B

Type

Plans

BLD13-6289

Permit Number

18797

Street Number

HWY 1

Street Name

BBY

Community Code

103-050-003

APN

PRMD County of Sonoma

Ingenium, Inc.
Bartholow Engineering

2450 Summit Drive,
Santa Rosa, CA 95404

956 Peninsula Drive
Lake Atmanor, CA 96137

Phone (707) 578-1680
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June 30, 2013 **Job No. 13-014 Sheet 1 of 29**

Revised 2-9-14 Sheets 30 & 31 added.

Structural Calculations for the:

Hagemann Ranch Employee Residence
18401 Highway 1, Bodega California

California Building Code 2010 Edition & California Residential Code 2010 Edition

Vertical Loads		**Dead Loads**	**Live Loads**
Roof (comp roof	)	18 psf	17 psf
Roof (	)	____ psf	____ psf
Floor (	)	20 psf	40 psf
Floor (	)	____ psf	____ psf
Exterior Walls (	)	10 psf	
Interior Walls (	)	10 psf	

Wind Loads

V3S = 85 MPH — VFM = 71 MPH

Exposure "C" — Internal Pressure Coefficient: ± .18

Importance Factor: 1.0

Seismic Loads 38.3214 -123.0131

Ss = 2.155 — S1 = 1.205

SDS = 1.436 — SD1 = 1.205

Importance Factor: 1.0 — Occupancy Category: ____

Seismic Design Category: D

Basic Seismic force resisting system: bearing wall

Cs = 1.436/6.5 = .22 — R = 6.5

Soil Site Class ____ — Soils Engineer: none

Title: ____

Analysis Procedure Used: equivalent force

BUILDING PLAN CHECK
☆ APPROVED ☆
MAR 10 2014
PERMIT AND RESOURCE
MANAGEMENT DEPARTMENT

REGISTERED PROFESSIONAL ENGINEER
JOHN B. BARTHOLOW
No. 043794
Exp. 6/30/15
CIVIL
STATE OF CALIFORNIA

2-9-14

Statement of Special Inspections

CNI-033

Hagemann
Name of Owner

18797 Hwy 1. BBY
Address

BLD13-6289
Permit Number

New Ag Employee SFD
Job Description

This Statement of Special Inspections is submitted to outline the requirements of CBC Chapter 17. Included are:

- Schedule of special inspections and tests applicable to this project:
  - Special inspections, per Section 1704
  - Special inspection for seismic resistance, per Sections 1707 and 1708
  - Structural observations, per Section 1710
  - Material testing and/or load testing, per Sections 1711 through 1716
- List of the special inspectors, testing agencies, and registered design professionals that will be retained to conduct the applicable tests, observations, and testing required.
- Contractor's statement of responsibility, per Section 1709

Special inspections and testing, and structural observations, shall be performed in accordance with the approved plans and specifications, this statement, approved testing procedures, applicable listing information for fabricated items, and CBC Section 17.

The Schedule of Special Inspections summarizes the special inspections and tests required. Special inspectors shall refer to the approved plans and specifications for detailed special inspection requirements. Any additional tests or observations required by the approved plans, specifications, or required by the building official shall also be performed.

Interim reports will be submitted to the building official and the registered design professional in responsible charge, in accordance with CBC Sections 1704.1.2 and 1710.

At the conclusion of work included in the permit, a report of special inspections and structural observations shall be submitted to the building official. This final report shall document:

- Required special inspections
- Final results of structural testing
- Correction of discrepancies noted in inspections
- Written statement of structural observations, and identify any reported deficiencies which, to the best of the structural observer's knowledge, have not been resolved

This plan has been developed with the understanding that the building official shall:

- Review and approve the qualifications of special inspectors who shall perform required inspections
- Review submitted inspection reports
- Perform inspections as required by the locally adopted building codes

Prepared by:

Ann B. Bartholow
Registered Design Professional in Responsible Charge

043794
License Number

Ann B. Bartholow
Signature

2-9-14
Date

Owner's Authorization:

Owner

Signature Date

BUILDING PLAN CHECK
☆ APPROVED ☆
Building official's acceptance:
MAR 10 2014
Building official Date
PLANNING AND RESOURCE MANAGEMENT DEPARTMENT

Schedule of Inspections, Testing Agencies, and Inspectors

The following are the testing agencies, registered design professionals, and special inspectors that will be retained to conduct tests, inspections, and structural observations for this project:

Responsibility	Firm	Address, telephone, e-mail
1. Special Inspection (Except for Geotechnical)		
2. Material Testing		
3. Geotechnical Inspections	TBD	
4. Structural Observations	INGENIUM INC.	2450 SUMMIT DR SR CA 707 899 3946

Seismic Requirements (Section 1705.3.8):

Identify the designated seismic systems and seismic-force-resisting systems subject to special inspections, per CBC Sections 1705.3 through 1705.3.5. Identify additional special inspection and testing required, per CBC Sections 1707 and 1708.

Summary of Required Special Inspections, Structural Testing, and Structural Observations:

Brief description of required special inspections and structural observations for this project. Full schedule of inspections are those that are checked off on the following pages. Include additional sheets as necessary to identify frequency and extent of structural observations.

SPECIAL INSPECTION	STRUCTURAL OBSERVATION
•Geotechnical per report •Shear Walls	•Foundation, Framing, and Final Certification Points PRIOR TO CONCRETE PLACEMENT PRIOR TO CLOSE-IN -

Schedule of Special Inspections

Notations used in this table:

Column headers:

C: Full-time observation of work by an approved special inspector while the work is being performed.

P: Intermittent observation of work by an approved special inspector where the work has been performed and at the completion of work.

Box entries:

X: Is placed in the appropriate column denoting either "C" continuous or "P" periodic inspections.

--: Denotes an activity that is either a one-time activity or whose frequency is defined in some other manner.

Notes/Referenced Standards: Indicates the applicable reference standard applicable to the criteria, method and frequency of the special inspection or testing required. Additional notes may be included in this box denoting frequency of inspections or the special inspection agency responsible for the particular inspection item.

Additional details regarding inspections and tests are provided in the project specifications or notes on the drawings.

Verification and Inspection	C	P	✓ If Req'd	Notes/ Referenced Standards
1704.2 Inspection of fabricators:				
1. Fabrication and implementation procedures	--	--		
2. Fabricator approval	--	--		
1704.3 Steel construction:				
Material verification of high strength bolts, nuts, and washers:				
1. Identification markings conform to ASTM standards specified in the approved construction documents		X		AISC 360: A3.3
2. Manufacturer's certificate of compliance required	--	--		
Inspection of high strength bolting:				
1. Snug-tight bolts		X		AISC 360: M2.5 CBC 1704.3.3
2. Pretensioned and slip-critical joints using turn-of-nut with matchmarking, twist-off bolt or direct tension indicator methods of installation		X		
3. Pretensioned and slip-critical joints using turn-of-nut without matchmarking or calibrated wrench methods of installation	X			
Material verification of structural steel and cold-formed steel deck:				
1. For structural steel, identification markings to conform to AISC 360		X		AISC 360: M5.5
2. For other steel, identification markings to conform to ASTM standards specified in the approved construction documents		X		Applicable ASTM material standards
3. Manufacturer's certified test reports		X		
Material verification of weld filler materials:				
1. Identification markings to conform to AWS specification in the approved construction documents		X		AISC 360: A3.6 Applicable AWS A5 documents
2. Manufacturer's certificate of compliance required		X		
Inspection of welding:				
1. Structural steel and cold-formed steel deck:				
a) Complete and partial joint penetration groove welds	X			AWS D1.1 CBC 1704.3.1
b) Multipass fillet welds	X			
c) Single-pass fillet welds >5/16"	X			
d) Plug and slot welds	X			
e) Single-pass fillet welds ≤ 5/16"		X		

f) Floor and roof deck welds		X		AWS D1.3
2. Reinforcing steel				
a) Verification of weldability of reinforcing steel other than ASTM A706		X		AWS D1.4 ACI 318: 3.5.2
b) Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special structural walls of concrete and shear reinforcement	X			
c) Shear reinforcement	X			
d) Other reinforcing steel				
Inspection of steel frame joint details for compliance:				
1. Details such as bracing and stiffening		X		CBC 1704.3.2
2. Member locations		X		
3. Application of joint details at each connection		X		
1704.4 Concrete construction:				
Inspection of reinforcing steel, including prestressing tendons, and placement		X	X	ACI 318: 3.5, 7.1-7.7 CBC 1913.4
Inspection of reinforcing steel welding	--	--		AWS D1.4 ACI 318: 3.5.2
Inspection of bolts to be installed in concrete prior to and during placement of concrete where allowable loads have been increased or where strength design is used	X		X	ACI 318: 8.1.3, 21.2.8 CBC 1911.5, 1912.1
Inspection of anchors installed in hardened concrete		X		ACI 318: 3.8.6, 8.1.3, 21.2.8 CBC 1912.1
Verify use of required design mix		X		ACI 318: Ch.4, 5.2-5.4 CBC 1904.2.2, 1913.2, 1913.3
At the time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete	X			ASTM C 172 ASTM C 31 ACI 318: 5.6, 5.8 CBC 1913.10
Inspection of concrete and shotcrete placement for proper application techniques	X			ACI 318: 5.9, 5.10 CBC 1913.6-1913.8
Inspection of prestressed concrete:				
1. Application of prestressing forces	X			ACI318: 18.20
2. Grouting of bonded prestressing tendons in the seismic-force-resisting system	X			ACI 318:18.18.4
Erection of precast concrete members		X		ACI 318: Ch. 16
Verification of in-situ concrete strength, prior to stressing of tendons in posttensioned concrete and prior to removal of shores and forms from beams and structural slabs		X		ACI 318: 6.2
Inspect formwork for shape, location and dimensions of the concrete member being formed		X		ACI 318: 6.1.1
1704.5 Masonry construction:				
Compliance with required inspection provisions of the construction documents and the approved submittals shall be verified		X		TMS 602/ACI 530.1/ASCE 6: Art.1.5
Verification of f'_m and f'_{AAC} prior to construction except where specifically exempted by this code		X		TMS 602/ACI 530.1/ASCE 6: Art.1.4B

Verification of slump flow and VSI as delivered to the site for self-consolidating grout	X			TMS 602/ACI 530.1/ASCE 6: Art.1.5B.1.b.3
As masonry construction begins, the following shall be verified to ensure compliance:				
1. Proportions of site-prepared mortar		X		TMS 602/ACI 530.1/ASCE 6: Art.2.6A
2. Construction of mortar joints		X		TMS 602/ACI 530.1/ASCE 6: Art.3.3B
3. Location of reinforcement, connectors, prestressing tendons and anchorages		X		TMS 602/ACI 530.1/ASCE 6: Art.3.4, 3.6A
4. Prestressing technique		X		TMS 602/ACI 530.1/ASCE 6: Art.3.6B
5. Grade and size of prestressing tendons and anchorages		X		TMS 602/ACI 530.1/ASCE 6: Art.2.4B, 2.4H
During construction the inspection program shall verify:				
1. Size and location of structural elements		X		TMS 602/ACI 530.1/ASCE 6: Art.3.3F
2. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction		X		TMS 402/ACI 530.1/ASCE 5: Sec. 1.2.2(e), 1.16.1
3. Specified size, grade and type of reinforcement, anchor bolts, prestressing tendons and anchorages		X		TMS 402/ACI 530.1/ASCE 5: Sec. 1.15 TMS 602/ACI 530.1/ASCE 6: Art.2.4, 3.4
4. Welding of reinforcing bars	X			TMS 402/ACI 530.1/ASCE 5: Sec. 2.1.9.7.2, 3.3.3.4(b)
5. Preparation, construction and protection of masonry during cold weather (temp. below 40°F) or hot weather (temp. above 90°F)		X		CBC 2104.3, 2104.4 TMS 602/ACI 530.1/ASCE 6: Art.1.8C, 1.8D
6. Application and measurement of prestressing force	X			TMS 602/ACI 530.1/ASCE 6: Art.3.6B
Preparation of any required grout specimens and/or prisms shall be observed	X			CBC 2105.2.2, 2105.3 TMS 602/ACI 530.1/ASCE 6: Art.1.4
1704.7 Verification and Inspection of soils:				
Verify materials below shallow foundations are adequate to achieve the design bearing capacity		X	✓	
Verify excavations are extended to proper depth and have reached proper material		X	✓	
Perform classification and testing of compacted fill materials		X	✓	
Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill	X		✓	
Prior to placement of compacted fill, observe subgrade and verify that site has been prepared properly		X	✓	
1704.8 Verification and Inspection of driven deep foundation elements:				
Verify element materials, sizes and lengths comply with the requirements	X			
Determine capacities of test elements and conduct additional load tests, as required	X			
Observe driving operations and maintain complete and accurate records for each element	X			
Verify placement locations and plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and document any damage to foundation element	X			
For steel elements, perform additional inspections in accordance with Section 1704.3	--	--		

For concrete elements and concrete-filled elements, perform additional inspections in accordance with Section 1704.4	--	--		
For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge	--	--		
1704.9 Verification and inspection of cast-in-place deep foundation elements:				
Observe drilling operations and maintain complete and accurate records for each element	X			
Verify placement locations and plumbness, confirm element diameters, bell diameters, lengths, embedment into bedrock and adequate end-bearing strata capacity. Record concrete or grout volumes	X			
For concrete elements, perform additional inspections in accordance with Section 1704.4	--	--		
1704.10 Helical pile foundations				
Record installation equipment used, pile dimensions, tip elevations, final depth, final installation torque, and other pertinent data as required.	X			
1704.11 Vertical masonry foundation elements:				
Inspections shall be performed in accordance with Section 1704.5 for vertical masonry foundation elements	--	--		
1704.12 Sprayed fire-resistant materials:				
Special inspections shall include the following tests and observations to demonstrate compliance with the listing and fire resistance rating:				
1. Condition of substrate	--	--		
2. Thickness of application	--	--		CBC 1704.12.4.1-1704.12.4.3 ASTM E 605
3. Density in pounds per cubic foot	--	--		ASTM E 605
4. Bond strength adhesion/cohesion	--	--		CBC 1704.12.6.1-1704.12.6.3 ASTM E 736
5. Condition of finished application	--	--		
1704.13 Mastic and intumescent fire-resistant coatings:				
Special inspection for mastic and intumescent fire resistive coatings applied to structural elements and decks	--	--		AWCI 12-B
1704.14 Exterior insulation and finish systems (EIFS):				
Special inspection of the water-resistive barrier coating when installed over a sheathing substrate	--	--		ASTM E 2570
1704.15 Special cases:				
Construction materials and systems that are alternatives to materials and systems prescribed by the applicable code	--	--		
Unusual design applications of materials described in the applicable code	--	--		
Materials and systems required to be installed in accordance with additional manufacturer's instructions that prescribe requirements not contained in the applicable code or referenced standards	--	--		List code reports (attached to construction documents) for each applicable material/system
1704.16 Smoke control:				
During erection of ductwork and prior to concealment for the purpose of leakage testing and recording of device location	--	--		
Prior to occupancy and after sufficient completion for the purposes of pressure difference testing, flow measurements and detection and control verification	--	--		

1707 Special inspections for seismic resistance				
1707.2 Structural steel:				
Structural steel in structures not specifically detailed for seismic resistance, with a response modification coefficient, R, or 3 or less, excluding cantilever column systems	--	--		AISC 341
For ordinary moment frames, ultrasonic and magnetic particle testing of complete joint penetration groove welds are only required for demand critical welds	--	--		AISC 341
1707.3 Structural wood:				
Field gluing operations of elements of the seismic-force-resisting system	X			
Nailing, bolting, fastening, and other fastening of components within the seismic-force-resisting system, where the fastener spacing of the sheathing is 4 inches or less on center.		X	✓	
1707.4 Cold-formed steel light-frame construction:				
Welding operations of elements of the seismic-force-resisting system		X		
Screw attachment, bolting, anchoring and other fastening of components within the seismic-force-resisting system where the sheathing is wood structural panels or steel sheets with fastener spacing is 4 inches or less on center		X		
1707.5 Storage racks and access floors:				
Required during the anchorage of access floors and storage racks 8 feet or greater in height		X		
1707.6 Architectural components:				
Erection and fastening of exterior cladding (more than 5 psf), interior (more than 15 psf) and exterior nonbearing walls, and interior and exterior veneer (more than 30 feet in height and more than 5 psf)		X		
1707.7 Mechanical and electrical components:				
Anchorage of electrical equipment for emergency or standby power systems		X		
Installation of anchorage of other electrical equipment		X		
Installation of piping systems intended to carry flammable, combustible, or highly toxic contents and their associated mechanical units		X		
Installation of HVAC ductwork that will contain hazardous materials		X		
Installation of vibration isolation systems where the construction documents require a nominal clearance of ¼ inch or less between the equipment support frame and restraint		X		
1707.8 Designated seismic system verifications:				
Examine designated seismic systems requiring qualification and verify that the label, anchorage or mounting conforms to the certificate of compliance	--	--		CBC 1708.4 ASCE 7: 13.2.2
1707.9 Seismic isolation system:				
Fabrication and installation of isolator units and energy dissipation devices that are part of the seismic isolation system		X		ASCE 7: 17.8
1708 Structural testing for seismic resistance				
1708.2 Concrete reinforcement:				
Mill test reports provided for each shipment of reinforcement used to resist earthquake-induced flexural and axial forces in special moment frames, special structural walls, and coupling beams connecting special structural walls.	--	--		ASTM A 615 CBC 1613 ACI 318: 21.1.5.2

Chemical tests performed to determine weldability of reinforcement complying with ASTM A615	--	--		ASTM A 615 ACI 318: 3.5.2
1708.3 Structural steel:				
Testing in accordance with the quality assurance plan requirements.	--	--		AISC 341
For ordinary moment frames, ultrasonic and magnetic particle testing of welds is only required for demand critical welds	--	--		
1708.4 Seismic certification of nonstructural components:				
Certification shall be based on an actual test on a shake table, by three-dimensional shock tests, by an analytical method using dynamic characteristics and forces, by the use of experience data, or by more rigorous analysis.	--	--		ASCE 7: 13.2.1 and 13.2.2
1708.6 Seismically isolated structures				
Required testing, per Section 17.8 of ASCE 7	--	--		ASCE 7: 17.8
1710 Structural observations				
Prior to the commencement of observations, the structural observer shall submit to the building official a written statement identifying the frequency and extent of structural observations	--	--		
At the conclusion of work included in the permit, the structural observer shall submit to the building official a written statement that the site visits have been made and identify any reported deficiencies which have not been resolved	--	--	✔	
1711 Design strength of materials				
Design strengths and permissible stresses of any structural material that are identified by a manufacturer's designation as to manufacture and grade by mill tests, or otherwise confirmed to the satisfaction of the building official, shall conform to the applicable specifications	--	--		
Materials that are not specifically provided for in the applicable code shall justify design strengths and permissible stresses to the satisfaction of the building official	--	--		
1714 In-Situ load tests				
An applicable load test procedure and acceptance criteria in the standard applies	--	--		CBC Chapter 35, 1714.3.2
Standard load test procedure is not specified, existing structure is subjected to a test procedure developed by a registered design professional	--	--		CBC 1604.3, 1714.3.2
1715 Preconstruction load tests				
An applicable load test procedure and acceptance criteria in the standard applies	--	--		CBC Chapter 35, 1715.3
Standard load test procedure is not specified, existing structure is subjected to a test procedure developed by a registered design professional	--	--		CBC Chapter 35, 1715.3.1, 1604.3
Wall and partition assemblies	--	--		
Exterior window and door assemblies	--	--		

Per Section 1709, each contractor responsible for the construction of a main seismic-force resisting system, designated seismic system or a seismic-resisting component listed in the Statement of Special Inspections shall submit a written statement of responsibility to the building official and the owner prior to the commencement of work on the system or component. The contractor's statement of responsibility shall contain acknowledgement of awareness of the special requirements contained in the Statement of Special Inspections.

Each contractor responsible for the construction of the applicable system or component as specified above shall use the following lines to enter their name, signature, company, license number, date, and particular system or component that they are taking responsibility for prior to commencement of work on the indicated system or component. A copy of this page shall be presented to the building official, and it is the contractor's responsibility to also provide the owner a copy of this document.

Name

Signature

Company

License Number

Date

Main seismic-force resisting system or designated seismic system or seismic-force resisting component

Name

Signature

Company

License Number

Date

Main seismic-force resisting system or designated seismic system or seismic-force resisting component

Contractor Responsibility

PJC & Associates, Inc.
Consulting Engineers & Geologists

December 30, 2013 Job No 3595.01

Bruce Hagemann
P.O. Box 1606
Bodega Bay, CA 94923

Subject: Geotechnical Review of Project Plans
Proposed Employee Residence
18401 Highway One
Bodega, California

References: Report titled, "Soil and Foundation Investigation, Proposed Employee Residence, 18401 Highway One, Bodega, California," prepared by PJC & Associates, Inc., dated December 30, 2013.

Project Architectural Plans, Sheets 1 through 7, prepared by Mike Craigie, undated.

Project Structural Plans, Sheets S-1 and S-2, prepared by Bartholow Engineering, dated July 2013.

Dear Bruce:

PJC & Associates, Inc. (PJC) is pleased to submit this letter which presents the results of our geotechnical review of the project architectural and structural plans for proposed employee residence located at 18401 Highway One in Bodega, California. PJC previously performed a soil and foundation investigation for project and presented the results in a written report dated December 30, 2013. The purpose of our plan review was to confirm that our recommendations of our geotechnical report were incorporated into the above referenced plans.

Based on the results of our geotechnical review, the above referenced plans are in conformance with the recommendations of our geotechnical report. However we have the following comment:

A representative of PJC should observe all foundation excavations prior to reinforcing steel placement. Footing depths could extend deeper than the depths shown on the plans. The actual depths should be determined by the geotechnical engineer in the field during construction. PJC should also observe and provide recommendations for foundation subdrain installation.

We trust that this is the information you require at this time. If you have any questions concerning the content of this letter, please call.

Sincerely,

PJC & ASSOCIATES, INC.

Patrick J. Conway
Geotechnical Engineer
GE 2303, California

PJC: mh

Cc: Homeworks (renehomeworks@gmail.com)

PJC & Associates, Inc.
Consulting Engineers & Geologists

December 30, 2013 Job No. 3595.01

Bruce Hagemann
P.O. Box 1606
Bodega Bay, CA 94923

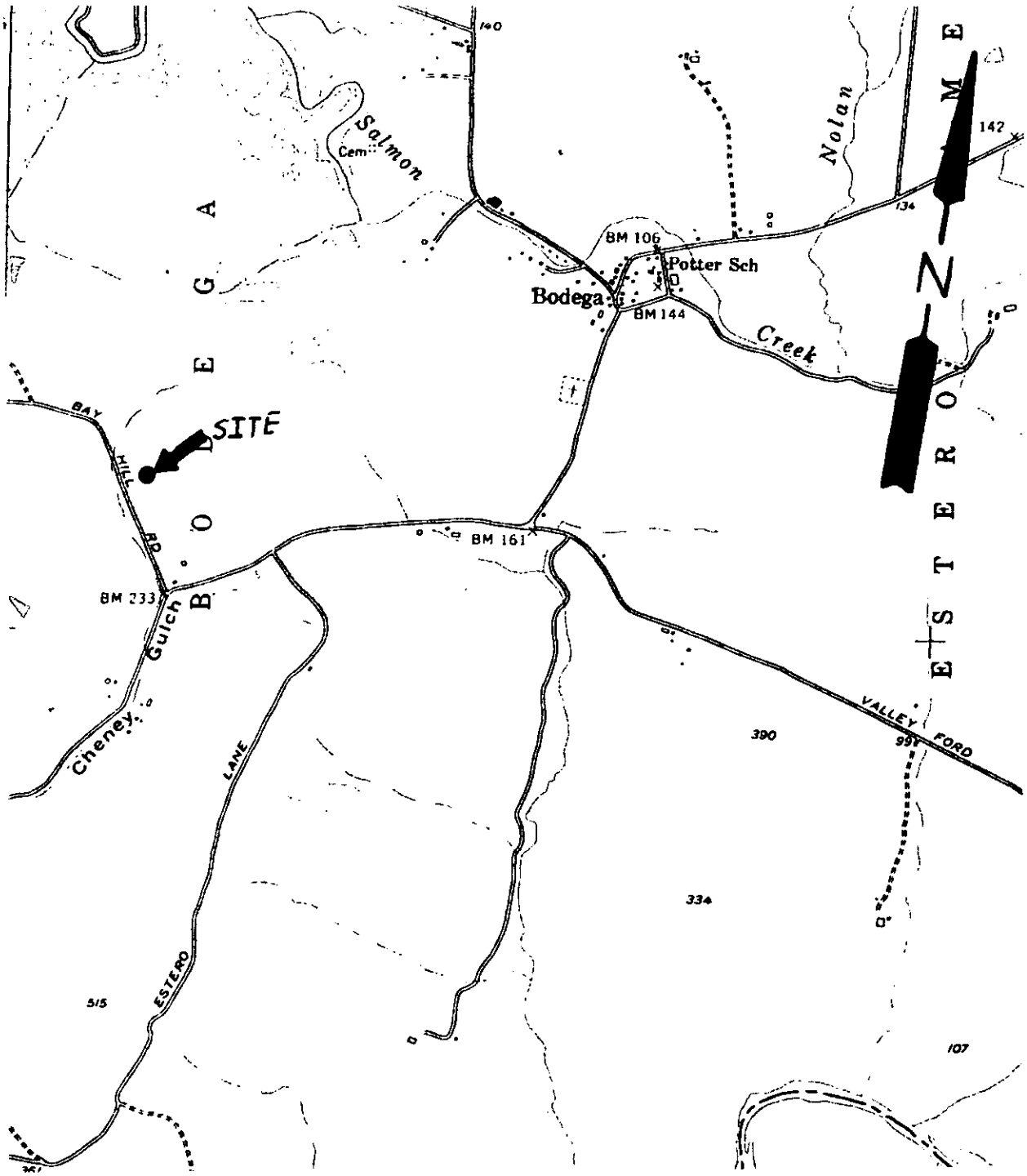
Subject: Soil & Foundation Investigation
Proposed Employee Residence
18401 Highway One
Bodega, California

Dear Bruce:

PJC and Associates, Inc., (PJC) is pleased to submit this report which presents the results of our soil and foundation investigation for the proposed employee residence located at 18401 Highway One in Bodega, California. The approximate location of the site is shown on the Site Location Map, Plate 1. The site corresponds to the latitudinal and longitudinal geographic coordinates of 38.337° north and 122.993° west, according to field GPS measurements performed at the site. Our services were completed in accordance with our agreement for geotechnical engineering services and your authorization to proceed with the work. The purpose of our investigation was to explore the subsurface conditions at the site and provide geotechnical recommendations and criteria for the design and construction of the proposed project. The opinions, recommendations and geotechnical design criteria presented in this report were based on two exploratory test pits, laboratory testing, geotechnical engineering analyses and our experience with other projects in the area. Based on the results of this study, it is our opinion that the project is feasible from a geotechnical engineering standpoint provided that the recommendations and criteria presented herein are incorporated in the design and carried out through construction.

1. PROJECT DESCRIPTION

Based on the project plans prepared by Mike Craigie, it is our understanding that the project will consist of constructing a new employee residence with an attached garage at the Hagemann Ranch, 18401 Highway One in Bodega, California. The residence will consist of a one-story, wood-frame structure with joist and girder supported raised wood-floors in the living areas, and a concrete slab-on-grade floor in the garage. The project will include an exterior covered entry porch and covered deck. The residence will be accessed by the existing driveway and serviced by underground municipal utilities, a private on-site septic sewer system, and a private on-site domestic well.



SCALE : 1:24000

Reference: USGS Valley Ford Quadrangle, Photorevised 1971

PJC & Associates, Inc. *Consulting Engineers & Geologists*	SITE LOCATION MAP Proposed Employee Residence 18401 Highway One Bodega, CALIFORNIA	PLATE 1
	Proj. No. 3595.01 Date: 12/13 App'd by: PJC	

Structural foundation loading information for the structure was not available at the time of this report. For our analysis, we anticipate that structural foundation loads will be light with dead plus live continuous wall loads less than two kips per lineal foot (plf) and dead plus live isolated column loads less than 50 kips. If these assumed loads vary significantly from the actual loads, we should be consulted to review the actual loading conditions and, if necessary, revise the recommendations of this report.

We anticipate that site grading will consist of cuts and fills of five feet and less to achieve the finish pad grades and provide adequate gradients for site drainage. We do not anticipate that engineered retaining walls will be required for the project.

2. SCOPE OF SERVICES

The purpose of this study is to provide geotechnical criteria for the design and construction of the proposed project as described above. Specifically, the scope of our services included the following:

a. Excavate two exploratory test pits to a depth of six feet below the existing ground surface to observe the soil and groundwater conditions underlying the site. Our geologist was on site to log the materials encountered in the test pits and to obtain representative samples for visual classification and laboratory testing.

b. Laboratory observation and testing of representative samples obtained during the course of our field investigation to evaluate the engineering properties of the subsurface soils at the site.

c. Review seismological and geologic literature to evaluate the presence of geologic hazards at the site.

d. Perform engineering analyses to develop geotechnical recommendations for site preparation and earthwork, foundation type(s) and design criteria, lateral earth pressures, settlement, concrete slab-on-grade recommendations, surface and subsurface drainage control, and construction considerations.

e. Preparation of this report summarizing our work on this project

3. SITE CONDITIONS

a. General. The site is located approximately 1,600 feet northwest of State Route One in an agricultural and residential area of estate single-family homes and ranch lands. The site is located on the Hagemann Ranch, which comprises several 100 acres of land. A residence, outbuildings and

trout ponds currently occupy the site. The remaining portion of the site is vacant and consists predominantly of grazing grass lands.

The building pad is located at the western portion of the site. At the time of our investigation, the site was vacant and covered with perennial grasses.

b. Topography and Drainage. The site is located in the Coastal Mountains, approximately two and one-half miles northeast of Bodega Bay. The site is located at an approximate elevation of 314 feet above mean sea level (MSL), according to USGS Valley Ford California Quadrangle. The site consists of a southwest sloping hillside with an estimated gradient of ± 10 percent. Relief across the pad is less than 10 feet.

No creeks or drainage swales were observed at or near the site. Site drainage consists of sheet flow and surface infiltration, and provided by a seasonal drainage course located approximately 350 feet southwest and downslope of the site. The course flows southwest and discharges into Bodega Bay.

c. Site Geology. On June 20, 2007, two exploratory test pits were excavated at the site to a depth of six feet to investigate the soil and groundwater conditions underlying the site and to obtain representative samples for visual classification and laboratory testing. Our geologist was on site to observe the excavations, log the materials encountered, and to obtain representative samples for visual classification and laboratory testing.

Based on published geologic literature, the site has been mapped to be underlain by sediments of the Wilson Grove Formation (Twg). The sediments are blanketed with colluvial and residual soil strata.

The exploratory pits generally encountered colluvial and residual soils that extended to the maximum depths explored. The surface of the site is blanketed with a continuous colluvial stratum consisting of a medium plastic sandy clay. This stratum appeared moist to very moist, soft to stiff, and extended to a depth of four feet below the existing ground surface.

Underlying the colluvium, the pits encountered residual strata that extended to the maximum depths explored. These strata consisted of medium plastic sandy clays that appeared very moist and stiff in consistency.

Groundwater and seepage was not encountered during our field investigation on June 20, 2007. No springs or surface seepage was observed at or near the site. The phreatic groundwater likely exists at a great depth below the site and should not impact the project. However, near surface seepage and perched groundwater zones could likely develop at the site during and following prolonged rainfall. We judge that such conditions, if they develop, would dissipate following seasonal rainfall.

4. CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our investigation, it is our professional opinion that the project is feasible from a geotechnical engineering standpoint provided the recommendations contained in this report are followed. The primary geotechnical consideration in design and construction of the project is:

a. The presence of weak and compressible surface soils.

The test pits encountered weak and compressible surface soils extending to a depth of approximately two feet below the existing ground surface. Weak and compressible soils may appear hard and strong when dry. However, they could potentially collapse under the load of foundations, engineered fill or concrete slabs when their moisture content increases and approaches saturation. The moisture content of these soils can increase as the result of rainfall, or when the natural upward migration of water vapor through the soils is impeded by fills, slabs or foundations. These soils can undergo considerable strength loss and increased compressibility, thus causing irregular and erratic ground settlement under loads. The ground movement could cause cracked foundations and slabs and distress to architectural features of the structure. The detrimental effects of such movements can be significantly reduced by excavating foundations below the weak zone and into firm soils at depth.

We judge that this could be accomplished utilizing a spread footing foundation that derives bearing support from firm soils located at least 24 inches below the existing ground surface.

Concrete slabs-on-grade will not be used in living areas, but will be used for the garage. If excavation does not extend two feet below the existing ground surface and expose firm soils, we recommend that the weak soils in garage slab areas be subexcavated and recompacted according to the earthwork section of this report.

Based on our review of geologic literature and field exploration, geologic hazards such as landslides, earthquake faults and liquefaction/densification do not exist at the site. Based on laboratory testing and our experience, the surface soils at the site are not considered highly expansive.

Detailed geotechnical engineering recommendations for use in design and construction of the project are presented in the subsequent sections of this report.

5. GRADING AND EARTHWORK

a. General. Site grading and drainage plans for the project were not available at the time of this report. Based on site topography, we anticipate that site grading will consist of cuts and fills of five feet and less to achieve the finish pad grades and provide adequate gradients for site drainage.

b. Stripping. Areas to be graded should be cleared of vegetation, roots, tree stumps and the upper few inches of soil containing organic matter. The lateral extent of the stripping should extend at least three feet beyond the outside the perimeter of building foundations. We anticipate that the depth of stripping will be on the order of about two to four inches. Deeper stripping depths may be required where weak and organic soils are encountered. The strippings should be removed off site or, if suitable, stockpiled for later use in landscape areas. If underground utilities pass through the site, they should be removed and relocated where they exist outside an imaginary plane sloped two horizontal to one vertical from the outside perimeter of the nearest footing. Existing wells or septic systems to be abandoned should be done so according to the regulations set forth by the Sonoma County Health Department. Excavation should then be performed to achieve final grade or prepare areas to receive fill. Voids left by removal of obstructions should be properly backfilled in accordance with the following sections of this report.

c. Removal of Weak Soils. Where fills are to be constructed, the weak native soils should be removed until firm native soils are exposed. The depth of the weak soils is variable and should be determined by the geotechnical engineer in the field during construction. For planning and budgetary purposes, the depth should be two feet. The actual depth should be determined by the geotechnical engineer in the field during construction. The exposed surface should be prepared and compacted according to the following sections of this report.

d. Excavation and Compaction. Where fill is required, the existing weak and compressible native soils should be subexcavated to an approximate depth of 24 inches below existing grade and replaced as properly compacted engineered fill. The actual depth of subexcavation and recompaction could vary depending on the conditions exposed and should be determined by the geotechnical engineer in the field during construction. The lateral extent of the subexcavation should extend at least five feet beyond the perimeter foundation edge. The bottom of the subexcavation should be scarified to a minimum depth of eight inches, moisture conditioned to within two percent of optimum moisture content, and compacted to at least 90 percent of the materials relative maximum dry density as determined by ASTM D-1557 test procedures. The subexcavated material free of organics and man-made debris may be reused as engineered fill. Highly plastic clays, if encountered, must not be used as compacted engineered fill. The subexcavated material should be approved by the geotechnical engineer prior to use as fill. All fill material should be placed and compacted in accordance with the recommendations presented in Table 1.

e. Fill Placement & Compaction. All weak and compressible soils underlying areas where engineered fill will be placed, and within conventional slab-on-grade areas, should be subexcavated and firm native soils exposed. A level bench at least eight feet wide extending into firm native soils should be constructed at the toe of all fills. Prior to the placement of fill material the bench should be scarified to a depth of eight inches, moisture conditioned to within two percent of the material's optimum moisture content and compacted to a minimum of 90 percent relative compaction. All fill material should be placed in uniform lifts not exceeding eight inches in their loose state and compacted by mechanical means only with acceptable compaction equipment to a minimum of 90 percent relative compaction. We do not anticipate the placement of fill on slopes greater than 20 percent. If fill is required on slopes greater than 20 percent, we should provide specific recommendations for placement. In general the on-site materials may be used as fill. Excavated material to be used for the construction of site fills should not contain organic material, have a low to non-expansive potential, should have no rock or similar irreducible material with a maximum dimension greater than four inches, and should be approved by the geotechnical engineer before use. Rocks greater than four inches can be placed in deeper sections of fill, if approved by the geotechnical engineer during grading.

All fill material should be placed and compacted in accordance with the recommendations presented in Table 1. All fills should be placed in lifts no greater than eight inches in loose thickness.

It is recommended that any import fill to be used on site be of a low to non-expansive nature and should meet the following criteria:

Plasticity Index	less than 15
Liquid Limit	less than 35
Percent Soil Passing #200 Sieve	between 15% and 40%
Maximum Aggregate Size	4 inches

TABLE 1
SUMMARY OF COMPACTION RECOMMENDATIONS

Area	Compaction Recommendations*
General Engineered Fill (Native)	In lifts, a maximum of eight inches in loose thickness, compact to at least 90 percent relative compaction at or within two percent of the optimum moisture content.
General Engineered Fill (Low to Non-Expansive Import)	In lifts, a maximum of eight inches in loose thickness, compact to at least 90 percent relative compaction at or within two percent of the optimum moisture content.
Trenches**	Compact to at least 90 percent relative compaction at or within two percent of the optimum moisture content. Moisture condition to two percent over the optimum moisture content if site soils are used.

* All compaction requirements stated in this report refer to dry density and moisture content relationships obtained through the laboratory standard described by ASTM D 1557.

** Depths below finished subgrade elevations.

A representative of PJC should observe all site preparation and fill placement. It is important that during the stripping, grading and scarification processes, a representative of our firm be present to observe whether any undesirable material is encountered in the construction area.

Generally, grading is most economically performed during the summer months when on site soils are usually dry of optimum moisture content. Delays should be anticipated in site grading performed during the rainy season or early spring due to excessive moisture in the on-site soils. Special and relatively expensive construction procedures should be anticipated if grading must be completed during the winter and early spring.

6. FOUNDATIONS: SPREAD FOOTINGS

a. Vertical Loads. We judge that the structure may be adequately supported by conventional spread footings embedded at least 12 inches into firm native soils. Footing depths up to 24 inches and greater should be anticipated. All footings should be reinforced. The recommended soil bearing pressures, depths of embedment and minimum widths of spread footings are presented in Table 2. The bearing values provided have been calculated assuming that all footings are embedded at least 12 inches into firm bearing soils.

TABLE 2
FOUNDATION DESIGN CRITERIA

Footing Type	Bearing Pressure (psf)*	Minimum Embedment (in)**	Minimum Width (in)
Continuous wall	1,500	12	12
Isolated Column	2,000	12	18

* Dead plus live load
** Into Firm Native Soils

The allowable soil bearing pressures are net values. The weight of the foundation and backfill over the foundation may be neglected when computing dead loads. Allowable soil bearing pressures may be increased by one-third for transient applications such as wind and seismic loads.

b. Lateral Loads. Resistance to lateral forces may be computed by using friction or passive pressure. A friction factor of 0.30 is considered appropriate between the bottom of the concrete structures and the firm bearing soils. A passive pressure equivalent to that exerted by a fluid weighing 300 pounds per square foot per foot of depth (psf/ft) is recommended. Unless restrained at the surface, the top six inches should be neglected for passive resistance. Footing concrete should be placed neat against undisturbed soil. Footing excavations should not be allowed to dry before placing concrete. If shrinkage cracks appear in the footing excavations, the excavations should be thoroughly moistened prior to concrete placement.

c. Settlement. Total settlement of individual foundations will vary depending on the width of the foundation and the actual load supported. Foundation settlements have been estimated based on the foundation loads and bearing values provided. Maximum settlements of shallow foundations designed and constructed in accordance with the preceding recommendations are estimated to be less than one inch. Differential settlement between similarly loaded, adjacent footings is expected to be less than one-half inch. The majority of the settlement is expected to occur during construction and placement of dead loads.

We should be retained to review the spread footing excavations, to review the actual soil bearing conditions exposed, and provide modifications in the field, if necessary.

7. NON-STRUCTURAL SLABS-ON-GRADE

It is our understanding that concrete slabs-on-grade will not be used in living areas, but will be used for the garage. Non-structural slabs-on-grade may be used if they are supported on firm native soils or compacted engineered fill. The slab subgrade should be moisture conditioned and rolled to produce a firm and unyielding surface and not allowed to dry.

Slabs-on-grade should be at least four inches thick and underlain by a four inch layer of compacted clean gravel or crushed rock. The rock should be graded so that 100 percent passes the one inch sieve and no more than five percent passes the No. 4 sieve. The rock will serve as a capillary break; however moisture may accumulate in the base coarse. Therefore, a plastic vapor barrier of at least 10 mil thickness should be provided over the rock where moisture protection is desired. To control cracking, the slabs should be reinforced, be provided with control joints at regular intervals, and cast and maintained separate from adjacent footings.

8. SEISMIC DESIGN

Based on criteria presented in the 2010 edition of the California Building Code (CBC) and ASCE (American Society of Civil Engineers) STANDARD ASCE/SEI 7-05, the following minimum criteria should be used in seismic design:

a.	Site Class	C
b.	Mapped Acceleration Parameters:	Ss = 1.916 S1 = 1.003
c.	Site Coefficients:	Fa = 1.0 Fv = 1.3

9. DRAINAGE

All final grades should be provided with positive gradients away from foundations to provide rapid removal of surface water runoff to an adequate discharge point. No ponding of water should be allowed on the building pad, adjacent to foundations, or above or below slopes.

The use of continuous roof gutters is recommended to reduce the possibility of soil saturation adjacent to the building. Downspouts from gutters should be discharged onto erosion resistant areas.

We recommend that foundation subdrains be placed adjacent to all foundations except the downhill foundation, in order to reduce the risk of crawl space groundwater intrusion. The foundation subdrains should extend at least 12 inches below the interior crawl space grade. The bottom of the trench should be sloped to drain by gravity and lined with a few inches of three quarter to one and a half inch drain rock. Four-inch diameter perforated pipe should be placed on top of the drain rock with holes oriented down and sloped to drain by gravity. The trench should then be backfilled to within six inches of finished surface with drain rock. The upper few inches should consist of compacted soil to reduce surface water inclusion. We recommend that a drainage filter cloth such as Mirafi 140N be placed between the soil and the drain rock.

10. LIMITATIONS

The data, information, interpretations and recommendations contained in this report are presented solely as basis and guides to the geotechnical design of the proposed employee residence located at 18401 Highway One in Bodega Bay, California. The conclusions and professional opinions presented herein were developed by PJC in accordance with generally accepted geotechnical engineering principles and practices. No warranty, either expressed or implied, is intended.

This report has not been prepared for use by parties other than the designers of the project. It may not contain sufficient information for the purposes of other parties or other uses. If any changes are made in the project described in this report, the conclusions and recommendations contained herein should not be considered valid, unless the changes are reviewed by PJC, and the conclusions and recommendations are modified or approved in writing. This report is for design purposes only. They are not intended to act, by themselves, as construction drawings or specifications.

Soil and bedrock deposits may vary in type, strength, and many other important properties between the points of observation and exploration. Additionally, changes can occur in groundwater and soil moisture conditions due to seasonal variations, or for other reasons. Therefore, it must be recognized that we do not and cannot have complete knowledge of the subsurface conditions underlying the subject site. The criteria presented are based upon the findings at the points of exploration and upon interpretative data, including interpolation and extrapolation of information obtained at points of observation.

11. ADDITIONAL SERVICES

Upon completion of the project plans, they should be reviewed by our firm to determine that the design is consistent with the recommendations of this report. Observation and testing services should also be provided by PJC to verify that the intent of the plans and specifications is carried out during construction; these services should include observing the foundation excavations, drainage provisions and density testing of fills, if necessary.

These services will be performed only if PJC is provided with sufficient notice to perform the work. PJC does not accept responsibility for items that they are not notified to observe.

It has been a pleasure working with you on this project. Please call us if you have any questions regarding the results of this investigation, or if we can be of further assistance.

Sincerely,

PJC & ASSOCIATES, INC.

Patrick J. Conway
Geotechnical Engineer
GE 2303, California

PJC:mh

cc: Homeworks (renehomeworks@gmail.com)