measured from the edge of the presumed ESHAs and should be sufficiently wide to protect the potential habitat.
1(b)	***Sensitivity of Species to Disturbance.*** *The width of the buffer zone shall be based, in part, on the distance necessary to ensure that the most sensitive species of plants and animals will not be disturbed significantly by the permitted development. Such a determination shall be based on the following after consultation with the Department of Fish and Game or others with similar expertise:* *(1b-i) Nesting, feeding, breeding, resting, or other habitat requirements of both resident and migratory fish and wildlife species;* *(1b-ii) An assessment of the short-term and long-term adaptability of various species to human disturbance;* *(1b-iii) An assessment of the impact and activity levels of the proposed development on the resource.*

Mendocino County Coastal Zoning Code, Table 4. Section 20.496.020 ESHA – Development Criteria - BRENNAN	
	The Ten-Mile River, which borders the subject parcel, provides habitat to fish species including the endangered coho salmon (*Oncorhynchus kisutch*), marine mammals, shore birds and other wildlife. In addition to the 50ft buffer, the river is additionally being buffered by the riparian plant community itself, and in part the current residence and existing development. Due to the addition of these natural and cultural buffers, the width of the proposed 50' buffer is sufficient to protect the potential ESHAs on the property. Due to the proximity of the project to Highway One and residential development, any species present on or near the property will be well adapted to human disturbance at this point in time. As existing development is already present on the property (one single family residence and two small out buildings) and as the proposed project is in such close proximity to Highway One, the impact of activity levels should not have a negative impact on any ESHAs.
1(c)	***Susceptibility of Parcel to Erosion.*** *The width of the buffer zone shall be based, in part, on an assessment of the slope, soils, impervious surface coverage, runoff characteristics, and vegetative cover of the parcel and to what degree the development will change the potential for erosion. A sufficient buffer to allow for the interception of any additional material eroded as a result of the proposed development should be provided.*
	Erosion onsite will be minimal as the area where development is proposed is relatively flat. The existing single-family residence and driveway will help to buffer any erosion that may occur from the proposed project that may move towards the Ten-Mile River. In addition, the placement of straw wattles around the building envelope as recommended within the avoidance mitigation measures will help to ensure erosion levels remain low to non-existent.
1(d)	***Use of Natural Topographic Features to Locate Development.*** *Hills and bluffs adjacent to ESHA's shall be used, where feasible, to buffer habitat areas. Where otherwise permitted, development should be located on the sides of hills away from ESHA's. Similarly, bluff faces should not be developed, but shall be included in the buffer zone.*
	The areas where development is proposed is relatively flat, away from the steeper portion of the parcel. No hills or bluffs that could be used to buffer the ESHAs are present on the parcel. No bluff faces are proposed for development and the steeper portion of the parcel is included in the buffer zone.
1(e)	***Use of Existing Cultural Features to Locate Buffer Zones.*** *Cultural features (e.g., roads and dikes) shall be used, where feasible, to buffer habitat areas. Where feasible, development shall be located on the side of roads, dikes, irrigation canals, flood control channels, etc., away from the ESHA.*
	The existing driveways may have some buffering effect and the development is proposed within areas maintained as fields by mowing. The main portion of the proposed development is proposed on the side of the driveway away from a portion of existing driveway.
1(f)	***Lot Configuration and Location of Existing Development.*** *Where an existing subdivision or other development is largely built-out and the buildings are a uniform distance from a habitat area, at least that same distance shall be required as a buffer zone for any new development permitted. However, if that distance is less than one hundred (100) feet, additional mitigation measures (e.g., planting of native vegetation) shall be provided to ensure additional protection. Where development is proposed in an area that is largely undeveloped, the widest and most protective buffer zone feasible shall be required.*

Mendocino County Coastal Zoning Code, Table 4. Section 20.496.020 ESHA – Development Criteria - BRENNAN	
	The existing development on this parcel as well as on the parcel to the east both exist within 100ft of the riparian habitat and some portions of rare plant community presumed ESHA. The proposed development is farther from presumed ESHA than the existing single family residence. Avoidance mitigation measures, such as placing straw wattles between the proposed development and the ESHAs, are recommended in Section 7 of this document to ensure additional protection.
1(g)	***Type and Scale of Development Proposed.*** *The type and scale of the proposed development will, to a large degree, determine the size of the buffer zone necessary to protect the ESHA. Such evaluations shall be made on a case-by-case basis depending upon the resources involved, the degree to which adjacent lands are already developed, and the type of development already existing in the area.*
	The development of the proposed accessory structures are similar in size to those of the surrounding properties, and a 50ft buffer is sufficient to protect the resources.
(2)	***Configuration.*** *The buffer area shall be measured from the nearest outside edge of the ESHA (e.g., for a wetland from the landward edge of the wetland; for a stream from the landward edge of riparian vegetation or the top of the bluff).*
	All mapped presumed ESHAs were measured from the outside edges of the presumed ESHAs. The ESHAs were delineated by field site visits as well as referencing an aerial map and using ArcGIS to create a combined 50ft buffer surrounding all the presumed ESHAs.
(3)	***Land Division.*** *New subdivisions or boundary line adjustments shall not be allowed which will create or provide for new parcels entirely within a buffer area.*
	No new subdivisions or boundary line adjustments are proposed.
(4)	***Permitted Development.*** *Development permitted within the buffer area shall comply at a minimum with the following standards:*
4(a)	*Development shall be compatible with the continuance of the adjacent habitat area by maintaining the functional capacity, their ability to be self-sustaining and maintain natural species diversity.*
	Development within the recommended 50ft buffer area consists of approximately 25 linear feet of pipe to connect to the existing septic leach field. All other proposed development is greater than 50ft from all presumed ESHAs. The pipe will run from the septic tank of the proposed ADU to within around 30ft of a one parameter Coastal Act wetland where it will be attached to existing pipe that goes out to the existing septic leach field. The presumed ESHA meets the Coastal Act definition of wetland because of the dominance of dune willow (*Salix hookeriana*), a plant with the ACOE wetland plant ranking of FACW meaning that it occurs usually in wetlands, occasionally in non-wetlands. No wetland hydrology nor wetland soil indicators were observed in this area. Willows are a hardy plant and are not expected to be impacted by the pipe. The existing pipe runs directly adjacent to the willow patch and has had no perceivable affect on it. The development proposed is compatible with the continuance of the adjacent habitat.
4(b)	*Structures will be allowed within the buffer area only if there is no other feasible site available on the parcel.*

Mendocino County Coastal Zoning Code, Table 4. Section 20.496.020 ESHA – Development Criteria - BRENNAN	
	The proposed pipe would run from the proposed ADU to the existing septic leach field. There is no other feasible way to get the septic effluent from the ADU to the septic leach field on the opposite side of the parcel without going closer to other EHSAs present. The least impacting alternative is proposed.
4(c)	*Development shall be sited and designed to prevent impacts, which would degrade adjacent habitat areas. The determination of the best site shall include consideration of stream, access, soil type, vegetation, hydrological characteristics, elevation, topography, and distance from natural stream channels. The term "best site" shall be defined as the site having the least impact on the maintenance of the biological and physical integrity of the buffer strip or critical habitat protection area and on the maintenance of the hydrologic capacity of these areas to pass a one hundred (100) year flood without increased damage to the coastal zone natural environment or human systems.*
	The "best site" is as proposed. This is the only location that will minimize use of land within buffer areas; any other location on the property will result in increased development within buffers. No impact to the presumed ESHA is expected.
4(d)	*Development shall be compatible with the continuance of such habitat areas by maintaining their functional capacity and their ability to be self-sustaining and to maintain natural species diversity.*
	Development within the recommended 50ft buffer area consists only of approximately 25 linear feet of buried pipe. This development will be compatible with the continuance of the willows, maintaining their functional capacity and their ability to be self-sustaining and maintain natural species diversity.
4(e)	*Structures will be allowed within the buffer area only if there is no other feasible site available on the parcel. Mitigation measures, such as planting riparian vegetation, shall be required to replace the protective values of the buffer area on the parcel, at a minimum ratio of 1:1, which are lost as a result of development under this solution.*
	No other location is feasible for the pipe to connect to the existing septic leach field. The pipe is proposed in a location that is already an existing driveway. No protective values of the buffer area will be reduced. Soil disturbed by the installation of the pipe will be reseeded with a native erosion control grass mix.
4(f)	*Development shall minimize the following: impervious surfaces, removal of vegetation, amount of bare soil, noise, dust, artificial light, nutrient runoff, air pollution, and human intrusion into the wetland and minimize alteration of natural landforms.*
	The pipe is proposed to be installed in a location that is currently used as a driveway and has minimal vegetation. No additional impervious surfaces are proposed within the buffer. The project is not expected to result in significant areas of bare soil, noise, dust, artificial light, nutrient runoff, air pollution or human intrusion into sensitive areas.
4(g)	*Where riparian vegetation is lost due to development, such vegetation shall be replaced at a minimum ratio of one to one (1:1) to restore the protective values of the buffer area.*

Mendocino County Coastal Zoning Code, Table 4. Section 20.496.020 ESHA – Development Criteria - BRENNAN	
	No riparian vegetation will be removed as part of the project.
4(h)	*Above ground structures shall allow peak surface water flows from a one hundred (100) year flood to pass with no significant impediment.*
	The development is not proposed in a 100-year flood zone.
4(i)	*Hydraulic capacity, subsurface flow patterns, biological diversity, and/or biological or hydrological processes, either terrestrial or aquatic, shall be protected.*
	Hydraulic capacity, subsurface flow patterns, biological diversity, and/or biological or hydrological processes will be protected and are not expected to be impacted by the pipe that is proposed 30 feet away from the small patch of dune willows.
4(j)	*Priority for stream conveyance from a development site shall be through the natural stream environment zones, if any exist, in the development area. In the stream system design report or development plan, the capacity of natural stream environment zones to convey runoff from the completed development shall be evaluated and integrated with the stream system wherever possible. No structure shall interrupt the flow of groundwater within a buffer strip. Foundations shall be situated with the long axis of interrupted impermeable vertical surfaces oriented parallel to the groundwater flow direction. Piers may be allowed on a case-by-case basis.*
	The project will not change topography or stream patterns.
4(k)	*If findings are made that the effects of developing an ESHA buffer area may result in significant adverse impacts to the ESHA, mitigation measures will be required as a condition of project approval. Noise barriers, buffer areas in permanent open space, land dedication for erosion control, and wetland restoration, including off-site stream improvements, may be required as mitigation measures for developments adjacent to environmentally sensitive habitats. (Ord. No. 3785 (part), adopted 1991)*
	No compensatory mitigation is recommended because impacts occur only within buffer areas and not within ESHAs themselves. Avoidance and minimization measures have been provided that should allow the project to avoid causing significant adverse impacts to the ESHAs present.

GEOTECHNICAL INVESTIGATION

PROPOSED BRENNAN STUDIO, GARAGE, FAMILY CARE UNIT/ADDITION DWELLING UNIT AND GUEST COTTAGE 29020 NORTH HIGHWAY 1 FORT BRAGG, CALIFORNIA

Project Number – 12892.01

prepared for

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1.0 INTRODUCTION

This report presents the results of our geotechnical investigation that Brunsing Associates, Inc. (BAI) has performed for the planned Brennan Studio, Garage, Family Care Unit (FCU) / Additional Dwelling Unit (ADU) and Guest Cottage at 29020 Highway 1 in Fort Bragg, Mendocino County, California. The site is located on a river bluff, approximately 9 miles north of Fort Bragg. The site location is shown on the Vicinity Map, Plate 1.

The property contains an existing residence that is visible in the 1972 oblique aerial photograph that we reviewed for this study. An existing cottage, shed, pump house and water storage tank are associated with the residence.

The proposed project areas are shown on the Site Plan, dated 2/22/2019, prepared by Wynn Coastal Planning (WCP). As indicated, the plan showed a new FCU/ADU, garage and studio will be located north of the existing single family residence. The guest cottage will be located in the northwest corner of the property, northeast of the existing leach field and southwest of the replacement leach field. The WCP Site Plan is the base map used for our Site Geologic Map, Plate 2. The existing residence and nearby "boat house" were not included in this investigation.

The purpose of our investigation was to evaluate the site soil and bedrock conditions in order to provide conclusions and recommendations regarding site grading, support of concrete slabs-on-grade, structure foundation support, and a limited geologic hazard assessment. Our approach to providing the geotechnical guidelines for the design of the project utilized our knowledge of the soil, bedrock and geologic conditions in the site vicinity and experience with similar projects. Field exploration for this investigation was directed toward confirming anticipated soil, bedrock and geologic conditions, in order to provide the basis for our conclusions and recommendations. As outlined in our Professional Services Agreement, dated July 30, 2018, and Change/Extra Service Order No.1, dated April 17, 2019, our scope of services for the geotechnical investigation included subsurface exploration, laboratory testing and engineering and geologic analyses, in order to provide conclusions and recommendations regarding:

- Geologic hazards;
- Effects of sea level rise;
- Site grading and drainage;
- Suitable foundation type(s) with design criteria and estimated settlement behavior;
- Seismic design criteria per California Building Code, 2016 edition;
- Support of concrete slabs-on-grade;
- Lateral earth pressures and drainage requirements for retaining and/or subsurface walls;
- Bluff stability analysis;
- Anticipated geotechnical construction problems, if appropriate;
- The need for additional geotechnical services as appropriate.

2.0 INVESTIGATION AND LABORATORY TESTING

2.1 Published Research

As part of our investigation, we reviewed published geotechnical literature, including geologic, fault, and seismic hazard maps for the site and vicinity. A list of selected published references reviewed for this investigation is presented in Appendix A.

2.2 Aerial Photograph Studies

Vertical aerial photograph prints that we reviewed for this project are dated June 28, 1964, June 24, 1981 and April 1, 2000. Additional, vertical aerial photographs that we examined were obtained from Google Earth and the California Coastal Records Project (www.californiacoastline.org). The Google Earth photos are dated September 10, 1998, June 3, 2003, December 31, 2004, June 11, 2005, June 25, 2006, April 24, 2010, May 31, 2012, and May 28, 2014. The 1998 photo is black and white, all others are in color. The California Records Project vertical aerial photographs (color) are dated April 18, 1986 and June 13, 1993.

In addition to reviewing vertical aerial photographs, we also obtained oblique-angle aerial photographs from the California Coastal Records Project (color) dated 1972, October 5, 1979, June 1987, November 14, 2002, October 4, 2005, September 27, 2009 and September 27, 2013. We qualitatively compared the aerial photographs to look for changes in the property that may be due to erosion. The 1979 and 2013 coastline oblique aerial photographs are presented on Plate 3.

2.3 Subsurface Exploration

Our subsurface exploration was conducted on August 28, 2018. The exploration consisted of drilling, logging and sampling five exploratory test borings using a truck-mounted Mobile B-53 drill rig utilizing 7-inch diameter hollow-stem flight augers. The borings were drilled to depths of 11.5 to 18.7 feet below the ground surface (bgs). The approximate boring locations are shown on Plate 2.

Our staff engineer made a descriptive log of each boring and obtained relatively undisturbed tube samples of the soil and bedrock materials encountered for visual classification and laboratory testing. Relatively undisturbed soil and bedrock samples were obtained using a 3.0-inch (CA) and 2.5-inch (CM) outside diameter modified California split-barrel sampler and 2.0-inch outside diameter Standard Penetration Test (SPT) sampler. The inside of the sampler barrels contained liners for retaining the soil and bedrock samples. The samplers were driven by a 140-pound drop hammer falling 30 inches per blow. Blows required to drive the CA and CM samplers were converted to SPT blow counts[1] for correlation with empirical test data, using conversion factors of 0.64 for the CA and 0.79 for the CM. Blow counts are presented on the boring logs alongside the sample locations.

Logs of the test borings showing the various soil and bedrock types encountered and the depths at which samples were obtained are presented on Plates 4 through 8. The soils are classified in

[1] SPT blow counts provide a relative measure of soil consistency and strength, and are utilized in our engineering analyses.

accordance with the Unified Soil Classification System outlined on Plate 9. The various descriptive properties used to describe the soil and bedrock are listed on Plates 10 and 11, respectively.

2.4 Laboratory Testing

Soil and bedrock samples obtained during our subsurface exploration were transported to our laboratory and examined to confirm field classifications. Laboratory tests were performed on selected samples to estimate their pertinent geotechnical engineering characteristics. Laboratory testing consisted of moisture content, dry density, grain size and unconsolidated-undrained triaxial compression tests. The test results are presented opposite the samples tested on the boring logs. A key to test data is provided on Plate 9. In addition, triaxial compression test data are presented on Plates 12 and 13.

3.0 SITE CONDITIONS

The property is bordered on the north by a common driveway, east by single family residences, south and west by the Ten Mile River and northwest by a residential parcel. A private gravel driveway off the northerly common driveway leads to the southern portion of the property where the existing residence, cottage, shed and septic tank are located. The existing residence is located in the lower, southeasterly corner of the property. The residence building pad was constructed by cutting into the river bank. A small, grass lawn is in front of the residence. The lawn elevation is between 6 and 10 feet above mean sea level, according to Google Earth Maps. The proposed FCU/ADU, garage and studio are located north of the existing residence. The proposed guest cottage is located on the western portion of the property northeast of the existing leach field.

The property slopes to the southwest, at approximately ten horizontal to one vertical (10H:1V). The river bluff face is approximately 3H:1V to near vertical. Site vegetation consists of grasses and occasional brush with a cluster of cypress trees in the southeast corner of the property. Site photographs A through D, on Plates 14 through 17, show the river bluff from several vantage points. The photographs were taken at an approximate tide level of +6.5 feet, per published tide tables.

The Ten Mile River mouth is approximately 1,000 feet northwest of the property. The channel of Ten Mile River in the property vicinity, northwest of the Highway 1 bridge, is bordered by elevated bluffs on the north and sand dunes on the south. The sand dunes extend south along the coast to the vicinity of Mill Creek in the community of Cleone.

Ten mile River is subject to daily tidal fluctuations. The river mouth is occasionally blocked by sand build up, as the river flow velocity (sediment carrying capacity) drops where the relatively, fast-moving river meets the “still” ocean. We understand that blocked river-mouth flood waters have come within a few feet of the existing residence in recent years. The flood waters rapidly recede when the river breaches a new channel through the sand bar to the ocean.

When the river mouth is not blocked up by sand, the river can't rise significantly above high tide level, since the ocean (sea level) is so close. The river flow can accelerate at times however, especially when tides are going out.

No surface water was observed on site except in Ten Mile River. Groundwater was encountered in our test boring B-3 at 10.0 feet bgs. All other test borings were dry. Temporarily perched water may occur within three to five feet of the surface during (and just following) wet weather periods.

4.0 SITE GEOLOGY AND SOIL CONDITIONS

4.1 Regional Geologic and Seismic Setting

The property occupies a gently-sloping marine terrace that was formed during the Pleistocene Epoch, when periods of glaciation caused sea level fluctuations, which created a series of steps, or terraces, cut into the coastal bedrock by wave erosion. Shallow marine sediments (Pleistocene terrace deposits) were deposited on the wave-cut, bedrock platforms while they were submerged beneath the ocean during interglacial sea-level high stands. Some of these marine deposits have been locally eroded as the terraces began to emerge from the ocean due to uplift associated with the San Andreas Fault Zone during the middle and late Pleistocene. Present sea levels were achieved about 5,000 to 7,000 years ago.

The seismicity and tectonics of the Mendocino County coastal region are controlled by a network of generally northwest-trending strike-slip faults of the San Andreas Fault system. The active San Andreas Fault (north coast segment) is located offshore, approximately 9.8 miles west-southwest of the site. Future, large magnitude earthquakes originating on the San Andreas, or other nearby faults are expected to cause strong ground shaking at the site.

The near-mouth portion of Ten Mile River, northwest of the Highway 1 bridge, forms a tectonic boundary between the sand dunes to the south and the river/ocean bluffs to the north. The sand dune area is a zone of subsidence, where the land has dropped, allowing the sand to accumulate. The river/ocean bluffs on the north side of the river are within an area of uplift. The elevated river/ocean bluffs continue to the north where they are further elevated in the vicinity of Bruhel Point.

A potentially active (Pleistocene age) fault may be responsible for separating the subsidence area to the south from the elevated terrace area to the north. The fault, if present, is within the river channel (not observed on land). The published geologic maps that we reviewed for this study do not show a fault in this area.

4.2 Site Geology and Soils

Site bedrock consists of Tertiary-Cretaceous, silty sandstone of the Coastal Belt, Franciscan Complex. The Franciscan bedrock is generally massive. The sandstone encountered in our borings is light brown olive to gray, intensely to little fractured, friable to moderate hardness and deeply to moderately weathered.

A layer of unconsolidated Pleistocene marine terrace deposits mantle the bedrock at the site. The terrace deposits are approximately 7.0 to 13.0 feet in thickness. The terrace deposits were deposited in lenses that are generally flat, with local undulations caused by the variable-energy nature of the depositional environment. The terrace deposits consist of beach or shallow marine sediments that are typically comprised of light brown sands with silt, gravel and clay, along with incorporated rock fragments from the underlying bedrock platform. The upper approximately 1.5 to 2.5 feet of the terrace deposits are brown sandy silt to silty sand (topsoil) that is generally porous and weak. Below the topsoils, the terrace deposits are light brown to orange brown, loose to dense silty sand. Layers of sand with few fine (five to 12 percent) was encountered in borings B-3 from 7.5 to 14.5 feet bgs, B-4 from 8 to 10 feet, and B-5 from 6.5 to 11 feet. A layer of silty sandy gravel was encountered in boring B-1 from 2.0 to 7.0 feet bgs.

No evidence of active faulting was observed in the site vicinity. No geomorphic evidence of recent fault movement, such as scarps, offset creek channels, linear features observable on the vertical, aerial photographs, etc., was observed in the property vicinity. The published references we reviewed for this investigation do not show faults on or trending towards the site.

No evidence of landsliding was observed in the area of the planned building site vicinity or elsewhere on the property. None of the published references that we reviewed show landslides in the property vicinity. No areas of severe erosion or erosional gullies were observed on the river banks.

5.0 DISCUSSION AND CONCLUSIONS

5.1 General

Based on the results of our reconnaissance and subsurface exploration, we conclude that the site is geologically and geotechnically suitable for the proposed studio, garage, FCU/ADU and guest cottage. The main geological/geotechnical considerations affecting the proposed construction are loose and porous near-surface soils, potential settlement, strong seismic shaking from future earthquakes, river bank erosion, sea level rise and potential liquefaction. These considerations and their possible mitigation measures are discussed below.

5.2 Loose and Porous Surface Soils

The planned building areas are covered by approximately 1.5 to 2.5 feet of surface soils that contain roots and have a weak, porous consistency. These soils are susceptible to collapse and consolidation under light to moderate loads, and are not suitable for support of foundations or slab-on-grades in their current condition. Recommendations for deepening of foundations below this weak soil zone are presented in the Section 6.0 of this report. Alternatively, removing a portion of the loose topsoil and replacing it with compacted fill can mitigate the detrimental effects.

5.3 Settlement

Assuming foundations are designed and constructed in accordance with our recommendations, we estimate that the maximum post-construction settlement due to foundation loads will be less

than 1/2 inch. We judge that post-construction differential settlement will be less than 1/4 inch between adjacent foundations.

5.4 River Bluff Retreat

The river bank at the property is subject to the following erosive forces:

1. Runoff, including subsurface seepage, from the land uphill.
2. Strong river flows during storms.
3. Daily tidal fluctuations.
4. Periodic flooding when the river mouth is temporarily blocked by sand, then rapid release when the river eventually cuts a new channel through the sand bar.
5. Infrequent ocean storm waves coming through the river mouth during high tides after strong river flows have opened up the river mouth.

The river bank has been relatively resistant to the above erosive forces in historic times. The northwest portion of the river bank is mostly bare, hard rock with scattered brush and weeds (west [left] side of Site Photograph A, Plate 14.) The rest of the property river bank, Site Photographs B, C and D Plates 15, 16 and 17, respectively, are heavily vegetated with trees and brush.

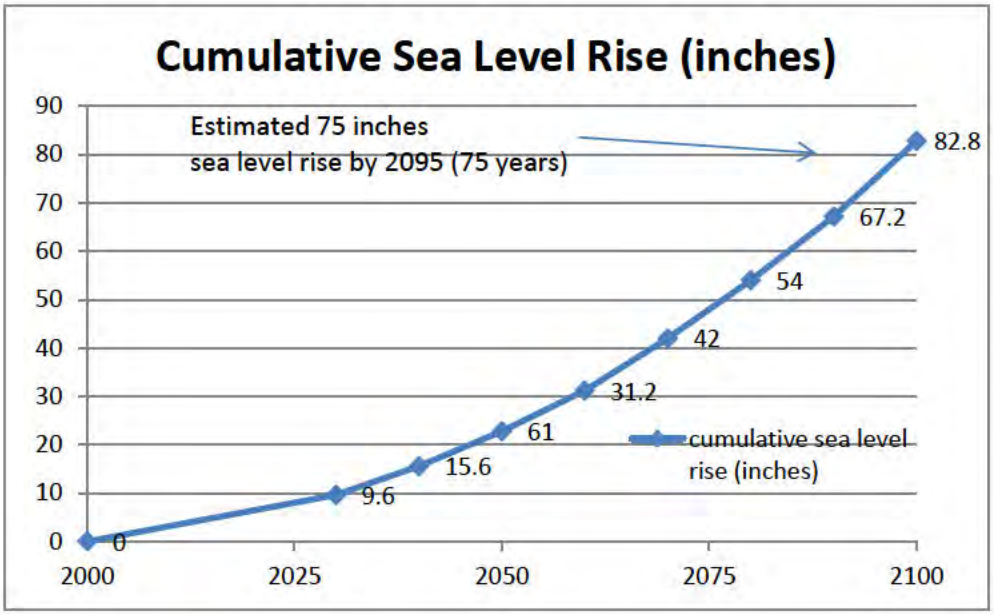
For our analysis, we also used qualitative comparisons of the 1964 through 2014 vertical aerial photographs as well as the 1972 through 2013 oblique aerial photographs. Our qualitative comparison of the vertical and oblique aerial photographs shows minor changes to the river bluff at the site. Our site reconnaissance and quantitative review of aerial photographs indicate an average bluff retreat (erosion) rate along the river bluffs of approximately one-half inch per year.

5.5 Sea Level Rise Effects on River Bluff Retreat

Rapid sea-level rise of approximately 400 - 450 feet occurred between 18,000 and 8,000 years before present, according to “Rising Seas in California”, Griggs, et al, 2017. Sea levels have remained relatively constant since that time. However, sea levels have started rising again. The California Coastal Commission (CCC) recently adopted the Science Update, dated November 7, 2018 to the 2015 Interpretive Guidelines for addressing Seal Level Rise in Local Coastal Programs and Coastal Development permits. The Science Update provides sea-level rise projections for the San Francisco coastal area, as follows in Table 1:

Table 1: Sea Level Rise Projections (Medium-High Risk Aversion)		
Time Period	Sea Level Rise (Feet)	Inches
2030	0.8	9.6
2040	1.3	15.6
2050	1.9	22.8
2060	2.6	31.2
2070	3.5	42.0
2080	4.5	54.0
2090	5.6	67.2
2100	6.9	82.8

Using the CCC's economic lifespan of a building of 75 years, we must consider the effects of sea level rise for a structure built circa 2020 through 2095. For this discussion, we will assume a linear rate of sea level rise (which may or may not be the case) in order to estimate a projected sea level rise of approximately 75 inches (6.25 feet) by 2095.



Based upon historic aerial photographs and site observations, the current average river bluff retreat rate appears to be less than one inch per year. However, the brush and tree-lined river banks will eventually be affected by the future, elevated river waters. Increased bank erosion will result from the river rise, but the bedrock materials beneath the upper soils and vegetation should limit the erosion effects. The retreat rate should increase to approximately 3.0 inches per year after 2070 as the bluff toe is continually subject to strong river activity.

Table 2: Bluff Retreat Rate				
Years	Span (years)	Cumulative Sea Level Rise (inches)	Retreat Rate (inches per year)	Amount of Retreat (inches)
2020-2030	10	10”	0.5”/yr.	5
2030-2050	20	23”	1.5”/yr.	30
2050-2070	20	42”	2.0”/yr.	40
2070-2094	24	73”	3.0”/yr.	72
				147” = 12.25’

Cumulative sea level rise is from 2020. Table 2 sums up the amount of projected retreat using estimated retreat rates over a 75-year span from a time of 2020 construction. This results in a total bluff retreat of 12.25 feet, along the river banks.

5.6 Tsunami Hazard

As typical of the Sonoma County coastal area, the site could be subject to large storm waves or tsunami waves. In February 1960, the Point Cabrillo Light House in Caspar was damaged by an approximately 60 feet high storm wave (meteorological tsunami, or “meteotsunami”). No such waves are recorded at the light house from 1909, the year it was built, to 1960. Nor have such large waves occurred since 1960. Since the property bluffs are approximately 80 to 90 feet in vertical height, impact or inundation from a severe storm surge or tsunami event is not considered a risk for the site.

Tsunamis are caused by large-scale sea floor elevation changes resulting from earthquakes on thrust faults associated with tectonic subduction zones. Major earthquakes have occurred along these Pacific Rim subduction zones in recent times; however, no significant tsunami in the Sonoma coastal zone has resulted from these earthquakes. Tsunami damage has been limited to boats and docks within the coves and harbors in Sonoma County. There are several factors that minimize the tsunami potential for Sonoma County:

- The San Andreas Fault is a strike slip fault. Earthquake fault rupture causes ground shifting relative to one side versus the other, but does not result in large, vertical uplift.
- The Mendocino Escarpment is a large, undersea ridge that extends west of Cape Mendocino. The ridge forms a partial wall that runs a few hundred miles to the west. According to Trenkwalder and Stover, the overall effect is that tsunami waves running south toward the escarpment tend to turn north “to impinge on Crescent City”.
- In the area south of the Mendocino Escarpment, the ocean is deeper than in the region north of the escarpment. This effect causes a dispersion and reduction in tsunami wave energy in the coastal waters south of Cape Mendocino.

5.7 Flooding

Review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), Panel 820 of 2100, Map Number 06045C0820G, dated July 18, 2017 indicates that the majority of the site (upper terrace level) is within Zone X. Zone X is an area of minimal flood

hazard. The planned new structures are outside the areas of potential flood hazard. The river bank area at the property is mapped within the FIRM map special flood hazard Zone A. Looking closely at that map, the flood line appears to encompass the existing residence. Zone A is an area without base flood elevation. It should be noted that the existing residence may need to be raised or re-located over the next 75 years due to sea level rise.

5.8 Soil Liquefaction and Densification

To evaluate liquefaction[2] potential, we performed laboratory testing of the soils and a liquefaction analysis. The results of our analysis indicate the potential for liquefaction at the site during a design earthquake is low to moderate. This analysis was based on procedures by Idriss and Boulanger, 2008, with 2014 update.

Where the factor of safety for liquefaction potential was 2.0 or less, we performed an analysis to estimate induced vertical settlement due to liquefaction. The results of our analysis indicate liquefaction induced settlement of zero to 0.24-inches could occur at the site.

Lateral spreading is generally caused by liquefaction of marginally stable soils underlying gently to steeply-inclined slopes. In these cases, the saturated soils move toward an unsupported face, such as an incised river channel or roadway cut. The results of our analysis indicate lateral spreading of zero to 3.5-inches could occur at the site.

Liquefaction and lateral spread analysis results are presented in Appendix B. The results of our analysis for liquefaction induced settlement and lateral spreading are shown in the following table. The soil layers of possible liquefaction are marked on the boring logs as "Zone".

Table 3: Liquefaction Induced Settlement and Lateral Spreading

Boring	Settlement (inches)	Lateral Spreading (inches)
B-1	0.0	0.0
B-2	0.0	0.0
B-3	<0.1	1.0
B-4	0.2	2.2
B-5	0.24	3.5

To mitigate the concern of liquefaction, the proposed FCU/ADU should be supported on drilled piers into competent bedrock.

5.9 Slope Stability Analysis

Our river bank bluff stability analysis was performed to correspond, as a minimum, to the guidelines by California Coastal Commission, "Establishing Development Setbacks from Coastal

[2] Liquefaction results in a loss of shear strength and potential soil volume reduction in saturated sandy, silty, silty/clayey, and also coarse gravelly soils below the groundwater table from earthquake shaking. The occurrence of this phenomenon is dependent on many factors, including the intensity and duration of ground shaking, the soil age, density, particle size distribution, and position of the groundwater table.

Bluffs", Proceedings, California and the World Ocean '02. The document recommends a factor of safety greater than or equal to 1.5 for static conditions and 1.1 for seismic conditions and a horizontal seismic coefficient of 0.15.

We also followed the guidelines prepared by (1) American Society of Civil Engineers (ASCE) and Southern California Earthquake Center (SC/EC) "Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California", dated June 2002 and (2) California Geological Survey (CGS) "Guidelines for Evaluating and Mitigating Seismic Hazards in California" dated 2008.

Cross Section A-A' and B-B', Plates 18 and 19, respectively, were created from the topographic map shown on Plate 2, our reconnaissance and data from our subsurface exploration as well as subsurface exploration on neighboring properties. The locations of the cross sections used for our stability analyses are shown on Plate 2.

From our subsurface exploration, five soil and bedrock units for each cross section, with different density and strength parameters, were identified within the bluff for our stability analyses. Unit "1" is the sandy silt to silty sand material that is soft and loose to medium dense. Unit "2" is the silty sandy gravel to silty/clayey sand that is loose to medium dense. Unit "3" is the sand with few fines that is medium dense. Unit "4" is the deeply weathered bedrock. Unit "5" is the moderately weathered bedrock. Table 4 summarizes soil and bedrock parameters used.

Table 4: Soil and Bedrock Parameters

Unit	Wet Density (pcf)	Cohesion (psf)	Friction Angle (□)
1	104	40	30
2	100	0	35
3	130	1,500	0
4	143	2,000	0
5	143	5,000	0

The above assigned strengths were determined from strength test results obtained from this site and adjacent sites, as well as from back-analysis of the slope stability calculations. The stability of the bluff slope was analyzed using the computer program SLIDE 5.0 version 5.044 by Rocscience, Inc.

The results of our stability analyses show that the river bank slope is stable for both static and seismic conditions. The results of our stability analyses are presented in Appendix C.

6.0 RECOMMENDATIONS

6.1 River Bank Setback

Based upon our site reconnaissance, our study of historical aerial photographs and our sea level rise analysis (table 2), we have estimated a projected river bluff retreat of 12.25 feet over 75 years. Using a safety factor of 2, our recommended bluff setback would be 24.5 feet, rounded up to 25 feet (see recommended setback line on Plate 2).

6.2 Site Grading

6.2.1 Clearing and Stripping

Areas to be graded should be cleared of existing vegetation, rubbish, and debris. After clearing, surface soils that contain organic matter should be stripped. In general, the depth of required stripping will be about 4 to 6 inches; deeper stripping and grubbing may be required to remove stumps and concentrations of organic matter or roots. The cleared materials should be removed from the site; however, strippings can be stockpiled for later use in landscape areas.

6.2.2 Structural Area Preparation

As used in this report, "Structural Areas" refers to the foundation envelope and the areas extending five feet beyond their perimeters, and to pavement and exterior concrete slabs areas and the areas extending three feet beyond their edges.

Within Structural Areas, existing weak soils should be removed to a depth of at least 2 foot below soil subgrade as determined in the field by BAI. Deeper excavating may be necessary to remove isolated, very weak soils.

After the recommended excavations are complete, BAI should observe the soils encountered to confirm suitable materials are exposed. The exposed soils should then be scarified to about six inches deep; moisture conditioned to at least optimum moisture content and compacted to at least 90 percent relative compaction as determined by the ASTM D 1557 test procedure, latest edition. These moisture conditioning and compaction procedures should be observed by BAI to check that the soil is properly moisture conditioned and the recommended compaction is achieved.

Prior to fill placement, within the FCU/ADU building area a geotextile stabilization fabric, such as Mirafi HP Series, or equal, should be placed over the excavation bottom in accordance with the manufacturer’s specifications. Native soils are suitable for use as compacted fill.

Fill material, on-site or imported, should be free of perishable matter and rocks greater than four inches in largest dimension, have an expansion index less than 30 and be approved by BAI before fill placement. Fill should be placed in thin lifts (six to eight inches depending on compaction equipment), moisture conditioned to near optimum moisture content, and compacted to at least 90 percent relative compaction, to achieve planned grades.

6.3 Foundation Support

6.3.1 General

As encountered in our test borings, most of the building area is underlain by approximately 1.5 to 2.5 feet of weak soils. Our test borings within the FCU/ADU building area encountered soils that have a potential for liquefaction. These soils are unsuitable for foundation support in their current state. Structure foundations and concrete slabs placed directly upon these soils could

undergo damaging differential settlement due to porous soil collapse when loaded in a saturated condition or liquefaction.

Foundations for the cottage must penetrate through these upper, weak soils using deepened spread footings or be founded within compacted fill placed in accordance with the recommendations above. Foundations for the FCU/ADU must penetrate through the liquefaction potential soils into the underlying bedrock or be founded within compaction fill placed in accordance with the recommendations above. Our recommendations are presented below.

6.3.2 Spread Footings Guest Cottage

The new guest cottage can be supported on reinforced concrete spread footings founded in compacted fill, placed in accordance with the recommendations above, or natural supporting soils. Footings can be assigned a soil bearing pressure of 2,500 pounds per square foot (psf) for dead plus live loads. A 33 percent increase in bearing pressure is allowable for total loads, including wind or seismic loads. Footing elements should be founded at least 12 and 18 inches below lowest adjacent finish grade for one and two-story structures, respectively. Cottage footings should be no less than 12 and 15 inches wide for one and two-story construction, respectively, isolated footings should be at least 18 inches wide.

Where weak and porous, loose sands are not removed, footing excavations should extend at least 12 inches into supporting soils, resulting in footing excavations that are about 24 to 36 inches deep below existing grade. If excavations exceed 18-inches, the lower portions of the deepened footing excavations can be filled with lean concrete (two sacks of cement per cubic yard) leaving sufficient space at the top of the foundation excavation for a standard, reinforced footing. The footing should be tied to the lean concrete per the structural engineer's requirements. No subsurface structures (such as subsurface walls, tanks, other foundations, or utility lines) should extend below the footings, or within a zone defined by a 45-degree angle projected downward from the outside, bottom edges of the footings. Completed foundation excavations should be observed by a representative from BAI prior to the placement of reinforcing steel or lean concrete.

6.3.3 Spread Footings FCU/ADU

The FCU/ADU can be supported on reinforced concrete footings founded in compacted fill, with at least 24 inches of compacted soil below the bottom of footings, placed in accordance with our recommendations. Footings founded in compacted fill can be designed using an allowable soil bearing pressure of 2000 psf for dead plus live loads. A 33 percent increase in bearing pressure is allowable for total loads, including wind or seismic loads. The spread footings should be designed to span a distance of at least five feet of unsupported footing due to the potential for liquefaction differential settlement.

Footing elements should be founded at least 12 inches below lowest adjacent finish grade or 18 inches for two story construction. Wall footings should be no less than 12 and 15 inches wide for one and two story construction, respectively. No subsurface structures (such as subsurface walls, tanks, other foundations, or utility lines) should extend below the footings, or within a zone defined by a 45-degree angle projected downward from the outside, bottom edges of the

footings. Completed foundation excavations should be observed by BAI prior to the placement of reinforcing steel.

6.3.4 Drilled Piers

Support for the new FCU/ADU and guest cottage can be obtained using cast-in-drilled-hole, reinforced-concrete piers interconnected with grade beams. Drilled piers should be at least 18 inches in diameter and should be embedded a minimum of four feet into supporting bedrock, as determined by BAI. The bedrock within the FCU/ADU area was encountered at approximately 10 to 16 feet bgs. The bedrock within the guest cottage area was encountered at approximately 11 to 12.5 feet bgs. The pier depths are anticipated to be approximately 14 to 20 feet bgs. Actual pier length and diameter should be determined by a structural engineer based on our recommendations.

Pier spacing should be no closer than 3 pier diameters, center to center. The drilled piers should be designed to gain support from skin friction. A skin friction value of 500 pounds per square foot (psf) of shaft area may be used in the bedrock, for dead loads plus live loads. A skin friction value of 200 pounds per square foot (psf) of shaft area may be used in the soils below the potential liquefaction zone, for dead loads plus live loads. For total downward loads due to wind or seismic forces, the pier capacity can be increased by one third. Uplift frictional capacity for piers should be limited to 2/3 of the allowable downward capacity. Both downward and uplift frictional capacity should be neglected in the upper 2.0 feet of soils in borings B-1 and B-2, and in the soil within and above the potential liquefaction zone. When final pier depths have been achieved, as determined by BAI, the bottoms of the pier holes should be cleaned of loose materials. BAI should observe the drilling and final clean out of the pier holes, prior to the placement of reinforcing steel and/or concrete.

During bidding, we recommend that proposed drillers be given a copy of this report to review. No caving was encountered in our borings, however caving could occur within the silty or clayey sand, the driller should be prepared to case pier holes where caving occurs.

If groundwater is encountered during construction, the pier holes should be dewatered prior to placement of reinforcing steel and concrete. Alternately, if more than six inches of groundwater has entered the pier hole, concrete can be tremied in to place with an adequate head to displace water or slurry. Concrete should not be placed free fall or in such a manner as to hit the sidewalls of the pier hole.

Difficult drilling conditions were encountered in our borings. The drilling contractor should be prepared to use rock-coring equipment to achieve full depth.

6.3.5 Lateral Loads

Resistance to lateral loads can be obtained using passive earth pressure against the face of the foundations. An allowable passive pressure of 250 psf per foot of depth below subgrade and frictional resistance of 0.30 times net vertical dead load, are appropriate for footing elements poured neat against supporting or approved engineered fill soils, if required. Passive pressure should be neglected within the upper 24 inches where weak soils are not removed in the areas of

boring B-1 and B-2, and in the soil within and above the potential liquefaction zone. If drilled piers are used, passive pressure can be projected over two pier diameters.

6.4 Seismic Design Criteria

The structures should be designed and/or constructed to resist the effects of strong ground shaking (on the order of Modified Mercalli Intensity IX) in accordance with current building codes. The California Building Code (CBC) 2016 edition indicates that the site classification for the property is Site Class F, due to the potential of liquefaction. For design purposes BAI is using Site Class C. Accordingly, CBC indicates that the following seismic design parameters are appropriate for the site:

Table 5: Seismic Design Parameters		
Site Class	=	C
Mapped Spectral Response Acceleration at 0.2 sec	Ss =	1.479g
Mapped Spectral Response Acceleration at 1.0 sec	S_1 =	0.600g
Modified Spectral Response Acceleration at 0.2 sec	S_{MS} =	1.479g
Modified Spectral Response Acceleration at 1.0 sec	S_{M1} =	0.780g
Design Spectral Response Acceleration at 0.2 sec	S_{DS} =	0.986g
Design Spectral Response Acceleration at 1.0 sec	S_{D1} =	0.520g
Site Coefficient	F_a =	1.0
Site Coefficient	F_v =	1.3
Seismic Design Category	=	D

6.5 Concrete Slab-on-Grade

Concrete slab-on-grade floors should be supported on properly compacted fill soils placed in accordance with our recommendations previously presented in Section 6.1 Site Grading. Interior concrete slab floors should be underlain by at least four inches of clean, free-draining crushed rock, graded in size from 3/4 inches maximum to 1/4 inches minimum, to act as a capillary moisture break. An underslab drain should be constructed as shown on the attached Plate 20. Shrinkage cracks within the subgrade soils should be closed by wetting before gravel or rock placement.

Where migration of moisture through the floor slab would be detrimental to its intended use, the installation of a vapor retarder membrane should be considered. The moisture/vapor retarder geomembrane, placed upon the gravel layer, should be at least 15 mils thick (i.e., Stego ® Wrap 15-mil Class A, Carlisle RMB 400 15-mil Class A, or equivalent), installed in accordance with the manufacturer's specifications to prevent moisture migration through the seams. With a 15-mil minimum thickness membrane, the 2 inches of wetted sand typically placed upon the membrane may be omitted. Construction of moisture/vapor retarders does not guarantee the prevention of moisture moving through the floor slab. However, this provision should substantially reduce the potential for moisture-vapor problems on the floors and/or future mold and mildew problems.

If a structural concrete slab is used (i.e., the slab is supported by and able to span between, interconnecting foundation elements without gaining support from underlying soil), then over-

excavation of the near-surface weak soil zone is not required. However, topsoils containing organics should be removed beneath the planned slab (as much as four inches to six inches in depth below existing ground surface).

6.6 Retaining Walls

Subsurface or retaining walls should be provided with permanent back drainage to prevent buildup of hydrostatic pressure. Drainage and backfill details are presented on Plate 21. In areas where movement of moisture/vapor through the wall would be detrimental to its intended use, installation of a vapor retarder membrane should be considered. Construction of vapor retarders does not guarantee the prevention of moisture moving through concrete walls. Quality, placement and compaction requirements for backfill behind subsurface walls are the same as previously presented for fill. Light compaction equipment should be used near the wall to avoid overstressing the walls. Retaining walls should be designed to resist the lateral earth pressures presented on Plate 22.

In addition to static loads, the retaining walls should also be designed to resist potential seismic loads, in accordance with CBC requirements. For seismic loads, a pressure increment equivalent to an inverted triangular distribution is recommended, varying from 18H pounds per square foot (psf) at the bottom of the wall to 0 (zero) psf at the top of the embedded portion, where "H" is the height of the embedded portion (resultant dynamic thrust act at 1/3H above the base of the wall).

6.7 Site Drainage

Because surface and/or subsurface water is often the cause of foundation or slope stability problems, care should be taken to intercept and divert concentrated surface flows and subsurface seepage away from the building foundations and the bluff edge. Roof runoff water should be directed away from the buildings and dispersed, as much as practical, across the lot. Drainage across the lot should be by sheet-flow. Surface grades should maintain a recommended five percent gradient away from building foundations.

If a raised wood floor is used, the area under the floor should be graded to drain towards an under house drain with a conduit outlet(s) through the footings/stem walls. Two-inch or four-inch PVC sleeves, or equivalent should be placed within the forms, at or slightly below ground level, prior to concrete placement.

7.0 ADDITIONAL SERVICES

Prior to construction, BAI should review the final grading and foundation plans, and geotechnical related specifications for conformance with our recommendations. During construction, BAI should provide periodic observations, together with the appropriate field and laboratory testing during site preparation, subdrain installations, and placement and compaction of fills. Foundation excavations should be reviewed by BAI while the excavation operations are being performed. Our reviews and tests would allow us to check that the work is being performed in accordance with project guidelines, confirm that the soil and bedrock conditions are as anticipated, and to modify our recommendations, if necessary.

8.0 LIMITATIONS

This geotechnical investigation and engineering geologic reconnaissance of the property were performed in accordance with the usual and current standards of the profession, as they relate to this and similar localities. No other warranty, expressed or implied, is provided as to the conclusions and professional advice presented in this report. Our conclusions are based upon reasonable geological and engineering interpretation of available data.

The samples taken and tested, and the observations made, are considered to be representative of the site; however, soil and geologic conditions may vary significantly between test borings and across the site. As in most projects, conditions revealed during construction excavation may be at variance with preliminary findings. If this occurs, the changed conditions must be evaluated by BAI, and revised recommendations be provided as required.

This report is issued with the understanding that it is the responsibility of the Owner, or his/her representative, to insure that the information and recommendations contained herein are brought to the attention of all other design professionals for the project, and incorporated into the plans, and that the Contractor and Subcontractors implement such recommendations in the field. The safety of others is the responsibility of the Contractor. The Contractor should notify the owner and BAI if he/she considers any of the recommended actions presented herein to be unsafe or otherwise impractical.

Changes in the condition of a site can occur with the passage of time, whether they are due to natural events or to human activities on this, or adjacent sites. In addition, changes in applicable or appropriate codes and standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, this report may become invalidated wholly or partially by changes outside of our control. Therefore, this report is subject to review and revision as changed conditions are identified.

The recommendations contained in this report are based on certain specific project information regarding type of construction and current building location, which have been made available to us. If conceptual changes are undertaken during final project design, we should be allowed to review them in light of this report to determine if our recommendations are still applicable.

CALIFORNIA COASTAL COMMISSION
NORTH COAST AREA
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Filed: May 24, 1990
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Staff: B. Saxon Leonard
Staff Report: June 1, 1990
Hearing Date: June 13, 1990
Commission Action:

W 13i

STAFF REPORT: REGULAR CALENDAR

APPLICATION NO.: 1-90-113

APPLICANT: WILLIAM BLINN AGENT: Andy Johnston

PROJECT LOCATION: 29004 No. Highway One, seven miles north of Fort Bragg, Mendocino County (APN 15-130-48 and 15-350-45)

PROJECT DESCRIPTION: Land division of 44± acres into three parcels of 14± acres each. The parcel is developed with three residential structures.

Lot area:	44± acres
Zoning:	Not certified
Plan designation:	Rural Residential - 10 acres, Planned Development

LOCAL APPROVALS RECEIVED: Mendocino County Minor Subdivision Approval #MS 20-89.

SUBSTANTIVE FILE DOCUMENTS: Mendocino County Land Use Plan

SUMMARY OF STAFF RECOMMENDATION:

Staff recommends approval with conditions to ensure that all environmentally sensitive habitat areas, public trust areas, and areas subject to potential prescriptive rights be withheld from development by including those areas in an open space easement.

I. STAFF RECOMMENDATION

Staff recommends that the Commission adopt the following resolution:

Approval with Conditions:

The Commission hereby grants, subject to the conditions below, a permit for the proposed development on the grounds that the development, as conditioned, will be in conformity with the provisions of Chapter 3 of the California Coastal Act of 1976, will not prejudice the ability of the local government having jurisdiction over the area to prepare a Local Coastal Program

conforming to the provisions of Chapter 3 of the Coastal Act, is located between the sea and first public road nearest the shoreline and is in conformance with the public access and public recreation policies of Chapter 3 of the Coastal Act, and will not have any significant adverse impacts on the environment within the meaning of the California Environmental Quality Act.

II. STANDARD CONDITIONS: See Attached

III. SPECIAL CONDITIONS:

1. Open Space Easement:

Prior to the issuance of the permit a document shall be executed and recorded in a form and content acceptable to the Executive Director, irrevocably offering to dedicate to a public agency or private association approved by the Executive Director an open space and conservation easement for protection of an environmentally sensitive and visually significant sand dune area. Such easement shall include all lands identified in Exhibit B. The document shall be recorded free of prior liens and any other encumbrances which the Executive Director determines may affect said interest. The offer shall run with the land in favor of the People of the State of California, binding all successors and assignees, and shall be irrevocable for a period of 21 years, such period running from the date of recording.

Alternatively, if the State purchases the lands identified for protection as shown on Exhibit B the condition shall be deemed met and the document referenced above need not be recorded.

2. Public Rights on Sand Dunes and Adjacent to Ten Mile River:

By acceptance of this permit, the applicant shall agree that the issuance of the permit and the completion of the development shall not prejudice any subsequent assertion of public rights, e.g. prescriptive rights or public trust. The applicant shall further agree that this approval by the Commission shall not be used or construed to allow anyone, prior to the settlement of any claims, to interfere with any rights of public access acquired through use which may exist on the sand dunes portion of the property.

3. Future Development:

Any future development of the property shall require an amendment to Permit 1-90-113 from the California Coastal Commission.

IV. FINDINGS AND DECLARATIONS:

1. Project Description:

The applicant proposes to divide 44± acres into three lots of 14± acres each located at the mouth of the Ten Mile River, seven miles north of Fort Bragg and immediately south of Ocean Meadows Subdivision. The property is developed with three small residences and the proposed parcels will each contain one

residence. The site is designated Rural Residential - 10 acres, Planned Development in a highly scenic area. Future development on the uplands will be restricted to the building envelopes, proposed by the applicant, as identified in Exhibit B. Any future development of the property shall require an amendment to Permit 1-90-113.

The land use plan also designates approximately one-half of the property, consisting of sand dunes, as an environmentally sensitive habitat area and 100-year floodplain. The Ten Mile River runs through the property naturally dividing it into two parts, one part consisting of sand dunes and the second part consisting of a steep blufftop vegetated with grassland and trees. Sandy beaches are on both sides of the river, accessible by the public. In fact, on file are many letters affirming extended public use. One letter relays that the southern portion of the property was once an integral part of a prominent Coast Yuki Indian village.

Parcel History:

A local group (Friends of Ten Mile River) tried for many years to obtain the property's sand dunes as an extension of MacKerricher State Park which is adjacent to the sand dunes southern boundary. For various reasons State acquisition was not realized. Recently, the public's interest in the property heightened when the applicant purchased it and applied for an LUP amendment to redesignate it commercial, allowing for a visitor serving facility. The proposal was extremely controversial and the County denied the change in late 1988.

As a result of the applicant's proposed amendment the public contacted the State Lands Commission (SLC) because there was concern that access to the Ten Mile River and the sea would be precluded at that location. The SLC staff proceeded to investigate the extent of public trust lands, assisted by the Attorney General's office (specifically, the applicant asserted ownership of the river bed and desired to keep the sand dunes area private). SLC staff, the Attorney General's Office and Coastal Commission staff also began investigating historic public use of the area to determine the extent of possible prescriptive rights.

In March, 1989 the applicant, his agent, SLC staff, a deputy attorney general, and Commission staff visited the site. The applicant stated he might be interested in a land division and to alleviate legal and environmental problems the river could be quitclaimed to the State and the State might want to purchase the sand dunes area. After many months of negotiation the State and the owner agreed the river would be quitclaimed and the sand dunes transferred to State ownership for a fee.

After the matter of riverbed title was settled the County accepted the applicant's request to divide the property into three parcels. Although the agreement between the State and the property owner has been executed, the transfer of the sand dunes will not take place until local and state approvals are granted.

2. Development:

Section 30250(a) of the Coastal Act provides:

> New residential, commercial, or industrial development, except as otherwise provided in this division, shall be located within, contiguous with, or in close proximity to, existing developed areas able to accommodate it or, where such areas are not able to accommodate it, in other areas with adequate public services and where it will not have significant adverse effects, either individually or cumulatively, on coastal resources. In addition, land divisions, other than leases for agricultural uses, outside existing developed areas shall be permitted only where 50 percent of the usable parcels in the area have been developed and the created parcels would be no smaller than the average size of surrounding parcels.

The subject property is located in the rural area of Mendocino County and is subject to section 30250's land division criteria. The parcel is located in an area that is 50% developed and meets that part of the rural land division test. The parcel also meets the average parcel size criterion, as discussed below.

A. Average Parcel Size Criterion:

Section 30250(a) of the Act requires that new parcels be no smaller than the average size of the surrounding parcels. The Commission uses two analytical approaches to determine the average parcel size. The first method is to calculate the average, or arithmetic mean, of all parcels within one-quarter mile of the subject property. The second method is to delineate a "typical" neighborhood using either topographical, man-made features such as highways, or a development pattern. This method is consistent with the approach the California Court of Appeals set forth in Billings v. California Coastal Commission, 103 Cal.App. 729 (1980). The typical neighborhood may be the same as the one-quarter mile area or it may be different.

Average Parcel Size Within One-quarter Mile:

There are 34 parcels within one-quarter mile. The parcels range in size from 204 acres to one acres. The average sized parcel is 8.7 acres. The median and the mode were also calculated for the quarter-mile are and both are one acre.

Parcel Size Within the Neighborhood:

Using Highway One as the eastern boundary, State Park land on the southern boundary and the northern edge of Ocean Meadows Subdivision extending approximately one-quarter mile to the north, the "neighborhood" average is one-plus acre, the median and the mode are one acre. It is noted that even excluding the sand dunes acreage, the proposed land division would meet the average parcel size standards of section 30250(a) of the Coastal Act.

B. Cumulative Impacts:

Section 30250(a) provides that new development be located in or near existing development where it will not have significant individual or cumulative

impacts on coastal resources. The proposed division has the potential for significant individual and cumulative impacts on coastal resources due to the environmentally sensitive nature of the lower portion of the property.

i. Environmentally Sensitive Habitat:

The sand dunes, a state-designated California Natural Area, contain a number of unique plant species such as the menzies wallflower and the Mendocino Coast paintbrush. Development of the dunes would potentially impact those species inconsistent with section 30240 of the Act which provides that environmentally sensitive habitat areas shall be protected and only uses dependent on such resources will be allowed.

The lower portion of the property is also within the 100-year floodplain and a tsunami-prone area and contains saltwater marsh, a North Oligosaline Estuary, a special biological resource of concern providing natural habitat for wildlife. Development within this area would not only endanger life and property inconsistent with section 30253 of the Act but also would be inconsistent with section 30240 because development would potentially disrupt habitat values. Further, Coastal Act section 30230 grants special protection to areas of special biological significant such as the North Oligosaline Estuary, therefore, because development may potentially impact the estuary consistency with the Act cannot be found.

ii. Archaeological Resources:

Further, there is a good possibility there are archaeological resources on-site, in the dune area. Information on file indicates part of the site was once an integral part of a prominent Coast Yuki Indian village. Development of the dune area may impact those resources inconsistent with section 30244 of the Act which seeks to protect archaeological and paleontological resources.

iii. Possible Inadequate Services:

Even if the sand dunes were not environmentally sensitive, water and septic services may be inadequate for contemplated development. The dune area is included within a critical water resource area and probably could not supply adequate water for development inconsistent with section 30250(a) of the Act. Additionally, the area probably could not support a traditional septic system due to permeable, shifting, sandy soils. Even an alternative septic system probably could not be supported because it would require underlying stable soil of denser consistency than the sandy soil this site contains. Therefore, development of the dune area would be inconsistent with section 30250(a) of the Act because adequate water and septic services would not exist. Development would also be inconsistent with section 30231 which protects coastal water quality and the biological productivity of coastal waters, wetlands and estuaries.

iv. Visual Impacts:

Section 30251 of the Act protects the scenic and visual qualities of coastal areas such as the Ten Mile River area. Section 30240(b) also protects

adjacent state park land from visually disruptive development. Travellers from all over the world visit the Ten Mile River and dunes to appreciate the scenic, natural beauty. It would be impossible to subordinate development in this area so there would be no impact to views from Highway One or adjacent state park land. Therefore, approval of the proposed land division without mitigation would be inconsistent with section 30251 and 30240(b) of the Act.

v. Public Access:

The Coastal Act seeks to provide maximum public access. Section 30211 of the Act also provides that development shall not interfere with the public's right of access to the sea where acquired through use. The Ten Mile dunes have been historically used by the public according to the many letters on file regarding this property. The property is adjacent to state park land and users cannot differentiate between public land and private land due to the lack of boundary markers. Also, an on-site visit determined there was a well-marked trail leading from Highway One to the subject sand dunes area. Development of the dunes may impact existing public access inconsistent with section 30210 and 30211 of the Coastal Act.

vi. Mitigation:

In view of the many significant individual and cumulative impacts identified above, which are inconsistent with sections 30250(a), 30240, 30244, 30251, 30253, 30230, 30231, 30210, and 30211 the proposed land division cannot be approved without mitigation. The County of Mendocino approved the land division with the following condition as mitigation for potential impacts:

> That portion of each parcel which lies south of the Ten Mile River shall be designated "not a Building Site - Open Space" on the final parcel map. Prior to receiving parcel map approval, the open space area shall be protected from future division and/or development including any activity which would negatively impact the existing resources, e.g. only passive recreational uses, by means such as contract with the County, conservation easement, open space conservation agreement or other appropriate legal mechanisms. Any such easement, agreement, contract, etc., shall be subject to review and approval by the Department of Planning and Building Services and County Counsel. The term of the agreement shall be for a minimum of 20 years or until ownership of the property is transferred to the State of California.

Purchase of the lower portion of the property by the State will remove all environmentally sensitive property and will ensure that adequate public access remains. However, should the sale fail development of the sand dunes conceivably could occur and would result in significant adverse impact to coastal resources. Therefore, in order to achieve consistency with the Coastal Act approval of the project will be conditioned to require the sand dunes portion to be protected by an open space easement with no limitations on public, passive recreational use. The open space easement shall be recorded prior to the issuance of the permit although alternatively if the State purchases the lower portion of the property the condition shall be deemed met. As conditioned, the project is consistent with the Coastal Act.

3. California Environmental Quality Act:

The California Environmental Quality Act requires projects to be mitigated to lessen the significance of environmental impacts. Numerous potential environmental impacts have been discussed above, inconsistent with the Coastal Act. The project can be mitigated by removing the environmentally sensitive sand dunes portion of the property from future development. Mitigation will occur via a recorded open space easement or by sale of the property to the State of California. As conditioned the project can be found consistent with CEQA.

7172P

ATTACHMENT A

Standard Conditions

1. Notice of Receipt and Acknowledgment. The permit is not valid and development shall not commence until a copy of the permit, signed by the permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.

2. Expiration. If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.

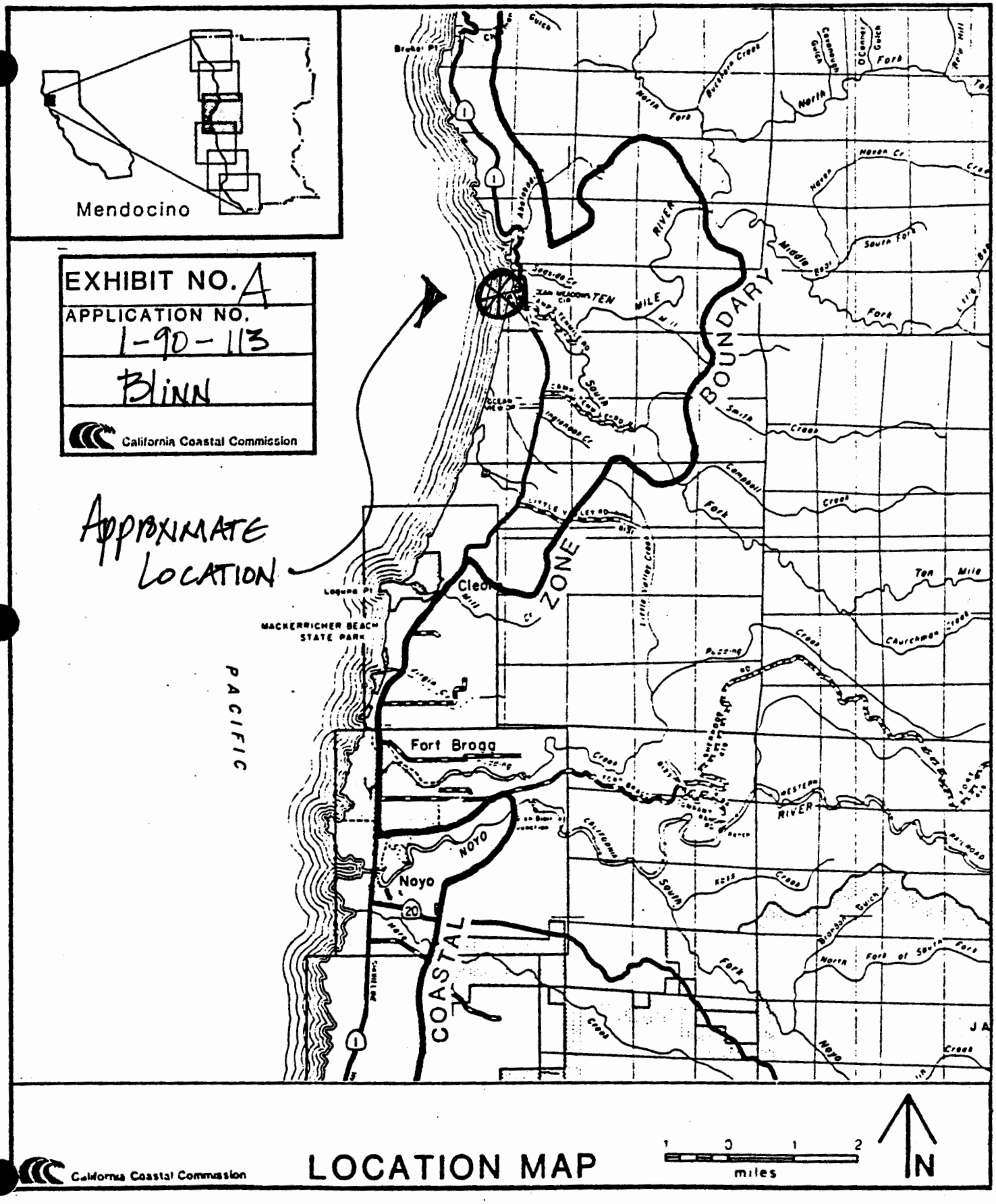
3. Compliance. All development must occur in strict compliance with the proposal as set forth in the application for permit, subject to any special conditions set forth below. Any deviation from the approved plans must be reviewed and approved by the staff and may require Commission approval.

4. Interpretation. Any questions of intent of interpretation of any condition will be resolved by the Executive Director or the Commission.

5. Inspections. The Commission staff shall be allowed to inspect the site and the development during construction, subject to 24-hour advance notice.

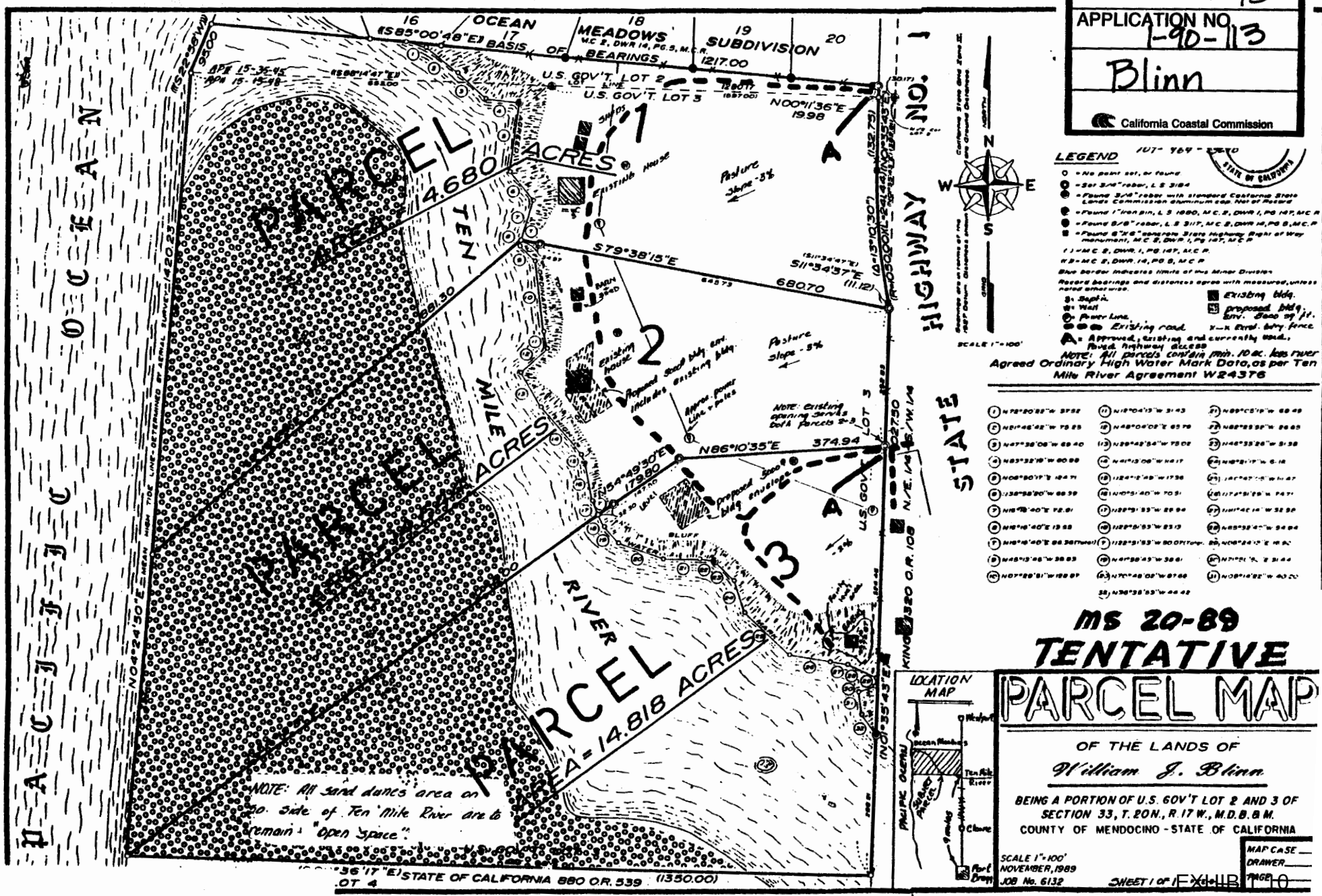
6. Assignment. The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.

7. Terms and Conditions Run with the Land. These terms and conditions shall be perpetual, and it is the intention of the Commission and the permittee to bind all future owners and possessors of the subject property to the terms and conditions.



County of Mendocino

Sheet 3 of 6



MS 20-89
TENTATIVE

= Open Space Easement

APPROVED TENT. MAP

EXHIBIT 10
1-90-113-A2 (Brennan)
Staff Report for Original Permit
(page 10 of 10)

CALIFORNIA COASTAL COMMISSION
NORTH COAST DISTRICT OFFICE
710 E STREET, SUITE 200
EUREKA, CA 95501
(707) 445-7833
www.coastal.ca.gov

AMENDMENT TO COASTAL DEVELOPMENT PERMIT

DATE: July 27, 2005

Permit No: 1-90-113-A1

issued to: Bruce F. Berry

for **Land division of approximately 44 acres into three parcels of approximately 14 acres each with designated building envelopes.**

at **29050 North Highway One, Fort Bragg (Mendocino County)**

has been amended to include the following changes:

Relocate the approved building envelope for Parcel 2 (APN No. 015-350-49) approximately 50-70 back from the bluff edge and reduce the size of the envelope by approximately 250 square feet.

This amendment was determined by the Executive Director to be immaterial, was duly noticed, and no objections were received or the Commission concurred with the Executive Director's determination of immateriality (Sec. 13166 (b)(2)).

This amendment will become effective upon return of a signed copy of this form to the North Coast District office. Please note that the original permit conditions are still in effect.

Sincerely,
PETER M. DOUGLAS
Executive Director

By: ROBERT MERRILL
District Manager

ACKNOWLEDGMENT:

I have read and understand the above amendment and agree to be bound by its conditions and the remaining conditions of Permit No: 1-90-113-A1.

Date: 8/1/05 Signature: _____

RECEIVED
AUG 0 4 2005
CALIFORNIA
COASTAL COMMISSION

EXHIBIT 11
1-90-113-A2 (Brennan)
Amendment 1-90-113-A1 Issued 7/27/05
(page 1 of 3)

CALIFORNIA COASTAL COMMISSION
NORTH COAST DISTRICT OFFICE
710 E STREET, SUITE 200
EUREKA, CA 95501
(707) 445-7833
www.coastal.ca.gov

NOTICE OF PROPOSED PERMIT AMENDMENT

TO: All Interested Parties

FROM: Peter Douglas, Executive Director

DATE: July 7, 2005

SUBJECT: **Permit No: 1-90-113-A1**
Granted to: Bruce F. Berry

Original Description:

for **Land division of approximately 44 acres into three parcels of approximately 14 acres each with designated building envelopes.**

at **29050 North Highway One, Fort Bragg (Mendocino County)**

The Executive Director of the Coastal Commission has reviewed a proposed amendment to the above referenced permit, which would result in the following changes:

Relocate the approved building envelope for Parcel 2 (APN No. 015-350-49) approximately 50-70 back from the bluff edge and reduce the size of the envelope by approximately 250 square feet.

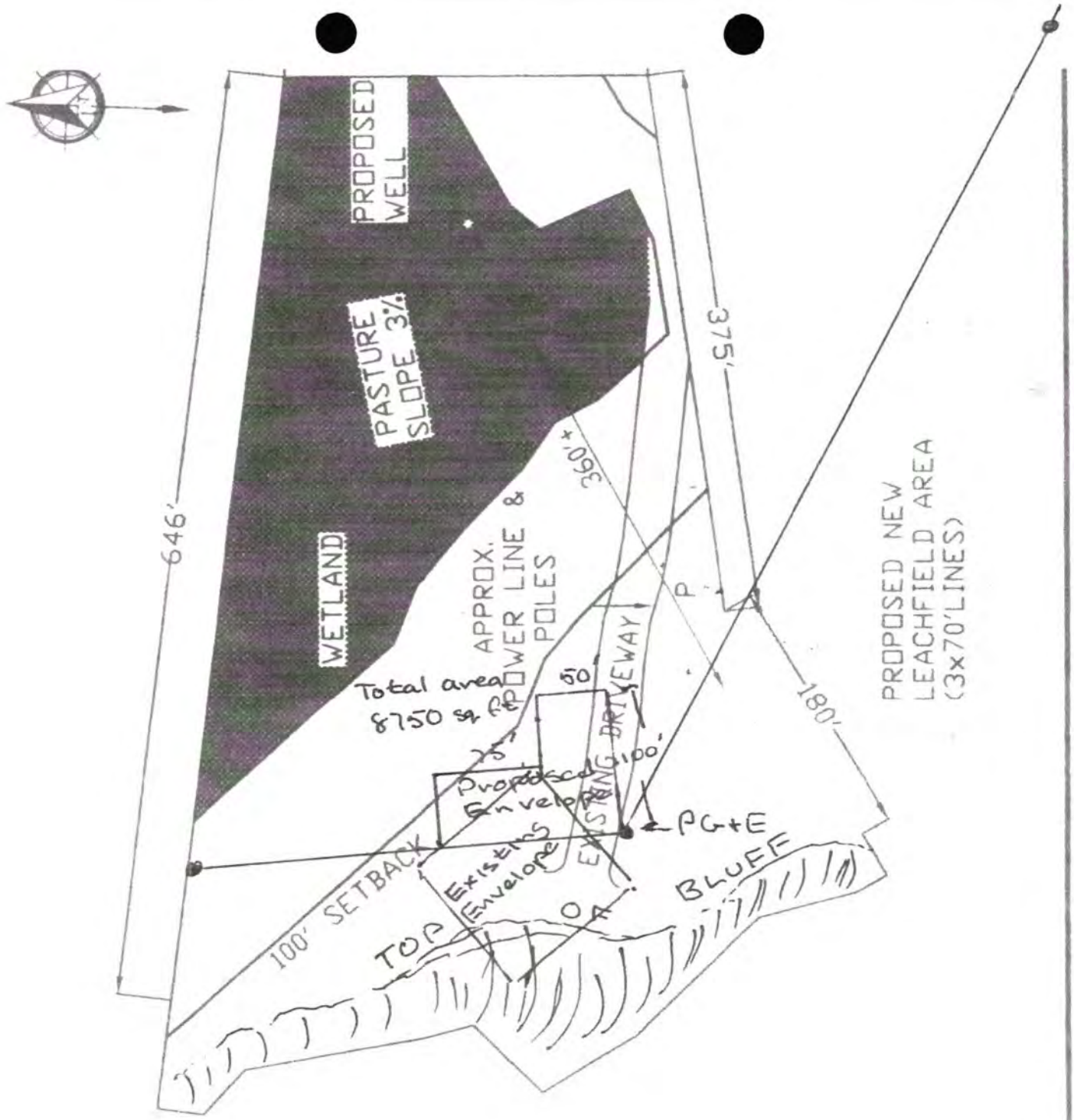
FINDINGS

Pursuant to Title 14, Section 13166(b) of the California Code of Regulations this amendment is considered to be IMMATERIAL and the permit will be amended accordingly if no written objections are received within ten working days of the date of this notice. If an objection is received, the amendment must be reported to the Commission at the next regularly scheduled meeting. This amendment has been considered IMMATERIAL for the following reason(s):

The approved building envelope was not surveyed at time of approval. A current survey determined that the approved building enveloped overhangs the bluff edge along the mouth of the Ten Mile River and is located beneath a power line, making development within the building envelope infeasible. The proposed relocated envelope would be located no closer than 50 feet from the bluff edge, would be located away from the powerline, and would maintain a 100-foot buffer from wetlands on the parcel. The proposed modification of the building envelope would accommodate future development of a single-family residence in a safer location with less impact on coastal resources and where the residence can be built consistent with the policies of the ceritifed LCP.

If you have any questions about the proposal or wish to register an objection, please contact Robert Merrill at the North Coast District office.

EXHIBIT 11
1-90-113-A2 (Brennan)
Amendment 1-90-113-A1 Issued 7/27/05



1 SITE PLAN
1"=100' SP1.1

kpff Consulting Engineers

SITE PLAN
BERRY RESIDENCE

SCALE: 1"=100'
JOB#204989

EXHIBIT 11
1-90-113-A2 (Brennan)
Amendment 1-90-113-A1 Issued 7/27/05
(page 3 of 3)