B

Type

X

Plans

BLD11-3241

Permit Number

9683

Street Number

BARNETT VALLEY RD

Street Name

TWI

Community Code

073-063-002

APN

PRMD County of Sonoma

S.C. Repro 3/10

Statement of Special Inspections

CNI-033

Steve Rolling
Name of Owner

560 Petaluma Ave
Address

BLD10-5310
Permit Number

Remodel w/additions
Job Description

This Statement of and Schedule 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 Sections 1704 and 1705
  - ☐ Special Inspections for Seismic Resistance
  - ☐ Structural Observations per Section 1709
- List of the Testing Agencies and other special inspectors that will be retained to conduct the tests and inspections.
- Contractor's Statement of Responsibility, per CBC Section 1706.

Special Inspections and Testing will be performed in accordance with the approved plans and specifications, this statement, and CBC sections 1704, 1705, 1707, and 1708.

The Schedule of Special Inspections summarizes the Special Inspections and tests required. Special Inspectors will refer to the approved plans and specifications for detailed special inspection requirements. Any additional tests and inspections required by the approved plans and specifications will also be performed.

Interim reports will be submitted to the Building Official and the Registered Design Professional in Responsible Charge in accordance with CBC Section 1704.1.2

A Final Report of Special Inspections documenting required Special Inspections, testing and correction of any discrepancies noted in the inspections shall be submitted prior to issuance of a Certificate of Use and Occupancy (Section 1704.1.2). The Final Report will document:

- Required special inspections.
- Final results of required structural testing.
- Correction of discrepancies noted in inspections.

The Owner recognizes his or her obligation to ensure that the construction complies with the approved permit documents and to implement this program of special inspections. In partial fulfillment of these obligations, the Owner will retain and directly pay for the Special Inspections as required in CBC Section 1704.1.

This plan has been developed with the understanding that the Building Official will:

- Review and approve the qualifications of the Special Inspectors who will perform the inspections.
- Review submitted inspection reports.
- Perform inspections as required by the local building code.

Prepared by:

Todd Green — 594860
Registered Design Professional in Responsible Charge — License Number

Signature — Date

Owner's Authorization:

Steve Rolling
Owner

Signature — 8/2/11 Date

Building Official's Acceptance:

Building Official

Signature — Date

Schedule of Inspection, Testing Agencies, and Inspectors

The following are the testing agencies and special inspectors that will be retained to conduct tests and inspection on this project.

Responsibility	Firm	Address, Telephone, e-mail
1. Special Inspection (except for geotechnical)	GREEN ENGINEERING.	
2. Material Testing		
3. Geotechnical Inspections	PJC,	
4.		

Seismic Requirements (Section 1705.3.1)

Description of seismic-force-resisting system and designated seismic systems subject to special inspections as per Section 1705.3:

SHEAR WALL & DIAPHRAGM NAILING
BY GREEN ENGINEERING.

PIER & GRADE BM REINFORCING
BY PJC.

The extent of the seismic-force-resisting system is defined in more detail in the construction documents.

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

Brief description of required special inspections and structural observations for this project. Full schedule of requirements are those that are √'d on the following pages:

- SPECIAL INSPECTION ON MWFRS & MSFRS.
- SPECIAL INSPECTION ON PIER DRILLING & PIER & GRADE BM. REINFORCING.

4. Identification and qualifications of the person(s) exercising such control and their position(s) in the organization. (Complete this page for each person exercising such control.)

Date: 8/2/11	Permit Number: BLD10-5310
Contractor Name, License Number and Contact Information: Steve Rolling, Owner Builder	
Name of Designated Quality Controller:	
Contact Information: Steve Rolling 996-4398	
Qualifications:	
Specific Tests/Inspections Individual is Responsible for Coordinating & Distributing Reports:	
Additional Notes:	
Signature:	

GREEN ENGINEERING
CONSULTING ENGINEERS
852 W. Sexton Rd., Sebastopol, CA 95472
phone 707 824 0660 fax 707 824 0567
www.greenengineering.net

TG	Structural Calculations for:	Job #10019
Date: 6/27/10	Rolling Residence 560 Petaluma Ave Sonoma, CA	1 of 21

Keith Franc - Architect

***California Building Code* - 2007 Edition**

Wind: ASCE 7 [6.4.2.1] SimplifiedMethod CBC 2007
[1605A.3.2] w= 1.3

Seismic: Simplified Method CBC 2007 [12.14.8]
Seismic Design Category E [1613A.5.6]
R=6.5 (Light Framed shear walls) Ss=1.5 [12.8.1.3]
F=1.1 [12.14.8.1]
V=(F Sds / R) W= .24W

Vertical Loads

	Dead	Live
Roof (Comp 5:12)	14 psf	20 psf
Floor (carpet/wood)	10 psf	40 psf
Exterior Walls (siding)	10 psf	--------
Interior Walls (gyp brd)	10 psf	--------

Foundation Design

Soil Engineer: **PJC Assoc.**
Title: Proposed Residential Remodel Rolling Residence
Job#: S429.01 Date: May 6, 2010

Spread Footing Foundation 12" min wide X 30 to 42" min. deep.
Allowable Bearing = 1500psf (DL+LL) 2250 psf (DL+LL+EorW)
Passive Pressure= 350 psf μ=.35

Drilled Pier Foundation 12" min Dia X 8'-0" min. deep.
Skin Friction = 600psf (DL+LL) 800 psf (DL+LL+EorW)
Uplift 1500 psf on G.B's.

REGISTERED PROFESSIONAL ENGINEER
TODD E GREEN
No. 59486
Exp. 12-31-11
STATE OF CALIFORNIA

PJC & Associates, Inc.
Consulting Engineers & Geologists

January 18, 2011 Job No. S429.01

Steven E. Rolling
388 Dechene Avenue
Sonoma, CA 95476

Subject: Geotechnical Plan Review
Proposed Residential Remodel and Addition
560 Petaluma Avenue
Sonoma, California

References: Report titled, "Geotechnical Investigation, Proposed Residential Remodel and Additions, 560 Petaluma Avenue, Sonoma, California" prepared by PJC & Associates, Inc., dated May 6, 2010.

Structural Plans, Sheets S-1 through S-4, prepared by Green Engineering, dated July 1, 2010.

PJC & Associates, Inc. (PJC) is pleased to submit this letter presenting the results of our geotechnical review of the structural plans for the above captioned project. PJC previously performed a geotechnical investigation for the project and presented the results in a written report dated May 6, 2010. The purpose of our review was to confirm that the recommendations of our report were incorporated into the structural plans.

Based on the results of our review, the structural plans are in general conformance with the recommendations of our report. However, observation and testing services should be provided by PJC to verify that the intent of the project plans and specifications is carried out during construction; these services should include observing the foundation excavations.

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

Sincerely,

PJC & Associates, Inc.

Anthony J. DeMartini
Geotechnical Engineer
GE 2750, California

REGISTERED PROFESSIONAL ENGINEER
ANTHONY J. DEMARTINI
No. 2750
Exp: 6-30-12
GEOTECHNICAL
STATE OF CALIFORNIA

PJC & Associates, Inc.
Consulting Engineers & Geologists

May 6, 2010 Job No. S429.01

Steven E. Rolling
388 Dechene Avenue
Sonoma, CA 95476

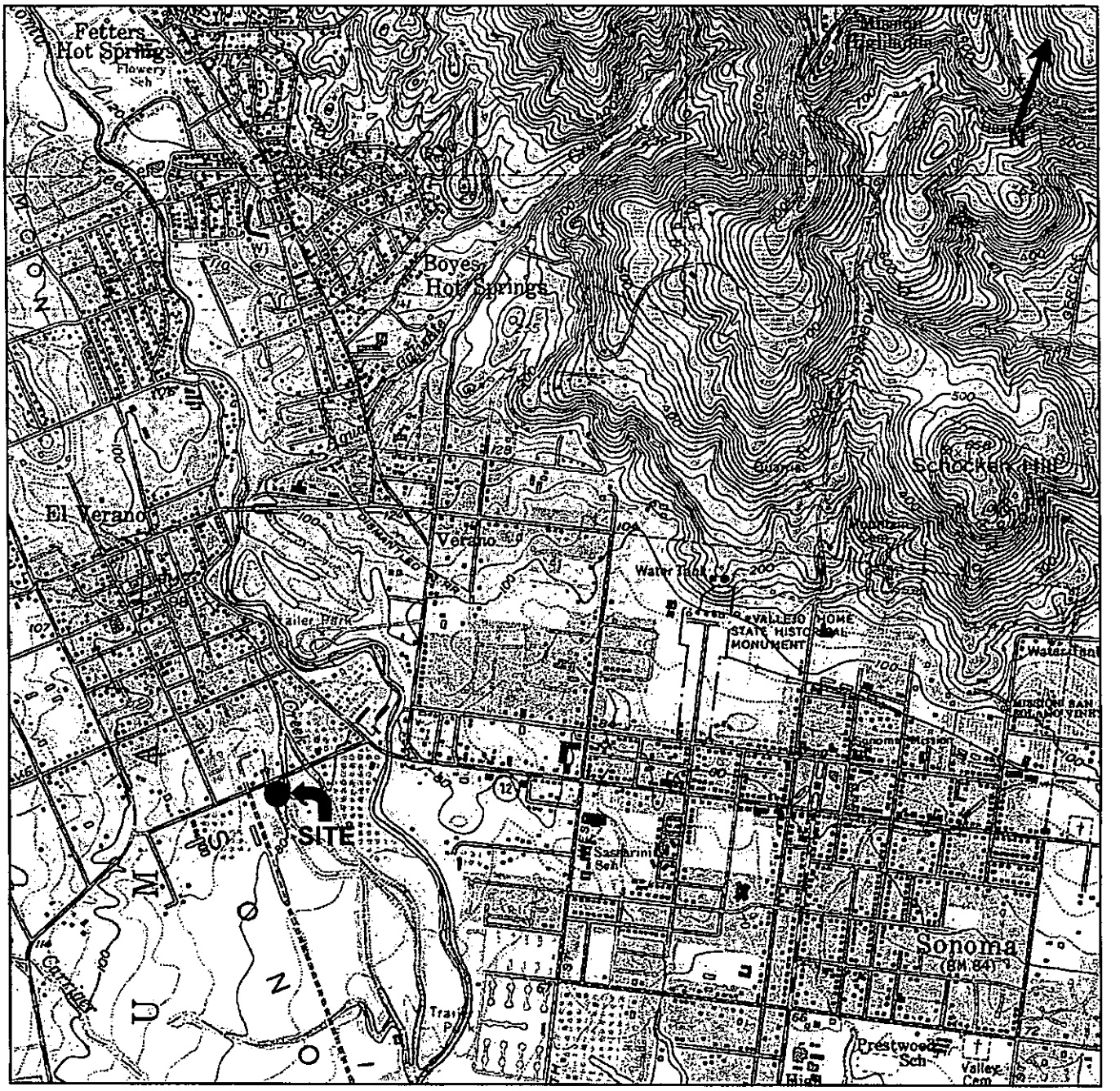
Subject: Geotechnical Investigation
Proposed Residential Remodel and Additions
560 Petaluma Avenue
Sonoma, California

PJC & Associates, Inc. (PJC) is pleased to submit this report which presents the results of our geotechnical investigation for the proposed residential remodel and additions located at 560 Petaluma Avenue in Sonoma, California. The approximate location of the site is shown on the Site Location Map, Plate 1. Our services were completed in accordance with our proposal for geotechnical engineering services, dated March 30, 2010. This report presents our engineering opinions and recommendations regarding the geotechnical aspects of the design and construction of the proposed project. Based on the results of this study, it is our opinion that the site can be developed from a geotechnical engineering standpoint provided the recommendations presented herein are incorporated in the design and carried out through construction.

1. PROJECT DESCRIPTION

Based on the information and preliminary plan provided by you, it is our understanding that the project will consist of remodeling the existing residence and constructing two new additions at the front of the residence. The residential remodel will include the replacement of the existing distressed foundation. We anticipate additions will consist of single story, wood frame construction with raised wood floors. The project will be serviced by underground municipal utilities.

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.



SCALE: 1:24,000

REFERENCE: USGS SONOMA CALIFORNIA QUADRANGLE, DATED 1980.

PJC & Associates, Inc.
Consulting Engineers & Geologists

SITE LOCATION MAP
PROPOSED RESIDENTIAL REMODEL & ADDITIONS
560 PETALUMA AVENUE
SONOMA, CALIFORNIA

Proj. No: S429.01 Date: 5/10 App'd by: PJC

PLATE
1

We anticipate that the structure will be constructed at or near existing grade. Therefore, we anticipate that site grading, if any, will consist of minor cuts and fills to achieve the desired pad grades and to provide adequate gradients for site drainage.

2. SCOPE OF SERVICES

The purpose of this investigation was to evaluate the subsurface conditions at the site and to develop geotechnical criteria for design and construction of the project. Specifically, the scope of our services consisted of the following:

a. Drill two exploratory boreholes to depths between 10.5 and 15 feet below the existing ground surface to observe the soil and groundwater conditions. Our geotechnical engineer was on site to observe the drilling, log the materials encountered in the boreholes and to obtain representative samples for visual classification and laboratory testing.

b. Perform laboratory tests on selected samples to evaluate their index and engineering properties.

c. Review seismological and geologic literature on the site area, discuss site geology and seismicity, and evaluate potential geologic hazards and earthquake effects (i.e., liquefaction, ground rupture, settlement, lurching and lateral spreading, expansive soils, etc.).

d. Perform engineering analyses to develop geotechnical recommendations for site preparation and grading, compaction requirements for subgrade and fills, foundation type(s) and design criteria, lateral earth pressures, site drainage, and construction considerations.

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

3. SITE CONDITIONS

a. General: The site is located in a rural residential area west of downtown Sonoma. The parcel is bordered by a tributary of Sonoma Creek and existing single family residences to the east, undeveloped land and vineyards to the south, another tributary of Sonoma Creek and agricultural land to the west and Petaluma Avenue to the north. The site is currently occupied by an existing single family residence, barn, tennis court, gravel covered

driveway, and landscaped areas. The remaining portions of the site are undeveloped and covered in native grasses and oak trees.

b. Topography and Drainage: The site is located on relatively level topography. According to the United States Geological Survey (USGS) Sonoma, California, 7.5 Minute Quadrangle Map (Topographic), the site is situated near an elevation of 80 feet above mean sea level (MSL). Two seasonal creek tributaries of Sonoma Creek traverse the site. The tributary at the western portion of the site is located approximately 15 feet from the proposed building envelope. The site drainage generally consists of sheet flow and surface infiltration, and is provided by the adjacent tributaries. Regional drainage is provided by Sonoma Creek which is located approximately one-quarter mile east of the site.

4. GEOLOGIC SETTING

The site is located in the Coast Ranges Geomorphic Province of California. This province is characterized by northwest trending topographic and geologic features, and includes many separate ranges, coalescing mountain masses and several major structural valleys. The province is bounded on the east by the Great Valley and on the west by the Pacific Ocean. It extends north into Oregon and south to the Transverse Ranges in Ventura County.

The structure of the northern Coast Ranges region is extremely complex due to continuous tectonic deformation imposed over a long period of time. The initial tectonic episode in the northern Coast Ranges was a result of plate convergence which is believed to have begun during late Jurassic time. This process involved eastward thrusting of oceanic crust beneath the continental crust (Klamath Mountains and Sierra Nevada) and the scraping off of materials that were accreted to the continent (northern Coast Ranges). East-dipping thrust and reverse faults were believed to be the dominant structures formed.

Right lateral, strike slip deformation was superimposed on the earlier structures beginning in mid-Cenozoic time, and has progressed northward to the vicinity of Cape Mendocino in Southern Humboldt County (Hart, Bryant and Smith, 1983). Thus, the principal structures south of Cape Mendocino are northwest-trending, nearly vertical faults of the San Andreas system.

According to published geologic literature, the soils underlying the site are comprised of stream terrace deposits (Q_{hty}) deposited as point bar and overbank deposits along Sonoma Creek; composed of moderately sorted clayey sand and sandy clay with gravels.

5. FAULTING

Geologic structures in the region are primarily controlled by northwest trending faults. No known active fault passes through the site. The site is not located in the Alquist-Priolo Earthquake Fault Studies Zone. Based on our research, the three closest potentially active faults to the site are the Rodgers Creek, West Napa and Hayward faults. The Rodgers Creek fault is located three miles to the southwest, the West Napa fault is located eight miles east and the Hayward fault is located 17 miles southeast of the site. Table 1 outlines the closest known active faults and their associated maximum magnitude.

TABLE 1
CLOSEST KNOWN ACTIVE FAULTS

Fault Name	Distance from Site (Miles)	Maximum Earthquakes (Moment Magnitude)	Peak Site Acceleration (g)
Rodgers Creek	3	7.0	0.47
West Napa	8	6.5	0.22
Hayward	17	7.1	0.19

6. SEISMICITY

The site is located within a zone of high seismic activity related to the active faults that transverse through the surrounding region. Future damaging earthquakes could occur on any of these fault systems during the lifetime of the proposed project. In general, the intensity of ground shaking at the site will depend upon the distance to the causative earthquake epicenter, the magnitude of the shock, the response characteristics of the underlying earth materials and the quality of construction. Seismic considerations and hazards are discussed in the following subsections of this report.

7. SUBSURFACE CONDITIONS

a. Soils. The subsurface conditions of the site were investigated by drilling two exploratory boreholes (BH-1 and BH-2) adjacent to the existing structure to depths between 10.5 and 15.0 feet below the existing ground surface. The approximate borehole locations are shown on the borehole Location Plan, Plate 2. The boreholes were used to perform Standard Penetration Tests (SPT) and to collect soil samples of the underlying stratums for laboratory testing. The drilling and sampling procedures, and descriptive borehole logs are included in Appendix A of this report. The laboratory procedures are presented in Appendix B.

The exploratory boreholes generally encountered unconsolidated alluvial deposits that extended to the maximum depths explored. At the surface of BH-2, our exploration encountered an isolated deposit of suspected artificial fill consisting of sandy clay that extended to a depth of two feet below the existing ground surface. The artificial fill appeared very moist, loosely placed, and exhibited high plasticity characteristics. Underlying the artificial fill, and encountered at the surface of BH-1, our exploration encountered an alluvial stratum consisting of dark brown sandy clays that extended to depths between four and five feet below the existing ground surface. This stratum appeared moist to very moist, medium stiff to stiff and exhibited high plasticity characteristics. This stratum was underlain by heterogeneous deposits of sandy clay that extended to the maximum explored depths of the boreholes. The underlying sandy clays appeared very moist to saturated, very stiff and exhibited medium to high plasticity characteristics.

b. Groundwater. Groundwater was encountered in BH-2 at a depth of eight and one-half feet below the existing ground surface at the time of our field exploration on April 6, 2010. Groundwater was not encountered in BH-1. However, groundwater levels can fluctuate by several feet throughout the year due to seasonal rainfall and other factors. Evaluation of these factors is beyond the scope of this report.

8. GEOLOGIC HAZARDS & SEISMIC CONSIDERATIONS

The site is located within a region subject to a high level of seismic activity. Therefore, the site could experience strong seismic ground shaking during the lifetime of the project. The following discussion reflects the possible earthquake effects which could result in damage to the proposed project.

a. Fault Rupture. Rupture of the ground surface is expected to occur along known active fault traces. No evidence of existing faults or previous ground displacement on the site due to fault movement is indicated in the geologic literature or field exploration. Therefore, the likelihood of ground rupture at the site due to faulting is considered to be low.

b. Ground Shaking. The site has been subjected in the past to ground shaking by earthquakes on the active fault systems that traverse the region. It is believed that earthquakes with significant ground shaking will occur in the region within the next several decades. Therefore, it must be assumed that the site will be subjected to strong ground shaking during the design life of the project.

c. Liquefaction. Our field exploration revealed no loose, saturated, granular soil stratums at the site. Therefore, it is judged that soil liquefaction is not likely to occur within 15 feet of the ground surface at the site.

d. Lateral Spreading and Lurching. Lateral spreading is normally induced by vibration of near-horizontal alluvial soil layers adjacent to an exposed face. Lurching is an action, which produces cracks or fissures parallel to streams or banks when the earthquake motion is at right angles to them. There are two creek tributaries located on the parcel. The existing residence is located approximately 15 feet from the crown of the adjacent creek bank. The existing creek bank is short, approximately five feet tall. Therefore, based on the setback distance of the structure and the subsurface conditions encountered, we judge that the proposed structure is set back a sufficient distance from the creek bank and should not be impacted by lateral spreading or lurching.

e. Expansive Soils. Based on laboratory testing (PI=29, EI=96) and our visual observations, the surface and near surface soils at the site are judged to have a high expansion potential.

9. CONCLUSIONS

Based on our field and office studies, we judge that from a geotechnical engineering standpoint, the site is suitable for development provided the recommendations presented in this report are incorporated into the design and carried out through construction. The primary geotechnical concerns in design and construction of the project is the presence of artificial fill and weak, compressible and highly expansive surface and near surface soils.

Our exploration encountered an isolated deposit of artificial fill at BH-2 that extended to a depth of two feet below the existing ground surface. Although this material may have been present for some time, it appears to be of variable composition and density. The fill is not suitable for support of fills, foundations and concrete slabs. Therefore, the artificial fill should be completely removed from structural areas and replaced as compacted engineered fill.

It is our understanding that the existing residence will be lifted and the existing foundations will be removed, and replaced with new foundations. As previously mentioned, the near surface soils are weak and compressible, and are not suitable for support of foundations. Furthermore, based on our visual observations and laboratory testing (PI=29, EI=96), the surface and near surface sandy clays are considered

highly expansive. Shrinking and/or swelling of these soils due to loss or increase of moisture content can cause irregular and excessive ground movement and distress and damage to foundations. These soils are not suitable for support of shallow foundations. Therefore, the foundations will need to extend through the weak and compressive soils, below the zone of significant moisture variation and into firm native deposits. This can be accomplished with either deepened spread footings or a drilled pier and grade beam foundation system.

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

10. EARTHWORK AND GRADING

Grading plans or finished pad elevations were not available. We anticipate that site grading, if any, will consist of minor cuts and fills to achieve the desired pad elevation and to provide adequate gradients for site drainage. We do not anticipate that significant cutting or filling will be required for the project

Structural areas should be stripped of the surface vegetation, old fills, debris, and underground utilities. These materials should be moved off site; some of them, if suitable, could be stockpiled for later use in landscape areas. If underground utilities pass through the building envelope, we recommend that these utilities be removed in their entirety or rerouted where they exist outside an imaginary plane sloped two horizontal to one vertical (2H:1V) from the outside bottom edge of the nearest foundation element. Voids left from the removal of utilities or other obstructions should be replaced with compacted engineered fill under the observation of the project geotechnical engineer. Excavation should then be preformed to achieve final grade or prepare areas to receive fill.

All areas scheduled to receive fill should be scarified to a minimum depth of eight inches, moisture conditioned to between three and five percent over optimum moisture content, and recompacted to at least 90 percent of relative maximum dry density as determined by ASTM D-1557-91 test procedures. The excavated on-site material, free of organics and rocks larger than six inches in size may be reused as engineered fill. The fill material should be spread in eight inch thick loose lifts, moisture conditioned to between three and five percent over optimum moisture content, and compacted to a minimum of 90 percent of the maximum dry density of the materials. We do not anticipate that fill will be imported to the site. If import fill is needed, it should be approved by the geotechnical engineer before importation.

All cut and fill slopes should be no steeper than two horizontal to one vertical (2H: 1V). Steeper slopes should be retained. The slopes should be covered with deep rooted ground cover to reduce and control erosion.

11. FOUNDATIONS-DEEPENED SPREAD FOOTINGS

a. Vertical Loads. The remodel and addiitons may be adequately supported by spread footings founded at least 30 inches below the existing ground surface and extending at least 12 inches into firm native soils. Based on our subsurface exploration, we anticipate that actual footing depths will vary and generally extend to depths between 30 and 42 inches below the existing ground surface. All footings should be reinforced. The recommended soil bearing pressures, depths of embedment and minimum width of spread footings are presented in Table 2. The bearing values provided have been calculated assuming that all footings extend at least 12 inches into firm native soils.

TABLE 2
FOUNDATION DESIGN CRITERIA

Footing Type	Bearing Pressure (psf)*	Minimum Embedment (in)**	Minimum Width (in)
Continuous Wall	1500	30	12
Isolated Column	2000	30	18

*Dead plus live load
** Below lowest adjacent grade

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 engineered fill. A passive pressure equivalent to that exerted by a fluid weighing 250 pounds per square foot per foot of depth (psf/ft) is recommended. The upper 24 inches should be neglected for passive resistance.

Footing concrete should be placed neat against undisturbed soil or engineered fill. Footing excavations should not be allowed to dry

before placing concrete. If shrinkage cracks appear in the footing excavations, the soil should be thoroughly moistened to close all cracks 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 bearing values provided. Maximum settlements of shallow foundations designed and constructed in accordance with the preceding recommendations are estimated to be less than three-quarters of an inch. Differential settlement between similarly loaded, adjacent footings are expected to be less than one-half of one inch. The majority of the settlement is expected to occur during construction and placement of dead loads.

12. FOUNDATIONS-DRILLED CAST-IN-PLACE PIERS

a. Vertical Loads. Foundation support may also be derived from a drilled, concrete cast-in-place pier and grade beam foundation system. The drilled piers should have a minimum diameter of 12 inches and be spaced at least three pier diameters center to center. The piers will derive their support through peripheral friction. Perimeter and interior piers should extend at least eight feet below the finish ground surface. The piers should be reinforced and designed by the project structural engineer. Perimeter and interior piers supporting continuous wall loads should be tied together with grade beams. The grade beams should be designed to span between the piers in accordance with structural requirements.

The portion of the piers extending at least three feet beneath the finished ground surface may be designed using an allowable dead plus live skin friction of 600 pounds per square foot (psf). This value may be increased by one-third for short duration wind and seismic loads. End bearing should be neglected because of difficulty in cleaning out small diameter pier holes and the uncertainty of mobilizing skin friction and end bearing simultaneously. A value equal to one-half the downward capacity of the pier may be used to resist uplift forces. An uplift swelling pressure of 1,500 psf should be used for the design of the grade beams.

b. Lateral Loads. Lateral loads resulting from wind and earthquake can be resisted by the pier through a combination of cantilever action and passive resistance of the soil surrounding the pier. A passive equivalent fluid pressure of 250 psf/ft acting on two pier diameters should be used. The upper two feet should be neglected for passive resistance.

c. Settlement. The maximum and differential settlements for the piers is estimated to be small and within tolerable limits.

If groundwater is encountered, it may be necessary to de-water the holes and/or place the concrete by the tremie method. If caving soils are encountered, it may be necessary to case the holes. Hard drilling may be required to achieve the required depths.

13. SEISMIC DESIGN

Geologic structures in the region are primarily controlled by northwest trending faults. No known active fault passes through the site. The site is not located in the Alquist-Priolo Earthquake Fault Studies Zone. Based on the data reviewed, it is concluded that the project site could be subjected to seismic shaking resulting from earthquakes on the active faults primarily in the Coast Ranges. For design, a site class type D, spectral accelerations of S_S of 1.50 g and S_1 of 0.60 g and site coefficients F_A of 1.00 and F_V of 1.50 are recommended.

14. DRAINAGE

We recommend that the roofs be provided with gutters and that the downspouts be connected to closed conduits discharging to a designated area away from foundations and slopes. Surface water should be channeled away from slopes and foundations.

If the interior crawl space grade is lower than the exterior adjacent grade, we recommend that foundation subdrains be placed adjacent to all foundations. The foundation subdrains should extend at least 12 inches below the lowest adjacent 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. The subdrain should consist of a heavy walled, four inch diameter, perforated pipe sloped to drain to outlets 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 be placed between the soil and the drain rock or Class II permeable material may be used in lieu of the filter fabric and drain rock.

Roof downspouts and surface drains must be maintained entirely separate from the foundation subdrains. The outlets should discharge onto erosion resistant areas.

15. LIMITATIONS

The data, information, interpretations and recommendations in this report are presented solely as bases and guides for the geotechnical design of the proposed residential remodel and additions located at 560 Petaluma Avenue in Sonoma, California. The conclusions and professional opinions presented herein were developed in accordance with generally accepted geotechnical engineering principles and practices. As with all geotechnical reports, the opinions expressed here are subject to revisions in light of new information, which may be developed in the future, and no warranties are either expressed or implied.

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 purpose of other parties or other uses. If any changes are made in the project as 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 and approved in writing. This report and the drawings contained herein are intended only for the design of the proposed project. They are not intended to act by themselves as construction drawings or specifications.

Soil 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 PJC does 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.

16. ADDITIONAL SERVICES

Upon completion of the project plans, they should be reviewed by our firm to verify that the design is consistent with the recommendations of this report. During the course of this investigation, several assumptions were made regarding building loads and development concepts. Should our assumptions differ significantly from the final intent of the project designers, our office should be notified of the changes to assess any potential need for revised recommendations. Observation and testing services should 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, field density testing of fill, and installation of the drainage facilities.

These services will be performed only if PJC is provided with sufficient notice to perform the work. PJC does not accept the 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.

Donald A. Whyte
Project Geologist

Anthony J. DeMartini
Geotechnical Engineer
GE 2750, California

APPENDIX A
FIELD INVESTIGATION

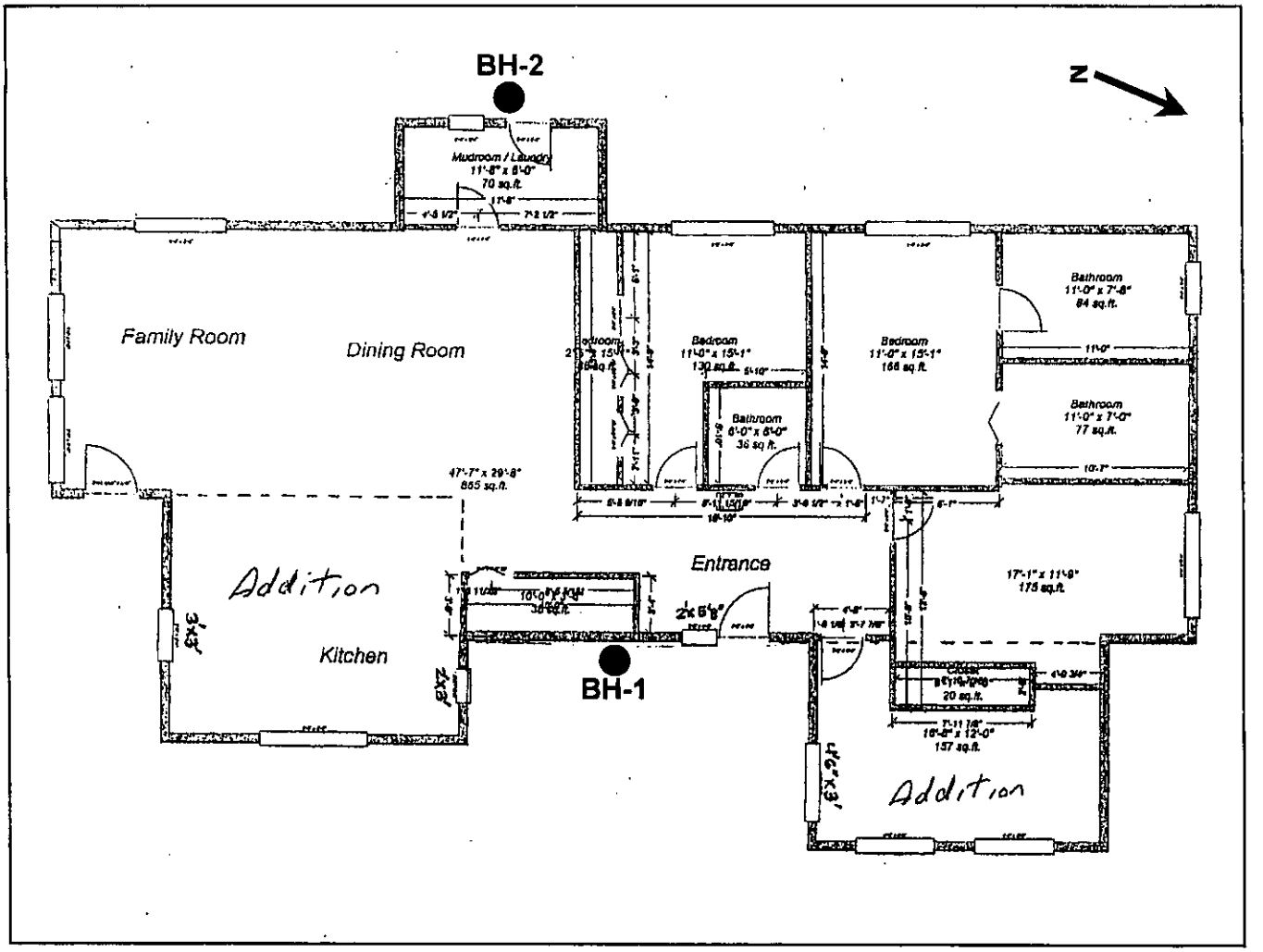
1. INTRODUCTION

The field program performed for this study consisted of drilling two exploratory boreholes (BH-1 and BH-2) in the vicinity of the proposed building site. The exploration was completed on April 6, 2010. The approximate borehole location is shown on the Borehole Location Plan, Plate 2. Descriptive logs of the boreholes are presented in this appendix as Plates 3 and 4.

2. BOREHOLES

The borehole was advanced using a portable powered drill rig with solid stem flight augers. The drilling was performed under the observation of a staff engineer of PJC who maintained a continuous log of the subsurface conditions and obtained samples suitable for laboratory testing. The soils were classified in accordance with the Unified Soil Classification System, as explained in Plate 5.

Relatively undisturbed and disturbed samples were obtained from the exploratory borehole. A 2.43 in I.D. California Modified sampler, or a 1.5 in I.D. Standard Sampler, was driven into the underlying soil using a 70 pound hammer falling 30 inches to obtain an indication in the field of the density of the soil and to allow visual examination of at least a portion of the soil column. Soil samples obtained with the split-spoon sampler were retained for further observation and testing. The number of blows required to drive the sampler at six-inch increments was recorded on each borehole log. All samples collected were labeled and transported to PJC's office for examination and laboratory testing.



EXPLANATION

● BOREHOLE LOCATION AND DESIGNATION

NO SCALE

REFERENCE: SITE PLAN PROVIDED BY STEVEN E. ROLLING.

PJC & Associates, Inc. *Consulting Engineers & Geologists*	BOREHOLE LOCATION PLAN PROPOSED RESIDENTIAL REMODEL & ADDITIONS 560 PETALUMA AVENUE SONOMA, CALIFORNIA	PLATE **2**
	Proj. No: S429.01 Date: 5/10 App'd by: PJC	

PJC & ASSOCIATES, INC.
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BORING NUMBER BH-1; PLATE 3

CLIENT STEVEN E. ROLLING
PROJECT NAME PROPOSED RESIDENTIAL REMODEL & ADDITIONS
PROJECT NUMBER S429.01
PROJECT LOCATION 560 PETALUMA AVENUE; SONOMA, CA
DATE STARTED 4/6/10 COMPLETED 4/6/10
GROUND ELEVATION ____ HOLE SIZE 4.0"
DRILLING CONTRACTOR LONE PINE DRILLING & DRAFTING
GROUND WATER LEVELS:
DRILLING METHOD PORTABLE POWERED W/ SOLID STEM AUGER
AT TIME OF DRILLING —
LOGGED BY A.J.D. CHECKED BY ____
AT END OF DRILLING —
NOTES ____
AFTER DRILLING —

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		0.0-5.0'; SANDY CLAY (CH); dark brown, very moist, stiff, high plasticity. (ALLUVIUM)										
			MC		10-17 (27)	1.0	86	32	53	24	29	
2.5												
			MC		15-21 (36)	2.0	92	29				
5.0		5.0-10.5'; SANDY CLAY (CL); light brown, very moist, very stiff, medium plasticity, with traces of gravel. (ALLUVIUM)										
			MC		32-44 (76)	4.0	86	34				
7.5												
			MC		30-33 (63)	2.25	83	37				
10.0		TERMINATED AT 10.5 FEET										

Bottom of borehole at 10.5 feet.

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BORING NUMBER BH-2; PLATE 4

CLIENT STEVEN E. ROLLING
PROJECT NAME PROPOSED RESIDENTIAL REMODEL & ADDITIONS
PROJECT NUMBER S429.01
PROJECT LOCATION 560 PETALUMA AVENUE; SONOMA, CA
DATE STARTED 4/6/10 COMPLETED 4/6/10
GROUND ELEVATION ___ HOLE SIZE 4.0"
DRILLING CONTRACTOR LONE PINE DRILLING & DRAFTING
GROUND WATER LEVELS:
DRILLING METHOD PORTABLE POWERED W/ SOLID STEM AUGER
▽ AT TIME OF DRILLING 8.50 ft
LOGGED BY A.J.D. CHECKED BY ___
AT END OF DRILLING ---
NOTES ___
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		0.0-2.0'; SANDY CLAY (CH); moderate brown, very moist, loosely placed, high plasticity, with gravel. (FILL)										
			MC		8-13 (21)	0.5	82	33				
2.5		2.0-4.0'; SANDY CLAY (CH); dark brown, very moist, medium stiff, high plasticity. (ALLUVIUM)										
		4.0-8.0'; SANDY CLAY (CH); light brown, very moist, very stiff, high plasticity. (ALLUVIUM)										
5.0			MC		12-23 (35)	2.25	93	26				
7.5												
		▽ 8.0-15.0'; SANDY CLAY (CL); yellowish brown, very moist to saturated, very stiff, medium plasticity, with sand lenses between 12.0 to 15.0 feet. (ALLUVIUM)										
10.0			MC		24-35 (59)	3.0	93	29				
12.5			MC		16-33 (49)	3.5	104	22				
			SPT		7-10 (17)			36				
15.0		TERMINATED AT 15.0 FEET										

Bottom of borehole at 15.0 feet.

MAJOR DIVISIONS				TYPICAL NAMES
COARSE GRAINED SOILS (MORE THAN HALF IS LARGER THAN #200 SIEVE)	GRAVELS — MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVELS, GRAVEL - SAND MIXTURES
			GP	POORLY GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, POORLY GRADED GRAVEL - SAND - SILT MIXTURES
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL - SAND - CLAY MIXTURES
	SANDS — MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS
			SP	POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, POORLY GRADED SAND - SILT MIXTURES
			SC	CLAYEY SANDS, POORLY GRADED SAND - CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN HALF IS SMALLER THAN #200 SIEVE)	SILTS AND CLAYS — LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS — LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

UNIFIED SOIL CLASSIFICATION SYSTEM

Shear Strength, psf

Confining Pressure, psf

Consol	- Consolidation	Tx	320 (2600)	Unconsolidated Undrained Triaxial
LL	- Liquid Limit (in %)	Tx CU	320 (2600)	Consolidated Undrained Triaxial
PL	- Plastic Limit (in %)	DS	2750 (2000)	Consolidated Drained Direct Shear
PI	- Plasticity Index	FVS	470	Field Vane Shear
G_s	- Specific Gravity	UC	2000	Unconfined Compression
SA	- Sieve Analysis	LVS	700	Laboratory Vane Shear
■	"Undisturbed" Sample	SS	- Shrink Swell	
▣	Bulk or Disturbed Sample	EXP	- Expansion	
◪	Standard Penetration Test	P	- Permeability	
⊡	Sample Attempt with No Recovery			

Note: All strength tests on 2.8" or 2.4" diameter sample unless otherwise indicated.

KEY TO TEST DATA

PJC & Associates, Inc.
Consulting Engineers & Geologists

PROPOSED RESIDENTIAL REMODEL & ADDITIONS
560 PETALUMA AVENUE
SONOMA, CALIFORNIA

PLATE 5

Proj. No: S429.01 Date: 5/10 App'd by: PJC

APPENDIX B
LABORATORY INVESTIGATION

1. INTRODUCTION

This appendix includes a discussion of test procedures and results of the laboratory investigation performed for the proposed project. The investigation program was carried out by employing currently accepted test procedures of the American Society of Testing and Materials (ASTM).

Disturbed samples used in the laboratory investigation were obtained during the course of the field investigation as described in Appendix A of this report. Identification of each sample is by borehole number and depth.

2. INDEX PROPERTY TESTING

In the field of soil mechanics and geotechnical engineering design, it is advantageous to have a standard method of identifying soils and classifying them into categories or groups that have similar distinct engineering properties. The most commonly used method of identifying and classifying soils according to their engineering properties is the Unified Soil Classification System described by ASTM D-2487-83. The USCS is based on a recognition of the various types and significant distribution of soil characteristics and plasticity of materials.

The index properties tests discussed in this report include the determination of natural water content and dry density, pocket penetrometer, Atterburg Limits, and expansion index.

a. Natural Water Content and Dry Density. Natural water content and dry density of the samples were determined on selected undisturbed samples. The samples were extruded, visually classified, trimmed to obtain a smooth flat face, and accurately measured to obtain volume and wet weight. The samples were then dried, in accordance with ASTM D-2216-80, for a period of 24 hours in an oven maintained at a temperature of 100 degrees C. After drying, the weight of each sample was determined and the moisture content and dry density calculated. The water content and dry density results are summarized on the borehole logs, Plates 3 and 4.

b. Pocket Penetrometer. Pocket Penetrometer tests were performed on all cohesive samples. The test estimates the unconfined compressive strength of a cohesive material by measuring the materials resistance to penetration by a calibrated, spring-loaded

cylinder. The maximum capacity of the cylinder is 4.5 tons per square foot (tsf). The results of these test are indicated on the borehole logs.

c. Atterburg Limits. Liquid and plastic limits were determined on selected samples in accordance with ASTM D4318-83. The results of the limits are presented on Plate 6.

d. Expansion Index. An expansion index was performed on a near surface sample in accordance with ASTM D 4829-88. The result is presented on Plate 7.

3. ENGINEERING PROPERTIES

The engineering properties testing consisted of unconfined compression testing.

a. Unconfined Compression Test. Unconfined compression tests were performed on intact samples obtained from the boreholes. In the unconfined compression test, the shear strength is determined by axial loading the sample under a slow constant strain rate until failure is obtained. Failure stress is defined as the maximum stress at ten percent strain. The results of these tests are presented on Plates 8 and 9.

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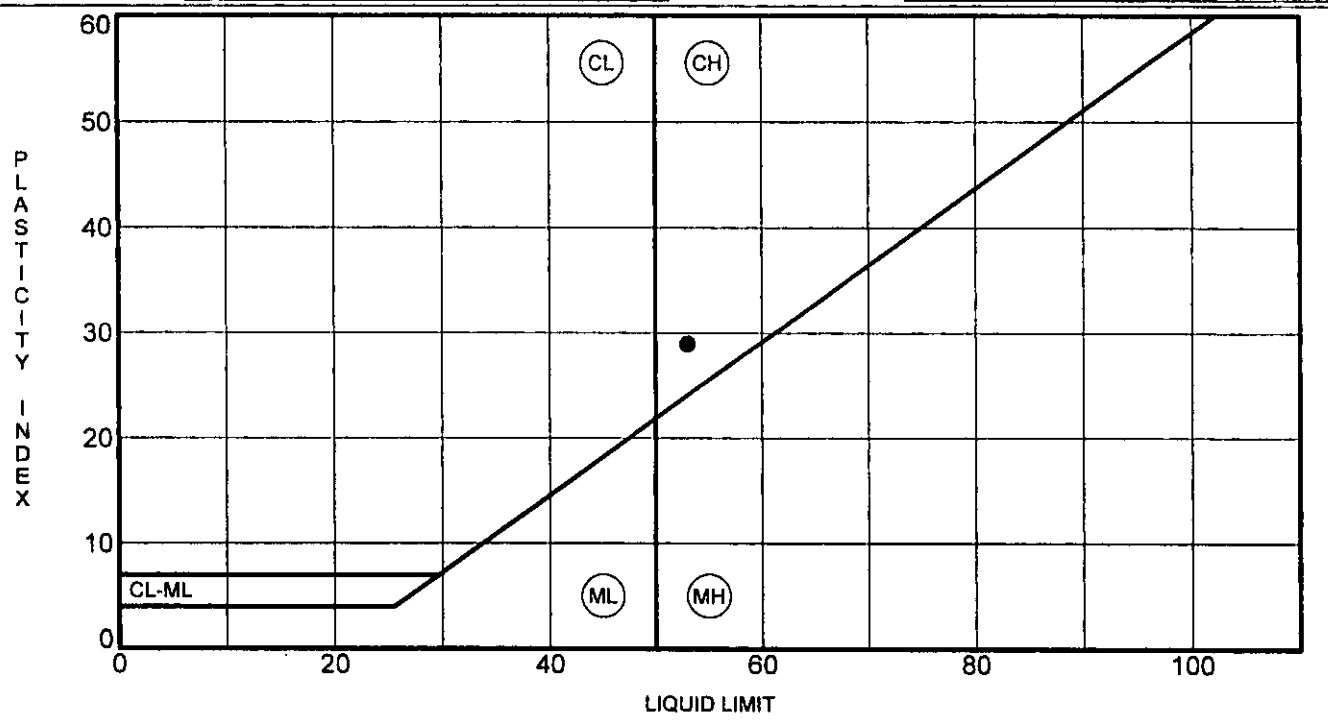
ATTERBERG LIMITS' RESULTS
PLATE 6

CLIENT STEVEN E. ROLLING
PROJECT NAME PROPOSED RESIDENTIAL REMODEL & ADDITIONS
PROJECT NUMBER S429.01
PROJECT LOCATION 560 PETALUMA AVENUE; SONOMA, CA

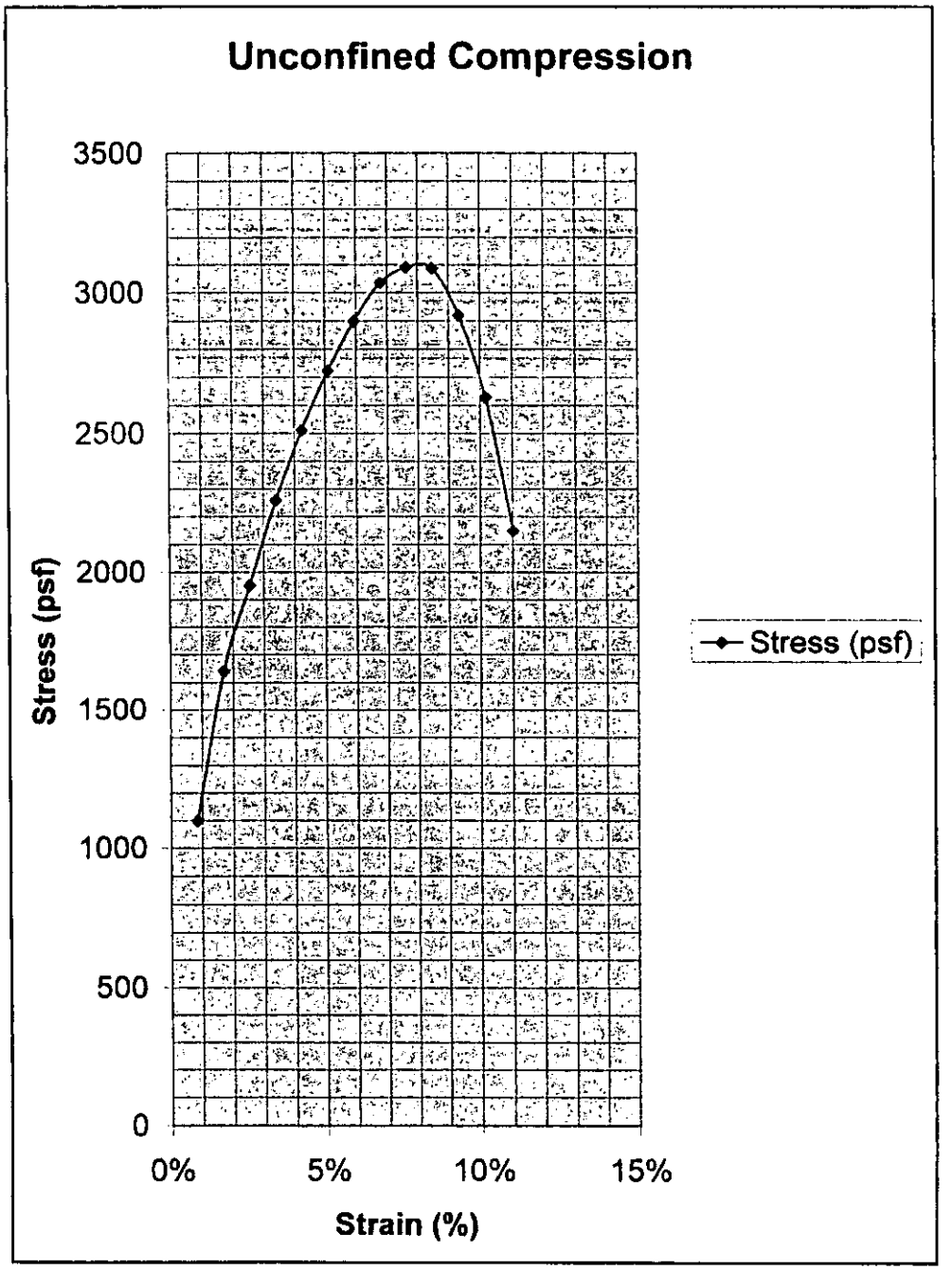


	Specimen Identification		LL	PL	PI	Fines	Classification
●	**BH-1**	**2.0**	**53**	**24**	**29**		**DARK BROWN SANDY CLAY (CH)**

EXPANSION INDEX=96

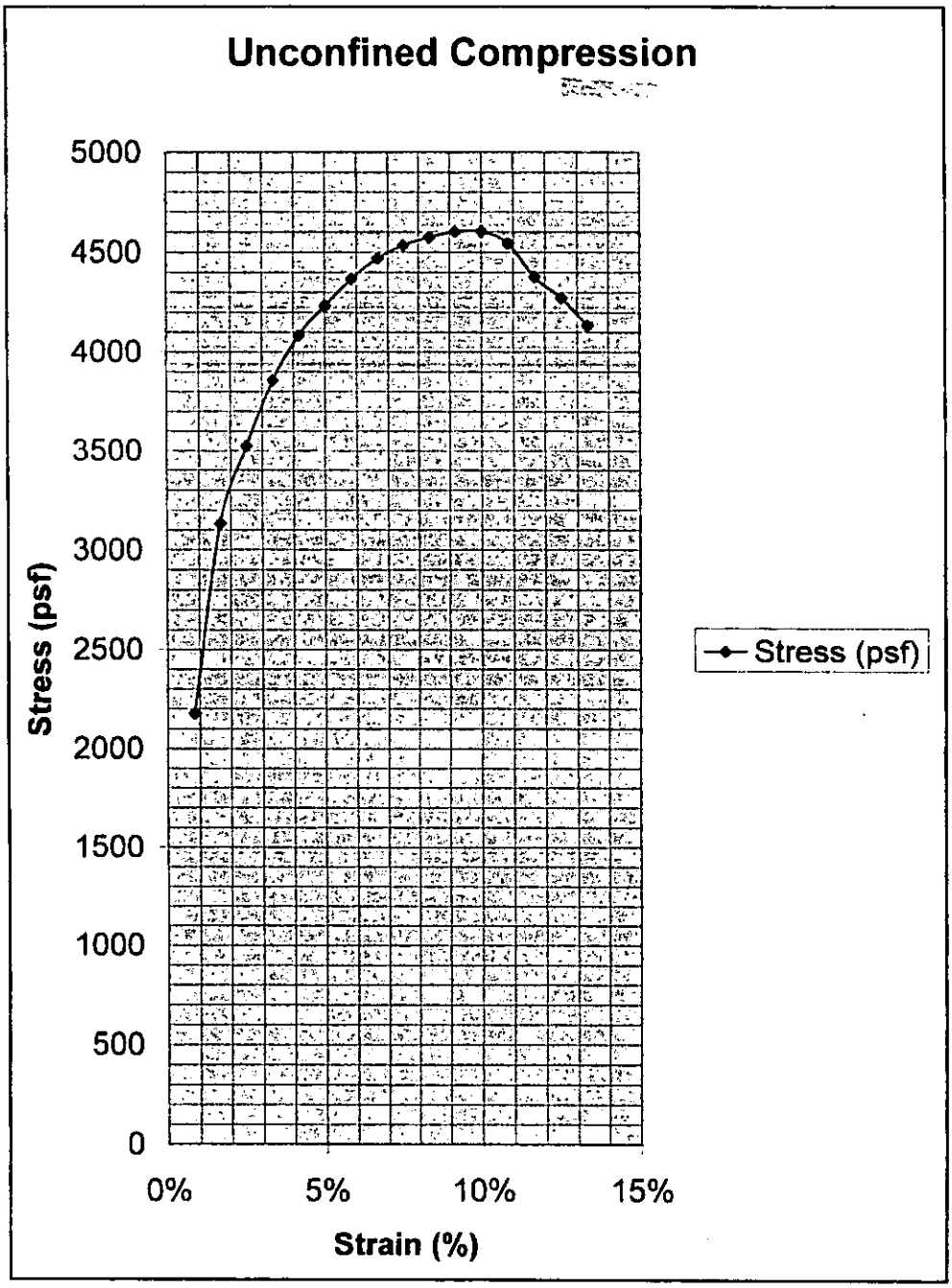
EXPANSION INDEX	EXPANSION POTENTIAL
0-20	VERY LOW
21-50	LOW
51-90	MEDIUM
91-130	HIGH
>130	VERY HIGH

SAMPLE LOCATION: BH-1 AT 3.5 FEET
DESCRIPTION: DARK BROWN SANDY CLAY (CH)
INITIAL WATER CONTENT: 13.9%
INITIAL DRY DENSITY: 92.0 pcf
INITIAL SATURATION: 46.2%
FINAL WATER CONTENT: 37.3%



LOCATION: BH-2 AT 6.0 FEET
DESCRIPTION: LIGHT BROWN SANDY CLAY (CH)
MOISTURE CONTENT: 26.3%
DRY DENSITY: 93.0 pcf
***UNCONFINED COMPRESSIVE STRENGTH :** 3,090psf

***Failure stress is defined as the maximum stress at ten percent strain.**



LOCATION: BH-2 AT 10.0 FEET
DESCRIPTION: YELLOWISH BROWN SANDY CLAY (CL)
MOISTURE CONTENT: 28.5%
DRY DENSITY: 93.3 pcf
***UNCONFINED COMPRESSIVE STRENGTH :** 4,600psf

***Failure stress is defined as the maximum stress at ten percent strain.**

APPENDIX C
REFERENCES

1. "Foundations and Earth Structures" Department of the Navy Design Manual 7.2 (NAVFAC DM-7.2), dated May 1982.

2. "Soil Dynamics, Deep Stabilization, and Special Geotechnical Construction" Department of the Navy Design Manual 7.3 (NAVFAC DM-7.3), dated April 1983.

3. "Drilled Shafts: Construction Procedures and Design Methods" U.S. Department of Transportation Federal Highway Administration (FHWA-HI-88-042), dated July 1988.

4. USGS Sonoma California Quadrangle 7.5-Minute Topographic Map, photorevised 1980.

5. Geologic Map of the Santa Rosa Quadrangle, Scale: 1:250,000, compiled by D.L Wagner and E.J. Bortugno, 1982.

6. Geologic Map of the Sonoma 7.5-Minute Quadrangle, Sonoma and Napa Counties, California, by David L. Wagner, Kevin B. Clahan, Carolyn E. Randolph-Loar, and Janet Sowers, 2004.

7. "Soil Mechanics" Department of the Navy Design Manual 7.1 (NAVFAC DM-7.1), dated May 1982.

8. McCarthy, David. Essential of Soil Mechanics and Foundations. 5th Edition, 1998.

9. Bowels, Joseph. Engineering Properties of Soils and Their Measurement. 4th Edition, 1992.

10. Miller, Debora, and Nelson, John. Expansive Soils: Problems and Practice in Foundation and Pavement Engineering, 1992.

11. California Building Code (CBC), 2007 edition.

12. "Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada," California Department of Conservation Division of Mines and Geology, Dated February 1998.

13. Blake, T.F. (2000), EQFAULT Version 3.0, software program.

14. Leyendecker, Frankel, and Rukstales (2007), Seismic Hazard Curves and Uniform Hazard Response Spectra version 5.0.8 software program.

15. "Minimum Design Loads for Buildings and Other Structures" American Society of Civil Engineers, 2005.

16. Preliminary Site Plan, Sheet 1, provided by Steven Rolling, undated.

PERFORMANCE CERTIFICATE: Residential (Part 1 of 5) CF-1R

Project Name	Building Type		Date
Rolling Residence	☐ Single Family ☐ Addition Alone ☐ Multi Family ☒ Existing+ Addition/Alteration		7/20/2010
Project Address	**California Energy Climate Zone**	**Total Cond. Floor Area**	**Addition**	**# of Stories**
560 Petaluma Ave Sonoma	CA Climate Zone 02	1,893	468	1

FIELD INSPECTION ENERGY CHECKLIST

☐ Yes ☒ No HERS Measures -- If Yes, A CF-4R must be provided per Part 2 of 5 of this form.

☐ Yes ☒ No Special Features -- If Yes, see Part 2 of 5 of this form for details.

INSULATION

Construction	Type	Cavity	Area (ft^2)	Special Features (see Part 2 of 5)	Status
Roof	Wood Framed Attic	R-30	460		New
Wall	Wood Framed	R-19	688		New
Floor	Wood Framed w/Crawl Space	R-19	468		New
Wall	Wood Framed	R-19	1,233		Altered
Roof	Wood Framed Attic	R-30	1,405		Altered
Floor	Wood Framed w/Crawl Space	R-19	1,425		Altered

FENESTRATION

Orientation	Area(ft^2)	U-Factor	SHGC	Overhang	Sidefins	Exterior Shades	Status
Skylight	8.0	0.480	0.48	none	none	None	New
Left (S)	70.0	0.360	0.32	none	none	Bug Screen	New
Front (E)	138.0	0.360	0.32	none	none	Bug Screen	New
Rear (W)	92.0	0.360	0.32	none	none	Bug Screen	New
Skylight	8.0	0.480	0.48	none	none	None	New
Skylight	1.0	0.840	0.67	none	none	None	New
Skylight	1.0	0.840	0.67	none	none	None	New
Skylight	1.0	0.840	0.67	none	none	None	New
Skylight	1.0	0.840	0.67	none	none	None	New
Skylight	8.0	0.480	0.48	none	none	None	New
Right (N)	16.0	0.360	0.32	none	none	Bug Screen	New

HVAC SYSTEMS

Qty.	Heating	Min. Eff	Cooling	Min. Eff	Thermostat	Status
1	Central Furnace	80% AFUE	Split Air Conditioner	13.0 SEER	Setback	Altered

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Status
Residential HVAC Unit	Ducted	Ducted	Attic, Ceiling Ins, vented	6.0	New

WATER HEATING

Qty.	Type	Gallons	Min. Eff	Distribution	Status
1	Instant Gas	0	0.80	No Pipe Insulation	Altered

PERFORMANCE CERTIFICATE: Residential	(Part 2 of 5)	CF-1R

Project Name	Building Type	Date
Rolling Residence	☐ Single Family ☐ Addition Alone ☐ Multi Family ☐ Existing+ Addition/Alteration	*7/20/2010*

SPECIAL FEATURES INSPECTION CHECKLIST

The enforcement agency should pay special attention to the items specified in this checklist. These items require special written justification and documentation, and special verification to be used with the performance approach. The enforcement agency determines the adequacy of the justification, and may reject a building or design that otherwise complies based on the adequacy of the special justification and documentation submitted.

HERS REQUIRED VERIFICATION

Items in this section require field testing and/or verification by a certified HERS Rater. The inspector must receive a completed CF-4R form for each of the measures listed below for final to be given.

PERFORMANCE CERTIFICATE: Residential (Part 3 of 5) CF-1R

Project Name	Building Type	Date
Rolling Residence	☑ Single Family ☐ Addition Alone ☐ Multi Family ☐ Existing+ Addition/Alteration	*7/20/2010*

ANNUAL ENERGY USE SUMMARY

TDV (kBtu/ft²-yr)	Standard	Proposed	Margin
Space Heating	78.00	29.96	48.04
Space Cooling	64.10	28.21	35.89
Fans	24.08	10.51	13.58
Domestic Hot Water	21.85	15.32	6.53
Pumps	0.00	0.00	0.00
Totals	188.04	83.99	104.04
Percent Better Than Standard:			55.3 %

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

		Ext. Walls/Roof	Wall Area	Fenestration Area
Building Front Orientation:	(E) 90 deg	(E)	585	97
Number of Dwelling Units:	1.00	(S)	540	70
Fuel Available at Site:	Natural Gas	(W)	585	92
Raised Floor Area:	1,893	(N)	486	16
Slab on Grade Area:	0	Roof	1,893	28
Average Ceiling Height:	9.0		TOTAL:	303
Fenestration Average U-Factor:	0.36			
Average SHGC:	0.32		Fenestration/CFA Ratio:	16.0 %

REMARKS

STATEMENT OF COMPLIANCE

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 the Administrative Regulations and Part 6 the Efficiency Standards of the California Code of Regulations.

The documentation author hereby certifies that the documentation is accurate and complete.

Documentation Author

Company *SOLDATA Energy Consulting*
Address *401-C College Avenue* Name *Ann Wolfe*
City/State/Zip *Santa Rosa, CA 95401* Phone *707 545-4440*

7/20/2010
Signed Date

The individual with overall design responsibility hereby certifies that the proposed building design represented in this set of construction documents is consistent with the other compliance forms and worksheets, with the specifications, and with any other calculations submitted with this permit application, and recognizes that compliance using duct design, duct sealing, verification of refrigerant charge, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Company *Owner*
Address *388 Dechene Ave* Name *Steve Rolling*
City/State/Zip *Sonoma, CA 95476* Phone *707 996-4398*

12/14/10
Signed License # Date

CERTIFICATE OF COMPLIANCE: Residential (Part 4 of 5) CF-1R

Project Name	Building Type	Date
Rolling Residence	☐ Single Family ☐ Addition Alone ☐ Multi Family ☐ Existing+ Addition/Alteration	*7/20/2010*

OPAQUE SURFACE DETAILS

Surface Type	Area	U-Factor	Insulation Cavity	Exterior	Frame	Interior	Frame	Azm	Tilt	Status	Joint Appendix 4	Location/Comments
Roof	*460*	*0.032*	*R-30*					*90*	*0*	*New*	*4.2.1-A8*	*New addition*
Wall	*204*	*0.074*	*R-19*					*180*	*90*	*New*	*4.3.1-A5*	*New addition*
Wall	*216*	*0.074*	*R-19*					*0*	*90*	*New*	*4.3.1-A5*	*New addition*
Floor	*468*	*0.037*	*R-19*					*0*	*180*	*New*	*4.4.1-A4*	*New addition*
Wall	*268*	*0.074*	*R-19*					*90*	*90*	*New*	*4.3.1-A5*	*New addition*
Wall	*493*	*0.074*	*R-19*					*270*	*90*	*Altered*	*4.3.1-A5 (E=4.3.1-A1)*	*1st floor Altered*
Roof	*1,405*	*0.032*	*R-30*					*90*	*0*	*Altered*	*4.2.1-A8 (E=4.2.1-A6)*	*1st floor Altered*
Wall	*266*	*0.074*	*R-19*					*180*	*90*	*Altered*	*4.3.1-A5 (E=4.3.1-A1)*	*1st floor Altered*
Wall	*254*	*0.074*	*R-19*					*0*	*90*	*Altered*	*4.3.1-A5 (E=4.3.1-A1)*	*1st floor Altered*
Wall	*220*	*0.074*	*R-19*					*90*	*90*	*Altered*	*4.3.1-A5 (E=4.3.1-A1)*	*1st floor Altered*
Floor	*1,425*	*0.037*	*R-19*					*0*	*180*	*Altered*	*4.4.1-A4 (E=4.4.1-A1)*	*1st floor Altered*
Wall	*272*	*0.356*	*None*					*90*	*90*	*Removed*	*4.3.1-A1*	*1st floor Altered*
Wall	*52*	*0.356*	*None*					*180*	*90*	*Removed*	*4.3.1-A1*	*1st floor Altered*

FENESTRATION SURFACE DETAILS

ID	Type	Area	U-Factor[1]		SHGC[2]		Azm	Status	Glazing Type	Location/Comments
1	*Skylight*	*8.0*	*0.480*	*NFRC*	*0.48*	*NFRC*	*90*	*New*	*Velux*	*New addition*
2	*Window*	*16.0*	*0.360*	*NFRC*	*0.32*	*NFRC*	*180*	*New*	*Wood/vinyl Low-E*	*New addition*
3	*Window*	*14.0*	*0.360*	*NFRC*	*0.32*	*NFRC*	*180*	*New*	*Wood/vinyl Low-E*	*New addition*
4	*Window*	*24.0*	*0.360*	*NFRC*	*0.32*	*NFRC*	*90*	*New*	*Wood/vinyl Low-E*	*New addition*
5	*Window*	*32.0*	*0.360*	*NFRC*	*0.32*	*NFRC*	*90*	*New*	*Wood/vinyl Low-E*	*New addition*
6	*Window*	*20.0*	*0.990*	*Default*	*0.74*	*Default*	*270*	*Removed*	*single wood default*	*1st floor Altered*
7	*Window*	*6.0*	*0.550*	*Default*	*0.67*	*Default*	*270*	*Removed*	*Double vinyl default*	*1st floor Altered*
8	*Window*	*30.0*	*0.990*	*Default*	*0.74*	*Default*	*270*	*Removed*	*single wood default*	*1st floor Altered*
9	*Window*	*28.0*	*0.990*	*Default*	*0.74*	*Default*	*270*	*Removed*	*single wood default*	*1st floor Altered*
10	*Window*	*64.0*	*0.360*	*NFRC*	*0.32*	*NFRC*	*270*	*New*	*Wood/vinyl Low-E*	*1st floor Altered*
11	*Window*	*8.0*	*0.360*	*NFRC*	*0.32*	*NFRC*	*270*	*New*	*Wood/vinyl Low-E*	*1st floor Altered*
12	*Window*	*20.0*	*0.360*	*NFRC*	*0.32*	*NFRC*	*270*	*New*	*Wood/vinyl Low-E*	*1st floor Altered*
13	*Skylight*	*8.0*	*0.480*	*NFRC*	*0.48*	*NFRC*	*90*	*New*	*Velux*	*1st floor Altered*
14	*Skylight*	*1.0*	*0.840*	*Default*	*0.67*	*Default*	*90*	*New*	*sola*	*1st floor Altered*
15	*Skylight*	*1.0*	*0.840*	*Default*	*0.67*	*Default*	*90*	*New*	*sola*	*1st floor Altered*
16	*Skylight*	*1.0*	*0.840*	*Default*	*0.67*	*Default*	*90*	*New*	*sola*	*1st floor Altered*

(1) U-Factor Type: 116-A = Default Table from Standards, NFRC = Labeled Value
(2) SHGC Type: 116-B = Default Table from Standards, NFRC = Labeled Value

EXTERIOR SHADING DETAILS

ID	Exterior Shade Type	SHGC	Window Hgt	Window Wd	Overhang Len	Overhang Hgt	Overhang LExt	Overhang RExt	Left Fin Dist	Left Fin Len	Left Fin Hgt	Right Fin Dist	Right Fin Len	Right Fin Hgt
1	*None*	*1.00*												
2	*Bug Screen*	*0.76*												
3	*Bug Screen*	*0.76*												
4	*Bug Screen*	*0.76*												
5	*Bug Screen*	*0.76*												
6	*Bug Screen*	*0.76*												
7	*Bug Screen*	*0.76*												
8	*Bug Screen*	*0.76*												
9	*Bug Screen*	*0.76*												
10	*Bug Screen*	*0.76*												
11	*Bug Screen*	*0.76*												
12	*Bug Screen*	*0.76*												
13	*None*	*1.00*												
14	*None*	*1.00*												
15	*None*	*1.00*												
16	*None*	*1.00*												

CERTIFICATE OF COMPLIANCE: Residential (Part 4 of 5) CF-1R

Project Name	Building Type	Date
Rolling Residence	☐ Single Family ☐ Addition Alone ☐ Multi Family ☐ Existing+ Addition/Alteration	*7/20/2010*

OPAQUE SURFACE DETAILS

Surface Type	Area	U-Factor	Insulation Cavity	Insulation Exterior	Insulation Frame	Insulation Interior	Insulation Frame	Azm	Tilt	Status	Joint Appendix 4	Location/Comments

FENESTRATION SURFACE DETAILS

ID	Type	Area	U-Factor[1]		SHGC[2]		Azm	Status	Glazing Type	Location/Comments
17	*Skylight*	*1.0*	*0.840*	*Default*	*0.67*	*Default*	*90*	*New*	*sola*	*1st floor Altered*
18	*Skylight*	*8.0*	*0.480*	*NFRC*	*0.48*	*NFRC*	*90*	*New*	*Velux*	*1st floor Altered*
19	*Window*	*32.0*	*0.360*	*NFRC*	*0.32*	*NFRC*	*180*	*New*	*Wood/vinyl Low-E*	*1st floor Altered*
20	*Window*	*8.0*	*0.360*	*NFRC*	*0.32*	*NFRC*	*180*	*New*	*Wood/vinyl Low-E*	*1st floor Altered*
21	*Window*	*6.0*	*0.550*	*Default*	*0.67*	*Default*	*180*	*Removed*	*Double vinyl default*	*1st floor Altered*
22	*Window*	*14.0*	*0.550*	*Default*	*0.67*	*Default*	*180*	*Removed*	*Double vinyl default*	*1st floor Altered*
23	*Window*	*40.0*	*0.550*	*Default*	*0.67*	*Default*	*180*	*Removed*	*Double vinyl default*	*1st floor Altered*
24	*Window*	*6.0*	*0.990*	*Default*	*0.74*	*Default*	*0*	*Removed*	*single wood default*	*1st floor Altered*
25	*Window*	*28.0*	*0.990*	*Default*	*0.74*	*Default*	*0*	*Removed*	*single wood default*	*1st floor Altered*
26	*Window*	*4.0*	*0.990*	*Default*	*0.74*	*Default*	*0*	*Removed*	*single wood default*	*1st floor Altered*
27	*Window*	*16.0*	*0.360*	*NFRC*	*0.32*	*NFRC*	*0*	*New*	*Wood/vinyl Low-E*	*1st floor Altered*
28	*Window*	*16.0*	*0.550*	*Default*	*0.67*	*Default*	*90*	*Removed*	*Double vinyl default*	*1st floor Altered*
29	*Window*	*28.0*	*0.990*	*Default*	*0.74*	*Default*	*90*	*Removed*	*single wood default*	*1st floor Altered*
30	*Window*	*20.0*	*0.360*	*NFRC*	*0.32*	*NFRC*	*90*	*New*	*Wood/vinyl Low-E*	*1st floor Altered*
31	*Window*	*21.0*	*0.360*	*NFRC*	*0.32*	*NFRC*	*90*	*New*	*Wood/vinyl Low-E*	*1st floor Altered*
32	*Window*	*16.0*	*0.550*	*Default*	*0.67*	*Default*	*90*	*Removed*	*Double vinyl default*	*1st floor Altered*

(1) U-Factor Type: 116-A = Default Table from Standards, NFRC = Labeled Value
(2) SHGC Type: 116-B = Default Table from Standards, NFRC = Labeled Value

EXTERIOR SHADING DETAILS

ID	Exterior Shade Type	SHGC	Window Hgt	Window Wd	Overhang Len	Overhang Hgt	Overhang LExt	Overhang RExt	Left Fin Dist	Left Fin Len	Left Fin Hgt	Right Fin Dist	Right Fin Len	Right Fin Hgt
17	*None*	*1.00*												
18	*None*	*1.00*												
19	*Bug Screen*	*0.76*												
20	*Bug Screen*	*0.76*												
21	*Bug Screen*	*0.76*												
22	*Bug Screen*	*0.76*												
23	*Bug Screen*	*0.76*												
24	*Bug Screen*	*0.76*												
25	*Bug Screen*	*0.76*												
26	*Bug Screen*	*0.76*												
27	*Bug Screen*	*0.76*												
28	*Bug Screen*	*0.76*												
29	*Bug Screen*	*0.76*												
30	*Bug Screen*	*0.76*												
31	*Bug Screen*	*0.76*												
32	*Bug Screen*	*0.76*												

CERTIFICATE OF COMPLIANCE: Residential (Part 4 of 5) CF-1R

Project Name	Building Type	Date
Rolling Residence	☑ Single Family ☐ Addition Alone ☐ Multi Family ☐ Existing+ Addition/Alteration	*7/20/2010*

OPAQUE SURFACE DETAILS

Surface Type	Area	U-Factor	Insulation					Azm	Tilt	Status	Joint Appendix 4	Location/Comments
			Cavity	Exterior	Frame	Interior	Frame					

FENESTRATION SURFACE DETAILS

ID	Type	Area	U-Factor[1]		SHGC[2]		Azm	Status	Glazing Type	Location/Comments
33	*Window*	*12.0*	*0.990*	*Default*	*0.74*	*Default*	*90*	*Removed*	*single wood default*	*1st floor Altered*
34	*Window*	*20.0*	*0.360*	*NFRC*	*0.32*	*NFRC*	*90*	*New*	*Wood/vinyl Low-E*	*1st floor Altered*
35	*Window*	*21.0*	*0.360*	*NFRC*	*0.32*	*NFRC*	*90*	*New*	*Wood/vinyl Low-E*	*1st floor Altered*
36	*Window*	*6.0*	*0.550*	*Default*	*0.67*	*Default*	*90*	*Removed*	*Double vinyl default*	*1st floor Altered*
37	*Window*	*4.0*	*0.990*	*Default*	*0.74*	*Default*	*90*	*Removed*	*single wood default*	*1st floor Altered*
38	*Window*	*14.0*	*0.990*	*Default*	*0.74*	*Default*	*90*	*Removed*	*single wood default*	*1st floor Altered*
39	*Window*	*11.0*	*0.990*	*Default*	*0.74*	*Default*	*180*	*Removed*	*single wood default*	*1st floor Altered*

(1) U-Factor Type: 116-A = Default Table from Standards, NFRC = Labeled Value
(2) SHGC Type: 116-B = Default Table from Standards, NFRC = Labeled Value

EXTERIOR SHADING DETAILS

ID	Exterior Shade Type	SHGC	Window		Overhang				Left Fin			Right Fin		
			Hgt	Wd	Len	Hgt	LExt	RExt	Dist	Len	Hgt	Dist	Len	Hgt
33	*Bug Screen*	*0.76*												
34	*Bug Screen*	*0.76*												
35	*Bug Screen*	*0.76*												
36	*Bug Screen*	*0.76*												
37	*Bug Screen*	*0.76*												
38	*Bug Screen*	*0.76*												
39	*Bug Screen*	*0.76*												

CERTIFICATE OF COMPLIANCE: Residential (Part 5 of 5) CF-1R

Project Name	Building Type	Date
Rolling Residence	☑ Single Family ☐ Addition Alone ☐ Multi Family ☑ Existing+ Addition/Alteration	*7/20/2010*

BUILDING ZONE INFORMATION

System Name	Zone Name	Floor Area (ft^2) New	Existing	Altered	Removed	Volume	Year Built
Residential HVAC Unit	*New addition*	*468*				*4,212*	
	1st floor Altered			*1,425*		*12,825*	*1929*
	Totals	*468*	*0*	*1,425*	*0*		

HVAC SYSTEMS

System Name	Qty.	Heating Type	Min. Eff.	Cooling Type	Min. Eff.	Thermostat Type	Status
Residential HVAC Unit	*1*	*Central Furnace*	*80% AFUE*	*Split Air Conditioner*	*13.0 SEER*	*Setback*	*Altered*
pre-altered for above		*Central Furnace*	*78% AFUE*	*No Cooling*	*13.0 SEER*	*Setback*	

HVAC DISTRIBUTION

System Name	Heating	Cooling	Duct Location	Duct R-Value	Ducts Tested?	Status
Residential HVAC Unit	*Ducted*	*Ducted*	*Attic, Ceiling Ins, vented*	*6.0*	☐	*New*
pre-altered for above	*Ducted*	*Ducted*	*Attic, Ceiling Ins, vented*	*2.1*	☐	
					☐	
					☐	
					☐	

WATER HEATING SYSTEMS

System Name	Qty.	Type	Distribution	Rated Input (Btuh)	Tank Cap. (gal)	Energy Factor or RE	Standby Loss or Pilot	Ext. Tank Insul. R-Value	Status
Tankless .80	*1*	*Instant Gas*	*No Pipe Insulation*	*150,000*	*0*	*0.80*	*n/a*	*n/a*	*Altered*
Standard Gas 50 gal or Le	*1*	*Small Gas*	*pre-altered for Above*	*40,000*	*50*	*0.53*	*n/a*	*n/a*	

MULTI-FAMILY WATER HEATING DETAILS

Control	Qty.	HP	Eff. Premium	Hot Water Piping Length (ft) Plenum	Outside	Buried	Add ½" Insulation
			☐				☐
			☐				☐
			☐				☐
			☐				☐
			☐				☐

HYDRONIC HEATING SYSTEM PIPING

System Name	Pipe Length	Pipe Diameter	Insul. Thick.

MANDATORY MEASURES SUMMARY: Residential (Page 1 of 3) MF-1R

Project Name	Date
Rolling Residence	*7/20/2010*

NOTE: Low-rise residential buildings subject to the Standards must comply with all applicable mandatory measures listed, regardless of the compliance approach used. More stringent energy measures listed on the Certificate of Compliance (CF-1R, CF-1R-ADD, or CF-1R-ALT Form) shall supersede the items marked with an asterisk (*) below. This Mandatory Measures Summary shall be incorporated into the permit documents, and the applicable features shall be considered by all parties as minimum component performance specifications whether they are shown elsewhere in the documents or in this summary. Submit all applicable sections of the MF-1R Form with plans.

Building Envelope Measures:

§116(a)1: Doors and windows between conditioned and unconditioned spaces are manufactured to limit air leakage.

§116(a)4: Fenestration products (except field-fabricated windows) have a label listing the certified U-Factor, certified Solar Heat Gain Coefficient (SHGC), and infiltration that meets the requirements of §10-111(a).

§117: Exterior doors and windows are weather-stripped; all joints and penetrations are caulked and sealed.

§118(a): Insulation specified or installed meets Standards for Insulating Material. Indicate type and include on CF-6R Form.

§118(i): The thermal emittance and solar reflectance values of the cool roofing material meets the requirements of §118(i) when the installation of a Cool Roof is specified on the CF-1R Form.

*§150(a): Minimum R-19 insulation in wood-frame ceiling or equivalent U-factor.

§150(b): Loose fill insulation shall conform with manufacturer's installed design labeled R-Value.

*§150(c): Minimum R-13 insulation in wood-frame wall or equivalent U-factor.

*§150(d): Minimum R-13 insulation in raised wood-frame floor or equivalent U-factor.

§150(f): Air retarding wrap is tested, labeled, and installed according to ASTM E1677-95(2000) when specified on the CF-1R Form.

§150(g): Mandatory Vapor barrier installed in Climate Zones 14 or 16.

§150(l): Water absorption rate for slab edge insulation material alone without facings is no greater than 0.3%; water vapor permeance rate is no greater than 2.0 perm/inch and shall be protected from physical damage and UV light deterioration.

Fireplaces, Decorative Gas Appliances and Gas Log Measures:

§150(e)1A: Masonry or factory-built fireplaces have a closable metal or glass door covering the entire opening of the firebox.

§150(e)1B: Masonry or factory-built fireplaces have a combustion outside air intake, which is at least six square inches in area and is equipped with a with a readily accessible, operable, and tight-fitting damper and or a combustion-air control device.

§150(e)2: Continuous burning pilot lights and the use of indoor air for cooling a firebox jacket, when that indoor air is vented to the outside of the building, are prohibited.

Space Conditioning, Water Heating and Plumbing System Measures:

§110-§113: HVAC equipment, water heaters, showerheads, faucets and all other regulated appliances are certified by the Energy Commission.

§113(c)5: Water heating recirculation loops serving multiple dwelling units and High-Rise residential occupancies meet the air release valve, backflow prevention, pump isolation valve, and recirculation loop connection requirements of §113(c)5.

§115: Continuously burning pilot lights are prohibited for natural gas: fan-type central furnaces, household cooking appliances (appliances with an electrical supply voltage connection with pilot lights that consume less than 150 Btu/hr are exempt), and pool and spa heaters.

§150(h): Heating and/or cooling loads are calculated in accordance with ASHRAE, SMACNA or ACCA.

§150(i): Heating systems are equipped with thermostats that meet the setback requirements of Section 112(c).

§150(j)1A: Storage gas water heaters rated with an Energy Factor no greater than the federal minimal standard are externally wrapped with insulation having an installed thermal resistance of R-12 or greater.

§150(j)1B: Unfired storage tanks, such as storage tanks or backup tanks for solar water-heating system, or other indirect hot water tanks have R-12 external insulation or R-16 internal insulation where the internal insulation R-value is indicated on the exterior of the tank.

§150(j)2: First 5 feet of hot and cold water pipes closest to water heater tank, non-recirculating systems, and entire length of recirculating sections of hot water pipes are insulated per Standards Table 150-B.

§150(j)2: Cooling system piping (suction, chilled water, or brine lines),and piping insulated between heating source and indirect hot water tank shall be insulated to Table 150-B and Equation 150-A.

§150(j)2: Pipe insulation for steam hydronic heating systems or hot water systems >15 psi, meets the requirements of Standards Table 123-A.

§150(j)3A: Insulation is protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind.

§150(j)3A: Insulation for chilled water piping and refrigerant suction lines includes a vapor retardant or is enclosed entirely in conditioned space.

§150(j)4: Solar water-heating systems and/or collectors are certified by the Solar Rating and Certification Corporation.

§150(m)1: All air-distribution system ducts and plenums installed, are sealed and insulated to meet the requirements of CMC Sections 601, 602, 603, 604, 605 and Standard 6-5; supply-air and return-air ducts and plenums are insulated to a minimum installed level of R-4.2 or enclosed entirely in conditioned space. Openings shall be sealed with mastic, tape or other duct-closure system that meets the applicable requirements of UL 181, UL 181A, or UL 181B or aerosol sealant that meets the requirements of UL 723. If mastic or tape is used to seal openings greater than 1/4 inch, the combination of mastic and either mesh or tape shall be used

§150(m)1: Building cavities, support platforms for air handlers, and plenums defined or constructed with materials other than sealed sheet metal, duct board or flexible duct shall not be used for conveying conditioned air. Building cavities and support platforms may contain ducts. Ducts installed in cavities and support platforms shall not be compressed to cause reductions in the cross-sectional area of the ducts.

§150(m)2D: Joints and seams of duct systems and their components shall not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.

§150(m)7: Exhaust fan systems have back draft or automatic dampers.

§150(m)8: Gravity ventilating systems serving conditioned space have either automatic or readily accessible, manually operated dampers.

§150(m)9: Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material.

§150(m)10: Flexible ducts cannot have porous inner cores.

§150(o): All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2-2007 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. Window operation is not a permissible method of providing the Whole Building Ventilation required in Section 4 of that Standard.

Pool and Spa Heating Systems and Equipment Measures:

§114(a): Any pool or spa heating system shall be certified to have: a thermal efficiency that complies with the Appliance Efficiency Regulations; an on-off switch mounted outside of the heater; a permanent weatherproof plate or card with operating instructions; and shall not use electric resistance heating or a pilot light.

§114(b)1: Any pool or spa heating equipment shall be installed with at least 36" of pipe between filter and heater, or dedicated suction and return lines, or built-up connections for future solar heating.

§114(b)2: Outdoor pools or spas that have a heat pump or gas heater shall have a cover.

§114(b)3: Pools shall have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.

§150(p): Residential pool systems or equipment meet the pump sizing, flow rate, piping, filters, and valve requirements of §150(p).

Residential Lighting Measures:

§150(k)1: High efficacy luminaires or LED Light Engine with Integral Heat Sink has an efficacy that is no lower than the efficacies contained in Table 150-C and is not a low efficacy luminaire as specified by §150(k)2.

§150(k)3: The wattage of permanently installed luminaires shall be determined as specified by §130(d).

§150(k)4: Ballasts for fluorescent lamps rated 13 Watts or greater shall be electronic and shall have an output frequency no less than 20 kHz.

§150(k)5: Permanently installed night lights and night lights integral to a permanently installed luminaire or exhaust fan shall contain only high efficacy lamps meeting the minimum efficacies contained in Table 150-C and shall not contain a line-voltage socket or line-voltage lamp holder; OR shall be rated to consume no more than five watts of power as determined by §130(d), and shall not contain a medium screw-base socket.

§150(k)6: Lighting integral to exhaust fans, in rooms other than kitchens, shall meet the applicable requirements of §150(k).

§150(k)7: All switching devices and controls shall meet the requirements of §150(k)7.

§150(k)8: A minimum of 50 percent of the total rated wattage of permanently installed lighting in kitchens shall be high efficacy. EXCEPTION: Up to 50 watts for dwelling units less than or equal to 2,500 ft$_2$ or 100 watts for dwelling units larger than 2,500 ft$_2$ may be exempt from the 50% high efficacy requirement when: all low efficacy luminaires in the kitchen are controlled by a manual on occupant sensor, dimmer, energy management system (EMCS), or a multi-scene programmable control system; and all permanently installed luminaries in garages, laundry rooms, closets greater than 70 square feet, and utility rooms are high efficacy and controlled by a manual-on occupant sensor.

§150(k)9: Permanently installed lighting that is internal to cabinets shall use no more than 20 watts of power per linear foot of illuminated cabinet.

§150(k)10: Permanently installed luminaires in bathrooms, attached and detached garages, laundry rooms, closets and utility rooms shall be high efficacy.
EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by a manual-on occupant sensor certified to comply with the applicable requirements of §119.
EXCEPTION 2: Permanently installed low efficacy luminaires in closets less than 70 square feet are not required to be controlled by a manual-on occupancy sensor.

§150(k)11: Permanently installed luminaires located in rooms or areas other than in kitchens, bathrooms, garages, laundry rooms, closets, and utility rooms shall be high efficacy luimnaires. EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided they are controlled by either a dimmer switch that complies with the applicable requirements of §119, or by a manual-on occupant sensor that complies with the applicable requirements of §119. EXCEPTION 2: Lighting in detached storage building less than 1000 square feet located on a residential site is not required to comply with §150(k)11.

§150(k)12: Luminaires recessed into insulated ceilings shall be listed for zero clearance insulation contact (IC) by Underwriters Laboratories or other nationally recognized testing/rating laboratory; and have a label that certifies the lumiunaire is airtight with air leakage less then 2.0 CFM at 75 Pascals when tested in accordance with ASTM E283; and be sealed with a gasket or caulk between the luminaire housing and ceiling.

§150(k)13: Luminaires providing outdoor lighting, including lighting for private patios in low-rise residential buildings with four or more dwelling units, entrances, balconies, and porches, which are permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy. EXCEPTION 1: Permanently installed outdoor low efficacy luminaires shall be allowed provided that they are controlled by a manual on/off switch, a motion sensor not having an override or bypass switch that disables the motion sensor, and one of the following controls: a photocontrol not having an override or bypass switch that disables the photocontrol; OR an astronomical time clock not having an override or bypass switch that disables the astronomical time clock; OR an energy management control system (EMCS) not having an override or bypass switch that allows the luminaire to be always on EXCEPTION 2: Outdoor luminaires used to comply with Exception1 to §150(k)13 may be controlled by a temporary override switch which bypasses the motion sensing function provided that the motion sensor is automatically reactivated within six hours. EXCEPTION 3: Permanently installed luminaires in or around swimming pool, water features, or other location subject to Article 680 of the California Electric Code need not be high efficacy luminaires.

§150(k)14: Internally illuminated address signs shall comply with Section 148; OR not contain a screw-base socket, and consume no more than five watts of power as determined according to §130(d).

§150(k)15: Lighting for parking lots and carports with a total of for 8 or more vehicles per site shall comply with the applicable requirements in Sections 130, 132, 134, and 147. Lighting for parking garages for 8 or more vehicles shall comply with the applicable requirements of Sections 130, 131, 134, and 146.

§150(k)16: Permanently installed lighting in the enclosed, non-dwelling spaces of low-rise residential buildings with four or more dwelling units shall be high efficacy luminaires. EXCEPTION: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by an occupant sensor(s) certified to comply with the applicable requirements of §119.