



Planning Director Staff Report Hearing on April 14, 2022

County of Ventura • Resource Management Agency

800 S. Victoria Avenue, Ventura, CA 93009 • (805) 654-2478 • www.vcrma.org/divisions/planning

3124 Solimar LLC COASTAL PLANNED DEVELOPMENT PERMIT CASE NO. PL21-0056

A. PROJECT INFORMATION

1. **Request:** The Applicant requests approval of a Coastal Planned Development (PD) Permit for the demolition of an existing Single-Family Dwelling and the construction of a new Single-family Dwelling (Case No. PL21-0056).
2. **Applicant/Property Owner:** 3124 Solimar LLC, c/o Manager Donald H. Jones 10508 Wyton Drive, Los Angeles, CA 90024
3. **Applicant's Representative:** Martha Picciotti, Architect, 4040 N. Catalina Street Ventura, CA 93001
4. **Decision-Making Authority:** Pursuant to the Ventura County Coastal Zoning Ordinance (CZO) (Section 8174-5 and Section 8181-3 et seq.), the Planning Director is the decision-maker for the requested Coastal PD Permit.
5. **Project Site Size, Location, and Parcel Number:** The 0.14-acre/6,098-square foot property is located at 3124 Solimar Beach Drive, adjacent to the beach, in the unincorporated area of Ventura County. The Project site is approximately 5 miles northwest of the City of San Buenaventura. The Tax Assessor's parcel number for the parcel that constitutes the Project site is 060-0-340-035 (Exhibit 2).
6. **Project Site Land Use and Zoning Designations (Exhibit 2):**
 - a. Countywide General Plan Land Use Map Designation: Residential Beach
 - b. Coastal Area Plan Land Use Map Designation: Residential High 6.1-36 DU/AC
 - c. Zoning Designation: RB-3,000 sq. ft. (Residential Beach-3,000 sq. ft. minimum lot size)
7. **Adjacent Zoning and Land Uses/Development (Exhibit 2):**

Location in Relation to the Project Site	Zoning	Land Uses/Development
North	COS-10 ac-sdf (Coastal Open Space, 10 acre minimum lot size)	State Route 1, Union Pacific Railroad Tracks, 101 Freeway

Location in Relation to the Project Site	Zoning	Land Uses/Development
East	RB-3,000 sq. ft.	Existing 2-Story Single Family Dwelling
South	COS-10 ac-sdf (Coastal Open Space, 10 acre minimum lot size)	Existing Rock Revetment, Sandy Shore, Pacific Ocean
West	RB-3,000 sq. ft.	Existing 2-Story Single Family Dwelling

- 8. Permit History:** The existing structure was constructed in 1970, and was modified in 1975 with an addition of a second story. Other minor documented building repairs have been completed over the past 20 years and include foundation repairs in 2004, the installation of an earthquake gas service valve in 2009, and the replacement of a gas furnace in 2011. The structure has been evaluated for compliance with the Ventura County Cultural Heritage Ordinance and the applicable policies of the Ventura County General Plan and the Coastal Area Plan and was determined to have no impact to historical resources as the Project site is not listed or determined to be eligible as a historical resource or significant in any other related cultural resource category.

The subject property is located adjacent to a community-wide rock revetment, immediately seaward of the project site, on a parcel owned by the Solimar Beach Colony Homeowner Association. The revetment was constructed in 1981 under Coastal Development Permit Case No. 216-21 - a reconstruction project of two previously existing seawalls with the construction of a rock revetment approximately 3,860 feet long, 21 feet wide and 15 feet high. The Project does not propose any modifications to the existing revetment.

- 9. Project Description:** The Project is a Coastal Planned Development (PD) Permit to demolish an existing 3,281 square foot beachfront single family dwelling and construct a new 6,204 square foot 2-story single family dwelling with a ground level 3,480-square-foot attached 3-car garage and storage area. The Project includes the construction of a 152 square foot covered entry, 341 square feet covered patio, and a 175 sq. ft. second floor deck. The single-family dwelling will have a height of 26.5 feet, as measured from the from lowest elevation of the first floor as established by the Public Works Agency. Structural slabs for the dwelling will be supported on piles and grade beams which will elevate the dwelling in accordance with the recommendations provided in supporting Project background reports (2nd Revised Coastal Engineer’s Report, GeoSoils, Inc., December 2021 and Soil Engineering Investigation, Heathcote Geotechnical, April 20, 2021). The Project includes the installation of a building elevator which extends from the ground level to the two habitable floors above the garage.

Access to the Project site is provided by a new private driveway which connects to Solimar Beach Drive, a private road. Potable water for domestic use will be provided by Casitas Municipal Water District and wastewater will be handled by a new Septic Tank Effluent Pump (STEP) system at the front of the lot which will connect to the County of Ventura Service Area No. 29 (Exhibit 3).

B. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) COMPLIANCE

Pursuant to CEQA (Public Resources Code Section 21000 et seq.) and the CEQA Guidelines (Title 14, California Code of Regulations, Division 6, Chapter 3, Section 15000 et seq.), the proposed Project is subject to environmental review.

The State Legislature through the Secretary for Resources has found that certain classes of projects are exempt from CEQA environmental impact review because they do not have a significant effect on the environment. These projects are declared to be categorically exempt from the requirement for the preparation of environmental impact documents. Pursuant to CEQA Sections 15301 (Existing Facilities) and 15303 (New Construction or Conversion of Small Structures), the proposed project is exempt from the provisions of CEQA. Further, the Project will not trigger any of the exceptions to the exemptions listed under CEQA Guidelines Section 15300.2. Therefore, no further environmental review is required.

C. CONSISTENCY WITH THE GENERAL PLAN

The 2040 Ventura County General Plan *Goals, Policies and Programs* (page 1-1) states:

All area plans, specific plans, subdivisions, public works projects, and zoning decisions must be consistent with the direction provided in the County's General Plan.

Finally, the Ventura County CZO (Section 8181-3.5.a) states that in order to be approved, a project must be found consistent with all applicable policies of the Ventura County Coastal Area Plan.

The proposed Project has been analyzed for consistency with the applicable policies of the General Plan Goals, Policies and Programs and Coastal Area Plan (Exhibit 4).

D. ZONING ORDINANCE COMPLIANCE

The proposed Project is subject to the requirements of the Ventura County CZO. Pursuant to the Ventura County CZO (Section 8174-4), the proposed use is allowed in the RB zone district with the granting of a Coastal PD Permit. Upon the granting of the Coastal PD Permit, the proposed Project will comply with this requirement.

The proposed Project includes the construction and use of a building that is subject to the development standards of the Ventura County CZO (Section 8175-2). Table 1 lists the applicable development standards and a description of whether the proposed Project complies with the development standards.

Table 1 – Development Standards Consistency Analysis

Type of Requirement	Zoning Ordinance Requirement	Complies?
Minimum Lot Area (Gross)	3,000 sq. ft.	Yes, 6204 sq. ft.
Maximum Percentage of Building Coverage	65% for Residential High	Yes, 57%
Front Setback	10 feet	Yes, 10 feet
Side Setback	3 feet	Yes, 3 feet
Rear Setback	14 feet	Yes, ~24 feet
Maximum Building Height	28 feet as measured from the lowest elevation datum of the first floor as established by the Public Works Agency	Yes, 26.5 feet as measured from the FF datum of 20.5 feet of the North American Vertical Datum of 1988 (NAVD88)

E. COASTAL PD PERMIT FINDINGS AND SUPPORTING EVIDENCE

The Planning Director must make certain findings in order to determine that the proposed Project is consistent with the permit approval standards of the Ventura County CZO (Section 8181-3.5 et seq.). The proposed findings and supporting evidence are as follows:

1. The proposed development is consistent with the intent and provisions of the County's Certified Local Coastal Program [Section 8181-3.5.a].

Based on the information and analysis presented in Sections C and D of this staff report, the finding that the proposed development is consistent with the intent and provisions of the County's Certified Local Coastal Program can be made.

2. The proposed development is compatible with the character of surrounding development [Section 8181-3.5.b].

The proposed dwelling is compatible with the character of the surrounding development. The Project which is comprised of the demolition and construction of a replacement residential structure has been analyzed for compatibility under the attached General Plan Consistency Analysis (Exhibit 4, Item 1). Existing single-family structures, which vary in age, are generally comprised of beach front two-story buildings. The architecture in the surrounding area is an eclectic mix of modern styles such as the neocolonial style and two-story adaptations of the ranch-style homes and modern homes styles with similar flat-roof designs, the proposed modern style dwelling would be compatible with the other homes in the area. The Project would not involve alterations of natural features or further degrade the viewshed from public viewing locations to the shore or from the publicly accessible areas of the beach to the surrounding hillside areas. The proposed dwelling also maintains the prescribed setbacks and lot coverage limit as prescribed for the underlying RB zone, as well as the stringline setback for all beachfront buildings within the Solimar Beach Colony.

Based on the discussion above, this finding can be made.

3. The proposed development, if a conditionally permitted use, is compatible with planned land uses in the general area where the development is to be located [Section 8181-3.5.c].

The proposed Project consists of the demolition and construction of a new single-family dwelling. The proposed use is not conditionally permitted; therefore, the requirement of this finding does not apply to the proposed Project.

Based on the discussion above, this finding can be made.

4. The proposed development would not be obnoxious or harmful, or impair the utility of neighboring property or uses [Section 8181-3.5.d].

As described in the attached General Plan Consistency Analysis (Exhibit 4), the proposed Project was analyzed for consistency with policies related to public facilities, services, and infrastructure, hazards and conservation and open space and was found to maintain the requirements prescribed under these policies. The Solimar Beach Colony is a private residential development situated between Pacific Coast Highway and the 101 Freeway and the beach. The consistency analysis found that there is adequate infrastructure, services and utilities to support the proposed dwelling without significantly impacting the level of existing services. The Project has access for public safety services such police and fire. The Project site also benefits from the presence of existing utility service connections for water, wastewater, electricity, gas, cable and telephone service. The site was analyzed for impacts to public access to the ocean, and was found to not require the development of new or expanded facilities to be implemented as a condition of this Project. The proposed Project is found to not be obnoxious or harmful to neighboring properties or impair the utility of neighboring properties or uses. The Project was also analyzed for temporary noise impacts from construction. The proposed Project will be subject to a standard condition of approval to limit the days and times of noise-generating construction activities (Exhibit 5, Condition No. 21).

Based on the discussion above, this finding can be made.

5. The proposed development would not be detrimental to the public interest, health, safety, convenience, or welfare [Section 8181-3.5.e].

As described in the attached General Plan Consistency Analysis (Exhibit 4), the proposed Project was analyzed for consistency with policies related to public facilities and services, conservation and open space, hazards and safety, and water resources which relate to the preservation of the public interest, and public health, safety, convenience, and general welfare. The Project was found to maintain policies related to emergency access, fire prevention and design, through the implementation of Condition of Approval Nos. 31 through 34 (Exhibit 5) issued by the Ventura County Fire Protection District (VCFPD). These conditions relate

to the provision of fire protection improvements within the structure and the review of the construction documents by VCFPD. The Project was also found to be consistent with the applicable hazard policies for sea level rise, planning and adaptation, structural design, the minimization of adverse impacts, the minimization of risks to life and property in areas of high geologic, flood and fire hazards and noise compatibility. Ground level improvements proposed by the applicant were analyzed within the 2nd Revised Wave Runup & Coastal Hazards Analysis (Exhibit 7). Proposed ground level improvements include the construction of a building elevator which connects to the habitable floors above the storage/garage. The supporting coastal hazards report indicates that the structure is reasonably safe from coastal hazards including shoreline erosion, wave runup and flooding without the need for shoreline protection to remaining in place. The Applicant will prepare construction documents which demonstrate that the structural design has incorporated the design considerations identified in the coastal hazards report (Exhibit 5, Condition No. 18). The Applicant is also subject to conditions of approval related to the submittal of a Floodplain Development Permit and payment of the Land Development Fee for Flood Control Facilities (Exhibit 5, Conditions Nos. 24 & 27), which further ensure that the public health, convenience and general welfare are maintained throughout the life of the Project. Therefore, the proposed Project will not be detrimental to the public interest, health, safety, convenience, or welfare.

Based on the discussion above, this finding can be made.

F. PLANNING DIRECTOR HEARING NOTICE, PUBLIC COMMENTS, AND JURISDICTIONAL COMMENTS

The Planning Division provided public notice regarding the Planning Director hearing in accordance with the Government Code (Section 65091), CZO (Section 8181-6.2 et seq.). On April 1, 2022, the Planning Division mailed notice to owners of property within 300 feet and residents within 100 feet of the property on which the Project site is located. On April 4, 2022, the Planning Division placed a legal ad in the *Ventura County Star*. As of the date of this staff report, no public comments have been received.

G. RECOMMENDED ACTIONS

Based upon the analysis and information provided above, Planning Division Staff recommends that the Planning Director take the following actions:

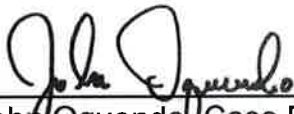
1. **CERTIFY** that the Planning Director has reviewed and considered this staff report and all exhibits thereto, and has considered all comments received during the public comment process;
2. **FIND** that this Project is categorically exempt from CEQA pursuant to Section[s] 15301 (Existing Structures) and 15303 (New Construction of Small Structures) of the CEQA Guidelines.

3. **MAKE** the required findings to grant a Coastal PD Permit pursuant to Section 8181-3.5 of the Ventura County CZO, based on the substantial evidence presented in Section E of this staff report and the entire record;
4. **GRANT** Coastal Planned Development Permit Case No. PL21-0056 subject to the conditions of approval (Exhibit 5).
5. **SPECIFY** that the Clerk of the Planning Division is the custodian, and 800 S. Victoria Avenue, Ventura, CA 93009 is the location, of the documents and materials that constitute the record of proceedings upon which this decision is based.

The decision of the Planning Director is final unless appealed to the Planning Commission within 10 calendar days after the Coastal PD permit has been approved, conditionally approved, or denied (or on the following workday if the 10th day falls on a weekend or holiday). Any aggrieved person may file an appeal of the decision with the Planning Division. The Planning Division shall then set a hearing date before the Planning Commission to review the matter at the earliest convenient date.

If you have any questions concerning the information presented above, please contact John Oquendo at (805) 654-3588 or John.Oquendo@ventura.org.

Prepared by:



John Oquendo, Case Planner
Residential Permit Section
Ventura County Planning Division

Reviewed by:



Jennifer Trunk, Manager
Residential Permit Section
Ventura County Planning Division

EXHIBITS

- Exhibit 2 Maps
- Exhibit 3 Plans
- Exhibit 4 General Plan Consistency Analysis
- Exhibit 5 Conditions of Approval
- Exhibit 6 Soil Engineering Investigation for Proposed Residence (Heathcote Geotechnical, April 2021)
- Exhibit 7 2nd Revised Wave Runup & Coastal Hazard Analysis (GeoSoils, Inc., December 2021)
- Exhibit 8 Noise Impact Assessment (Sespe Consulting, Inc., April 2021)
- Exhibit 9 Addendum to Planning Director Staff Report
- Exhibit 10 Coastal Commission Comment Letter Dated April 13, 2022



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

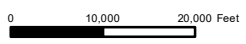


Ventura County, California
Resource Management Agency
GIS Development & Mapping Services
Map created on 11-04-2021



County of Ventura
Planning Director Hearing
Case No. PL21-0056

Exhibit 2 Maps



Disclaimer: This Map was created by the Ventura County Resource Management Agency, Mapping Services - GIS which is designed and operated solely for the convenience of the County and related public agencies. The County does not warrant the accuracy of this map and no decision involving a risk of economic loss or physical injury should be made in reliance thereon.





County of Ventura
Resource Management Agency
GIS Development & Mapping Services
Map created on 11-04-2021
Source: Ventura U.S.G.S.
7.5 Minutes Quadrangle
Contour Interval = 20 ft

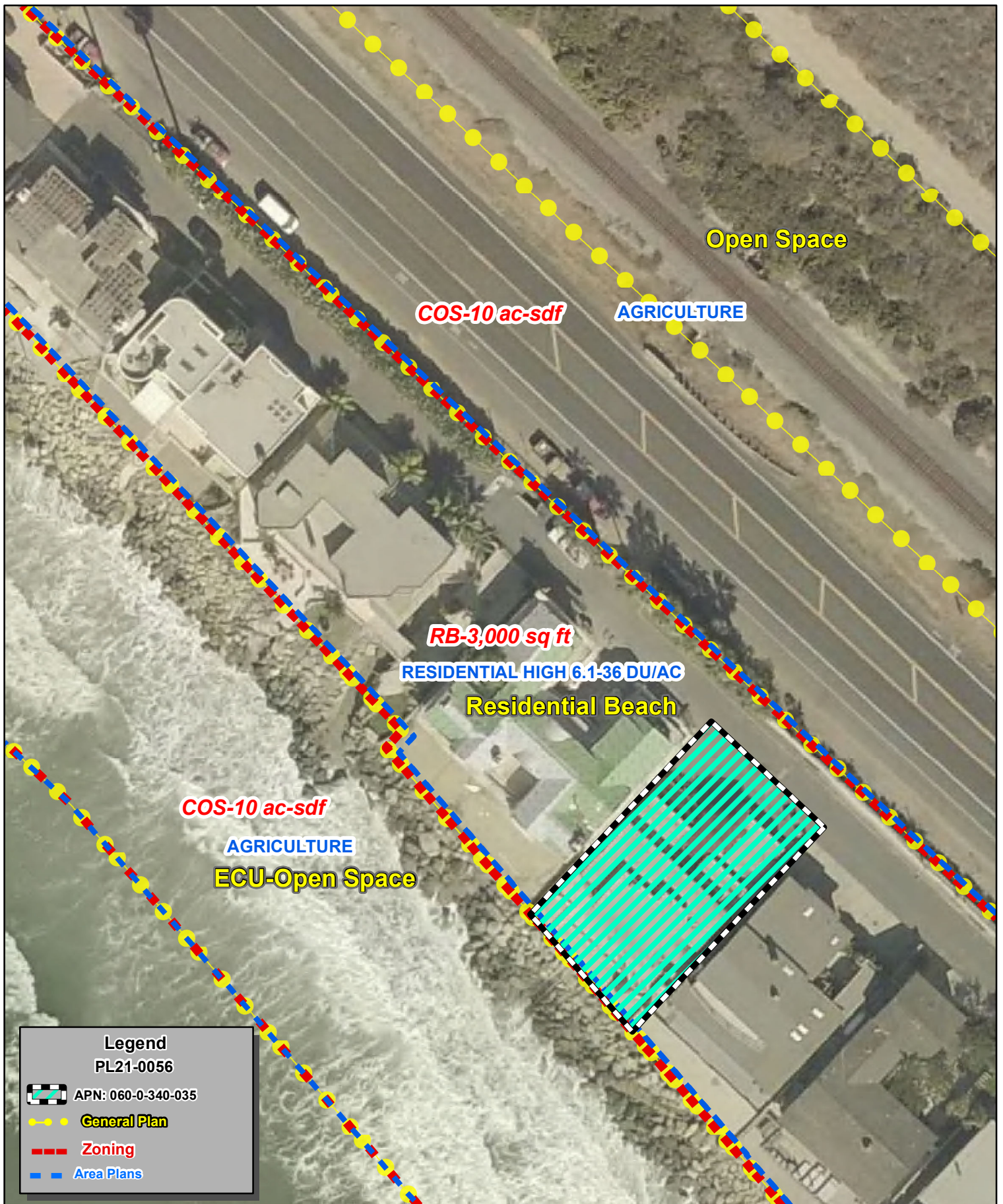





**County of Ventura
Planning Director Hearing
PL21-0056
Topo Map**

0 150 300 Feet

Disclaimer: This Map was created by the Ventura County Resource Management Agency, Mapping Services - GIS which is designed and operated solely for the convenience of the County and related public agencies. The County does not warrant the accuracy of this map and no decision involving a risk of economic loss or physical injury should be made in reliance thereon.





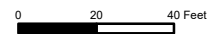
Legend
PL21-0056
 **APN: 060-0-340-035**
 **General Plan**
 **Zoning**
 **Area Plans**



Ventura County, California
 Resource Management Agency
 GIS Development & Mapping Services
 Map Created on 11-04-2021
 This aerial imagery is under the
 copyrights of Pictometry
 Source: Pictometry, 2019



County of Ventura
Planning Director Hearing
PL21-0056
General Plan & Zoning Map



Disclaimer: This Map was created by the Ventura County Resource Management Agency, Mapping Services - GIS which is designed and operated solely for the convenience of the County and related public agencies. The County does no warrant the accuracy of this map and no decision involving a risk of economic loss or physical injury should be made in reliance thereon.





060034003

SOLIMAR BEACH DR



Ventura County, California
Resource Management Agency
GIS Development & Mapping Services
Map Created on 11-04-2021
This aerial imagery is under the
copyrights of Pictometry 2019



County of Ventura
Planning Director Hearing
PL21-0056
Aerial Photography



Disclaimer: This Map was created by the Ventura County Resource Management Agency, Mapping Services - GIS which is designed and operated solely for the convenience of the County and related public agencies. The County does not warrant the accuracy of this map and no decision involving a risk of economic loss or physical injury should be made in reliance thereon.

PROJECT INFORMATION
PROJECT ADDRESS:
 3124 SOLIMAR BEACH DRIVE
 VENTURA, CA 93001
APN:
 060-0-340-035
OWNER:
 3124 SOLIMAR LLC
 MANAGER DONALD H. JONES
 10508 WYTON DRIVE
 LOS ANGELES, CA 90024
 (310) 780-8575 PHONE
 dhjones@jaclaw.com E MAIL

ZONING:
 R-B
DESCRIPTION:
 NEW TWO STORY SINGLE FAMILY RESIDENCE WITH COVERED ENTRY, COVERED PATIO AND SECOND FLOOR DECK. GARAGE AND STORAGE ON GRADE BELOW LIVING LEVEL.
CONSTRUCTION:
 TYPE V NON-RATED
FIRE SPRINKLERS:
 YES (UNDER SEPERATE PERMIT)
SOLAR:
 YES (UNDER SEPERATE PERMIT)

LOT SIZE:
 6355 S.F.
SQAURE FOOTAGE:
 FIRST FLOOR HABITABLE 3127 S.F.
 SECOND FLOOR HABITABLE 3077 S.F.
 TOTAL HABITABLE 6204 S.F.
 GARAGE AND STORAGE 3480 S.F.
 COVERED ENTRY 152 S.F.
 COVERED PATIO 341 S.F.
 SECOND FLOOR DECK 175 S.F.

LOT COVERAGE:
 FIRST FLOOR HABITABLE 3127 S.F.
 COVERED ENTRY 152 S.F.
 COVERED PATIO 341 S.F.
 TOTAL AREA 3620 S.F. OR 57%

SETBACKS:
 FRONT 10 FEET
 SIDES 3 FEET
 REAR PER STRINGLINE
MAXIMUM ALLOWABLE HEIGHT AND FINISHED FLOOR:
 28 FEET ABOVE DATUM IS MAXIMUM ALLOWABLE HEIGHT
 DATUM AND FINISHED FLOOR IS 2.5 FEET ABOVE BFE OF 18 FEET NAVD88
 DATUM AND FINISHED FLOOR IS 18 FEET + 2.5 FEET OR 20.5 FEET NAVD88
 STRUCTURE IS 26.5 FEET ABOVE DATUM OR 47 FEET NAVD88

ARCHITECT AND CONTACT PERSON:
 MARTHA PICCIOTTI
 404 N. CATALINA STREET
 VENTURA, CA 93001
 (805) 641-3221 PHONE
 mpdesign@charter.net E MAIL

REVISIONS	BY

PICCIOTTI ARCHITECT
 LICENSE # C18513

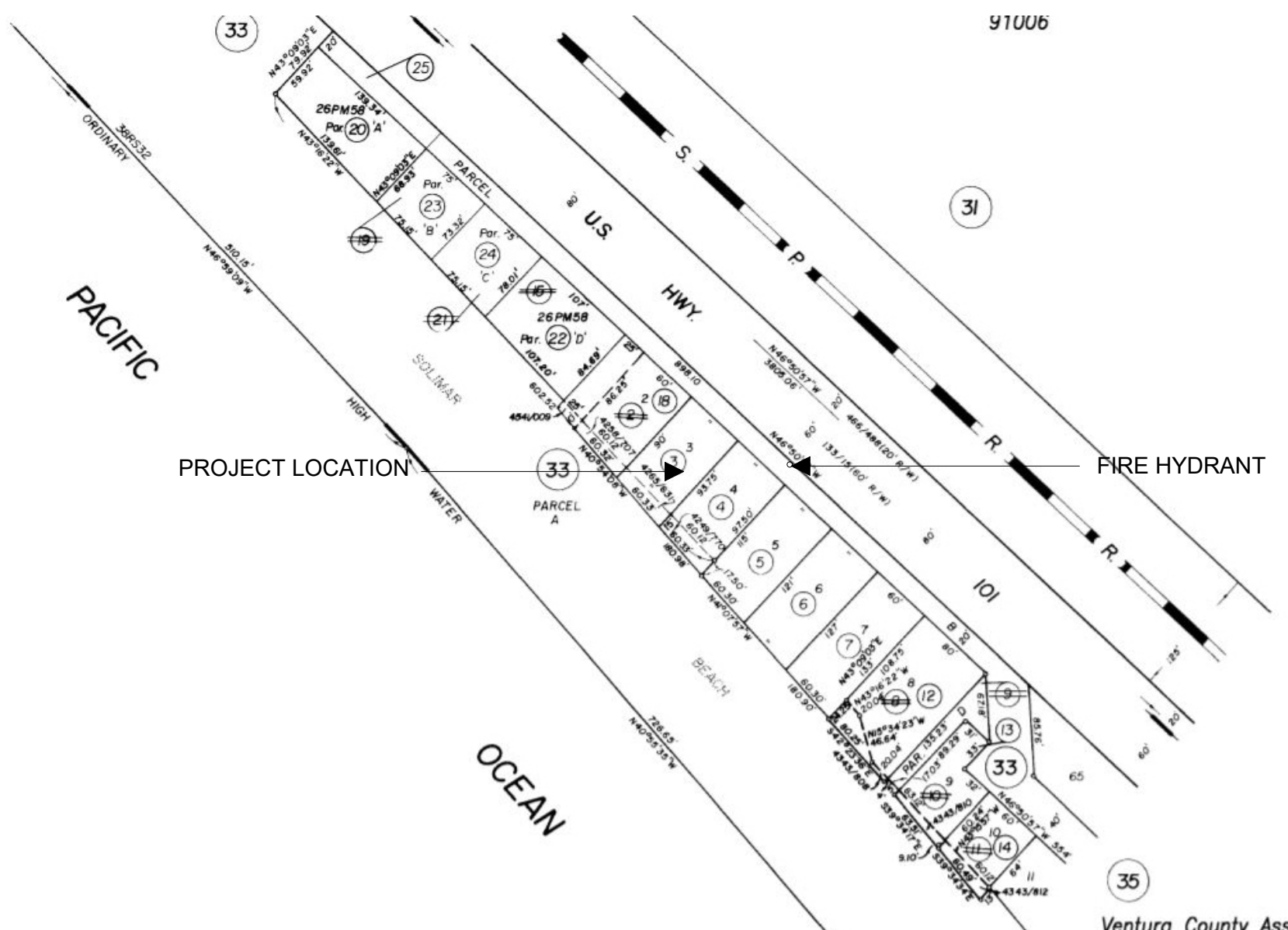
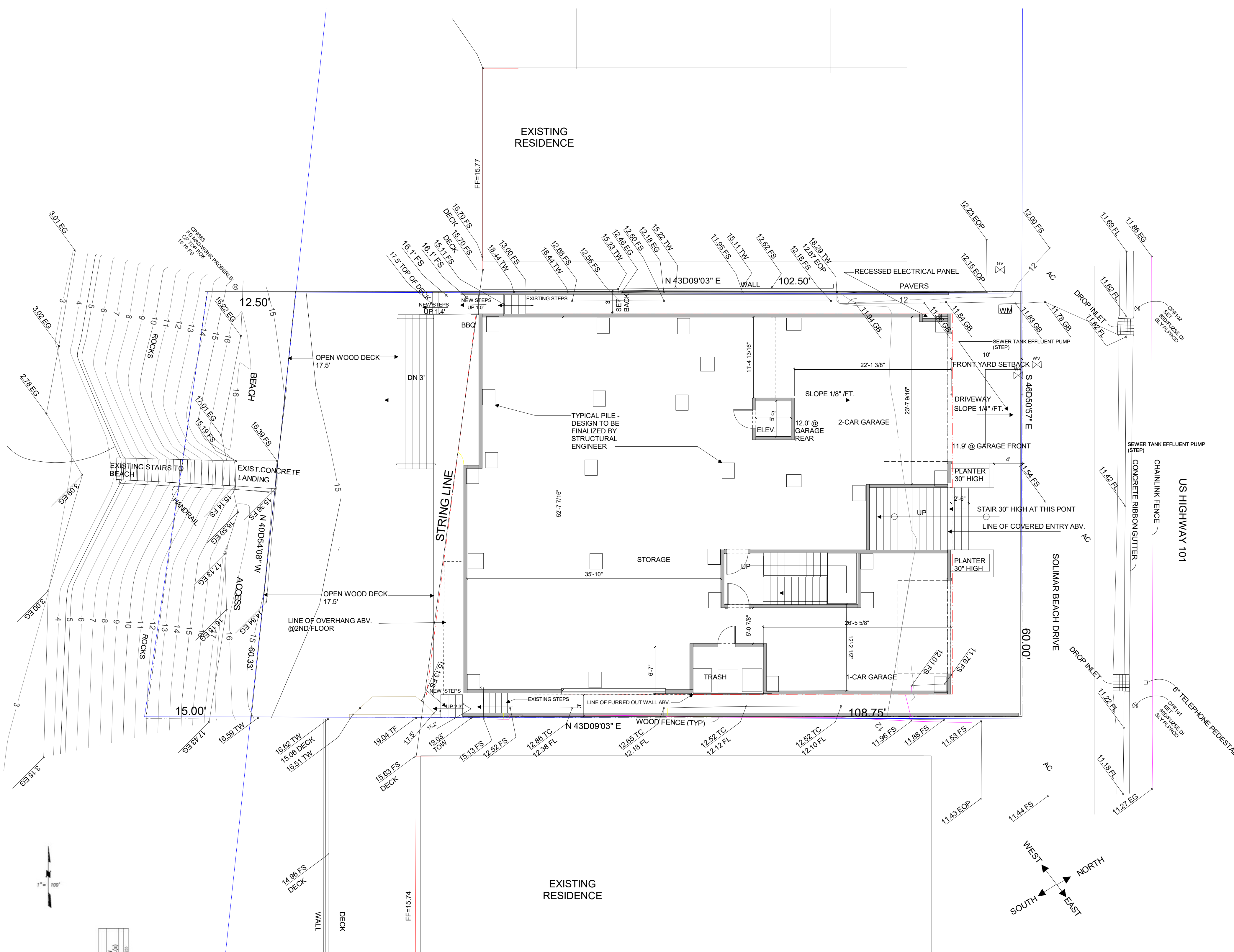
 DESIGN
 404 NORTH CATALINA STREET
 VENTURA, CA 93001
 TEL (805) 641 - 3221
 MPDESIGN@CHARTER.NET

NEW RESIDENCE
 for
SALLY AND DONALD JONES
 3124 SOLIMAR BEACH DRIVE
 VENTURA CA

VICINITY NAP
SITE PLAN
PROJECT
INFORMATION

DRAWN BY
 SCALE 1/8"=1'-0"
 DATE 11-22-21
 JOB
 SHEET

1



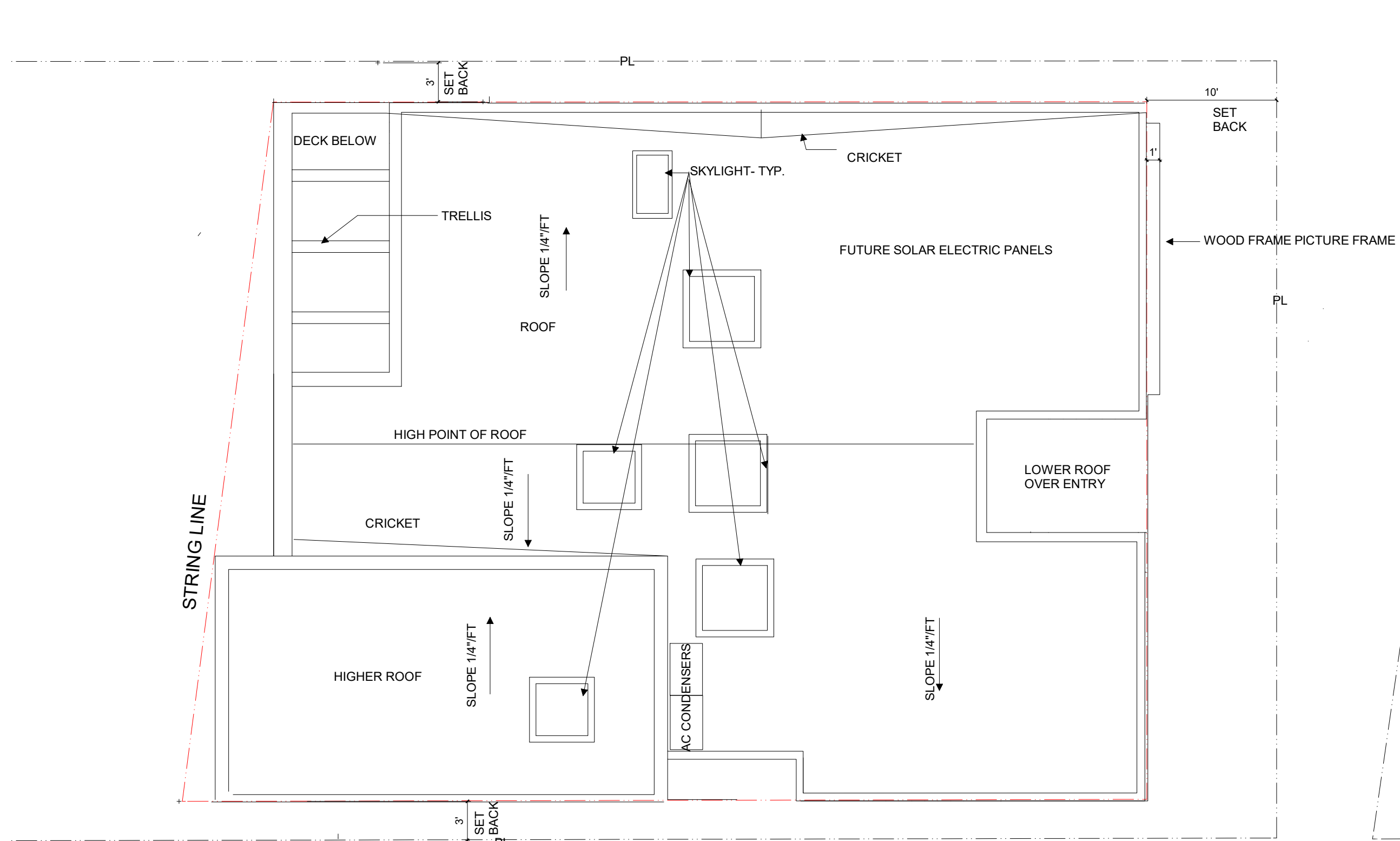
DATE	DESCRIPTION	BY
11/22/21	PLANNING DIRECTOR HEARING	MP
11/22/21	REVISION	MP
11/22/21	REVISION	MP
11/22/21	REVISION	MP

Ventura County Assessor's Map
 Assessor's Book Numbers Shown in Ellipses
 Assessor's Parcel Numbers Shown in Circles
 Assessor's Mineral Numbers Shown in Squares
 DRAWN BY: MP
 REVISION: 5-20-2009
 REVISION: 3-11-2014
 REVISION: 7-26-2021
 PREVIOUS: Bk. 65, Parcel Pg. 31
 Compiler: Ventura County Assessor's Office

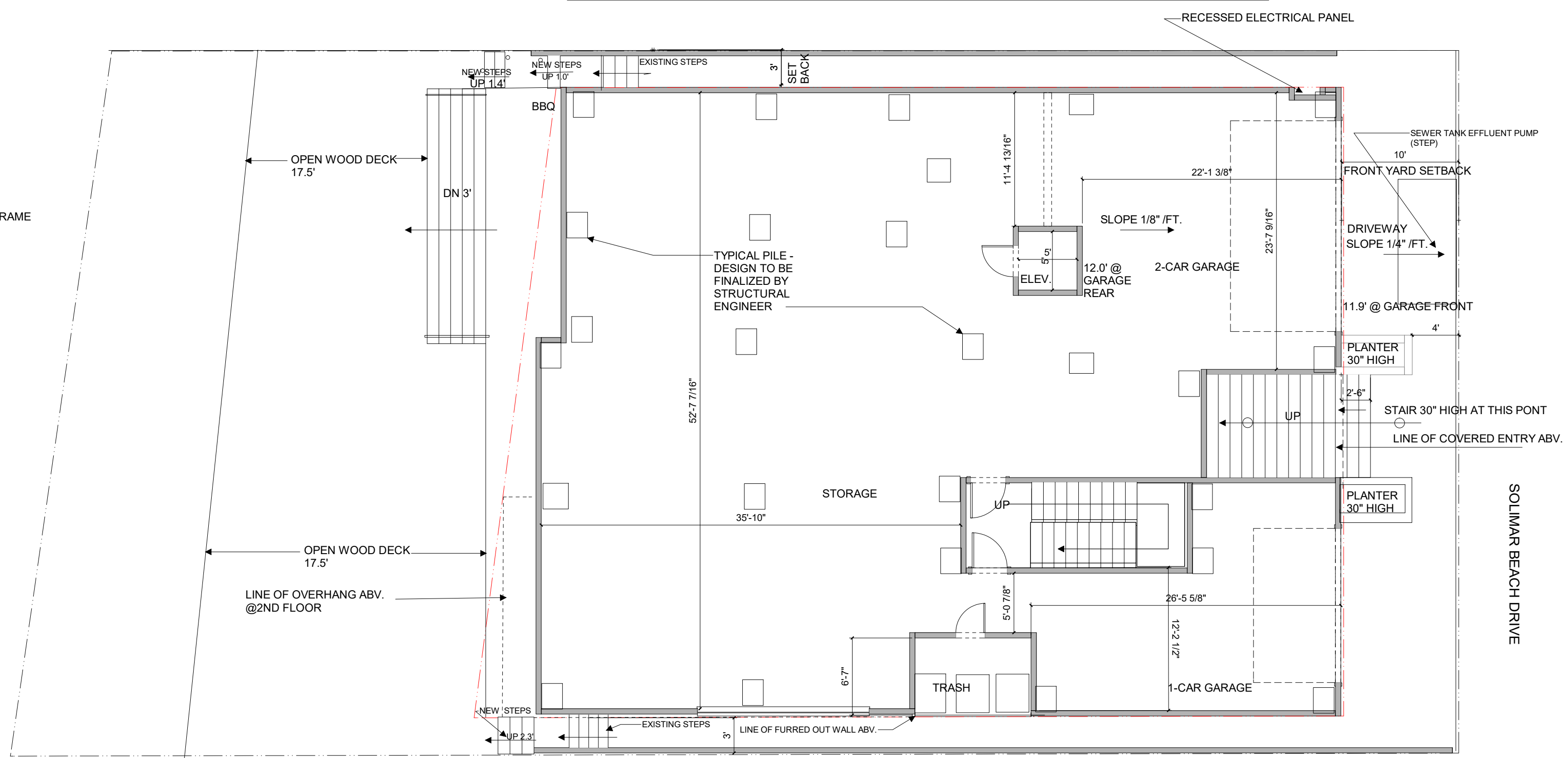
County of Ventura
 Planning Director Hearing
 Case No. PL21-0056
 Exhibit 3 - Plans

Portion Record Survey, R.S. Bk.38, Pg.32
 Rancho San Miguelito, M.R. Bk.1A, Pg.21

ASSESSORS PARCEL MAP



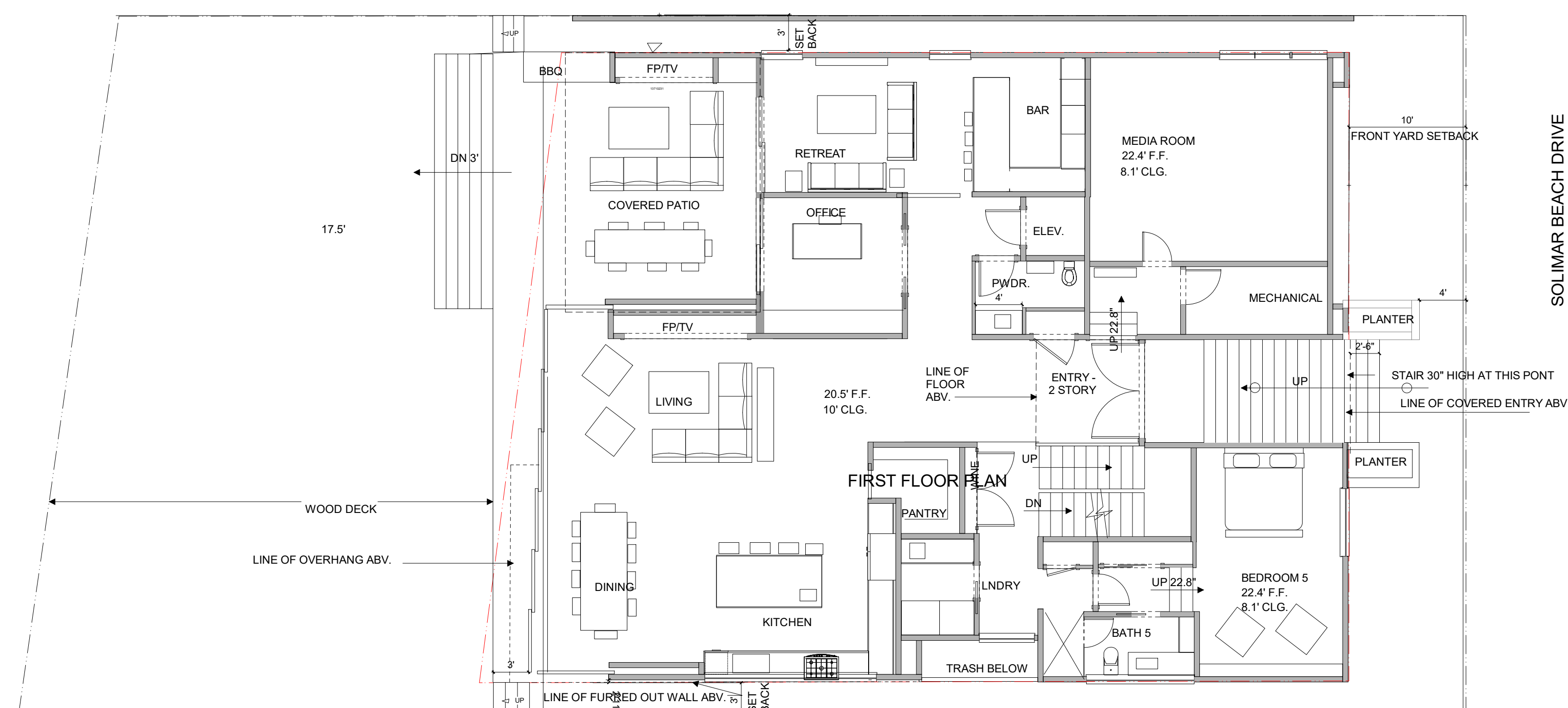
ROOF PLAN



GARAGE PLAN



SECOND FLOOR PLAN



FIRST FLOOR PLAN

REVISIONS	BY

PICCIOTTI
MARTHA PICCIOTTI ARCHITECT
 LICENSE # C18513
 DESIGN
 404 NORTH CATALINA STREET
 VENTURA, CA 93001
 TEL (805) 641 - 3221
 MPDESIGN@CHARTER.NET

NEW RESIDENCE
 for
SALLY AND DONALD JONES
 3124 SOLIMAR BEACH DRIVE
 VENTURA CA

FLOOR PLANS

DRAWN BY
 SCALE 1/8"=1'-0"
 DATE 11-22-21
 JOB
 SHEET

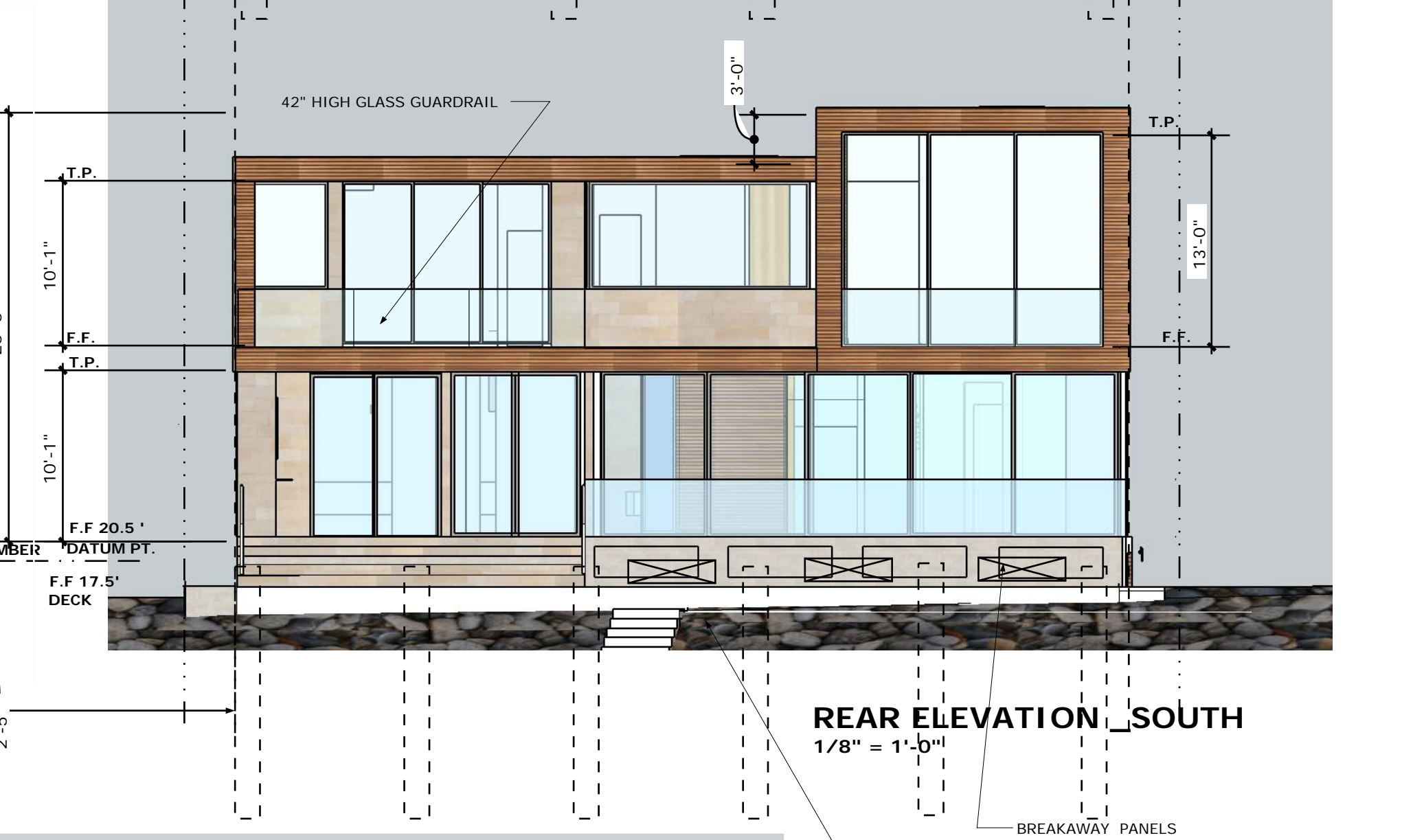
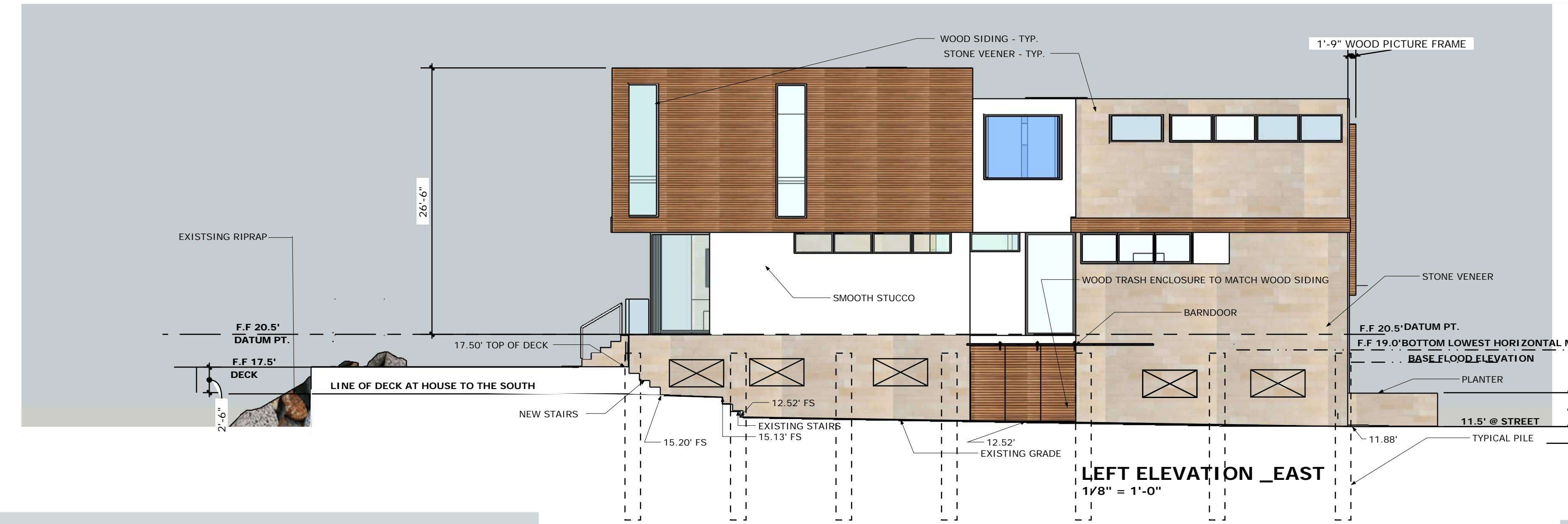
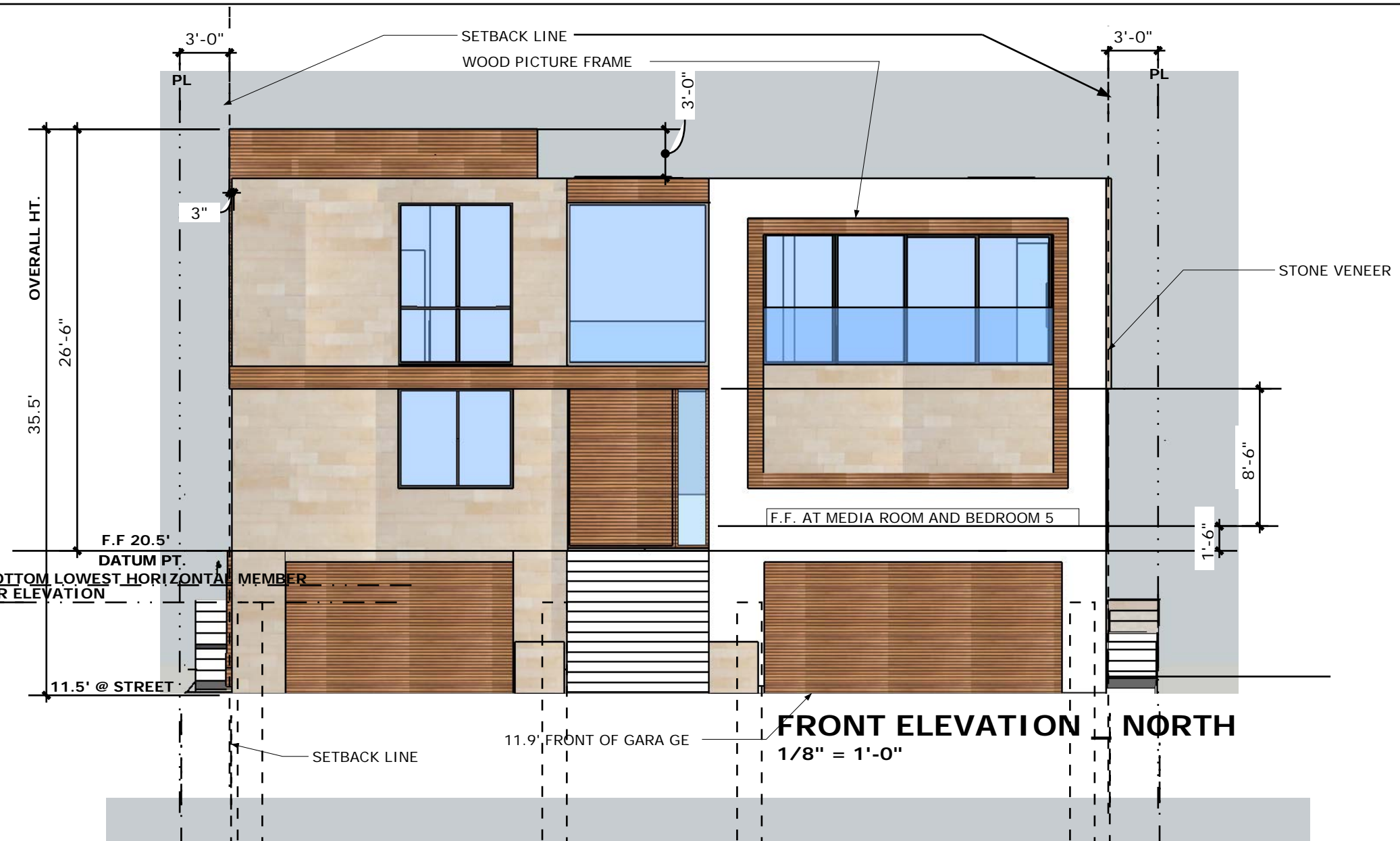
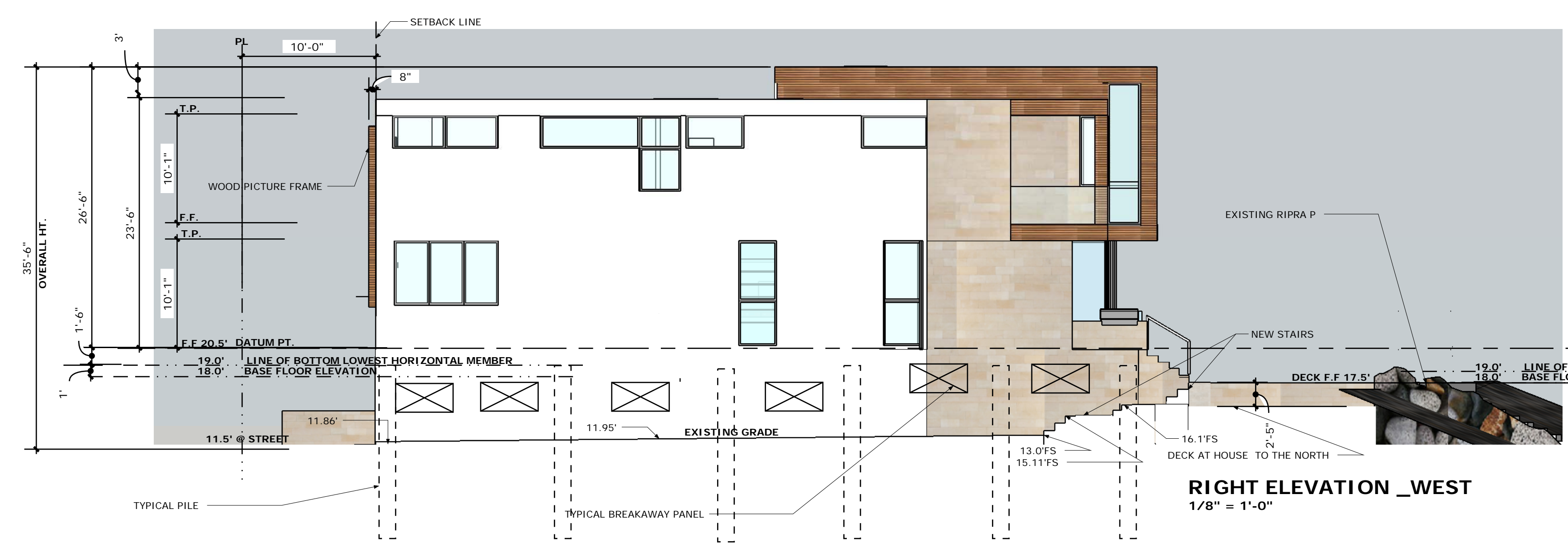
REVISIONS	

PICCIOTTI
MARTHA PICCIOTTI ARCHITECT
 LICENSE # C18513
DESIGN
 404 NORTH CATALINA STREET
 VENTURA, CA 93001
 TEL 805-641-3221
 mpdesign@charter.net

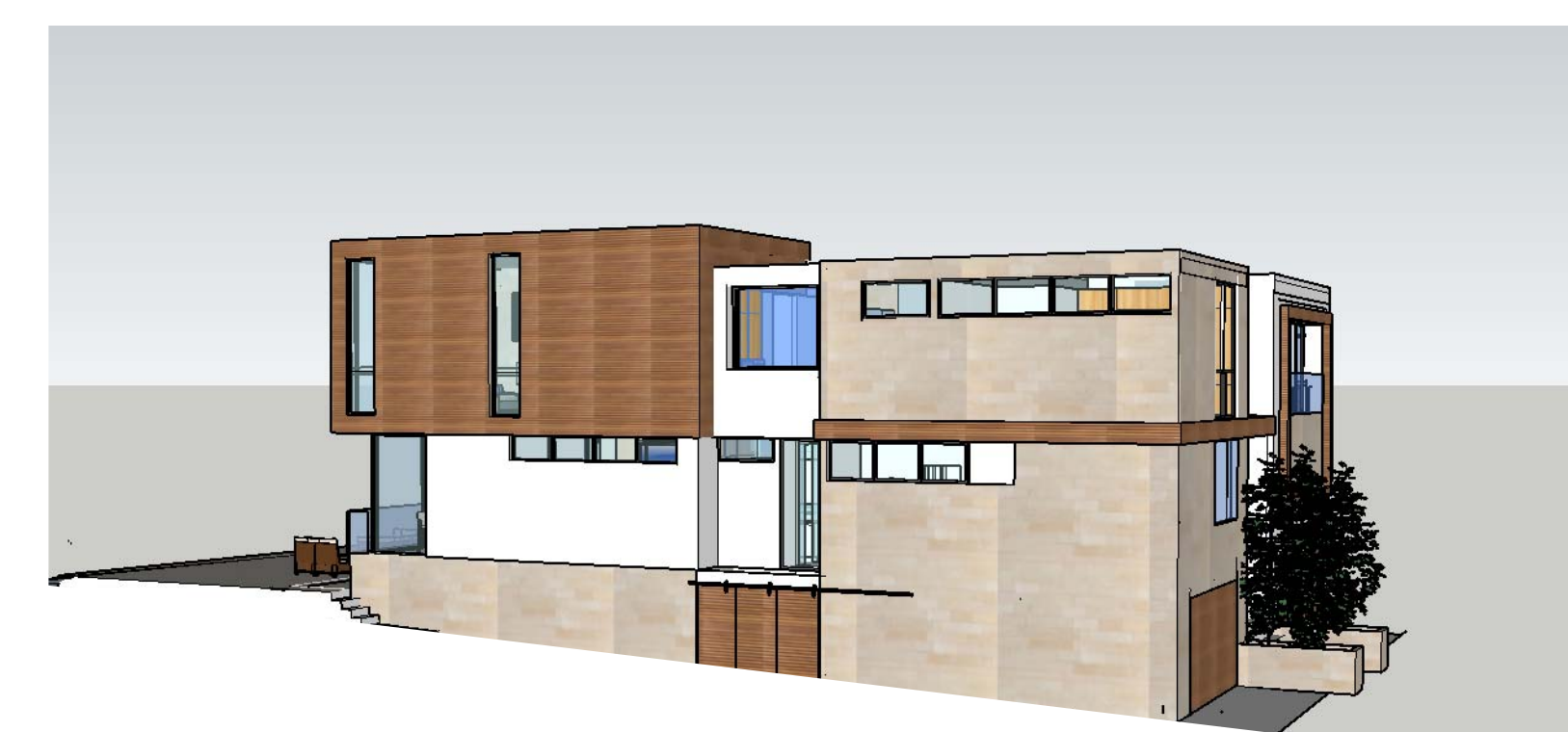
NEW RESIDENCE
 for
SALLY AND DONALD JONES
 3124 SOLIMAR BEACH DRIVE
 VENTURA, ca 93001

ELEVATIONS

DRAWN BY
 SCALE: 1/8" = 1'-0"
 DATE 11-22-21



SOUTH EAST VIEW FROM BEACH
N.T.S.



EAST VIEW
N.T.S.



FRONT LEFT (NORTH EAST) VIEW FROM ROAD
N.T.S.



SOUTH VIEW FROM BEACH
N.T.S.



SOUTH WEST VIEW FROM BEACH
N.T.S.



SOUTH WEST VIEW FROM BEACH
N.T.S.

SURVEYOR'S STATEMENT

THIS MAP CORRECTLY REPRESENTS A TOPOGRAPHIC SURVEY MADE BY ME OR UNDER MY DIRECTION IN CONFORMANCE WITH LOCALLY ACCEPTED STANDARDS AND PRACTICES ON JANUARY 13, 2021

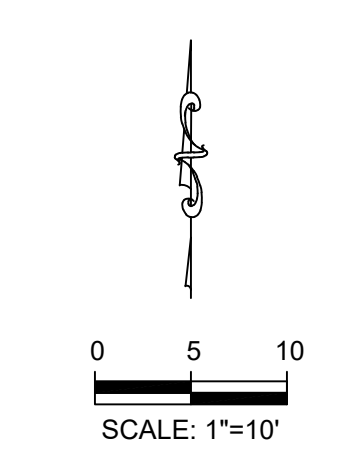
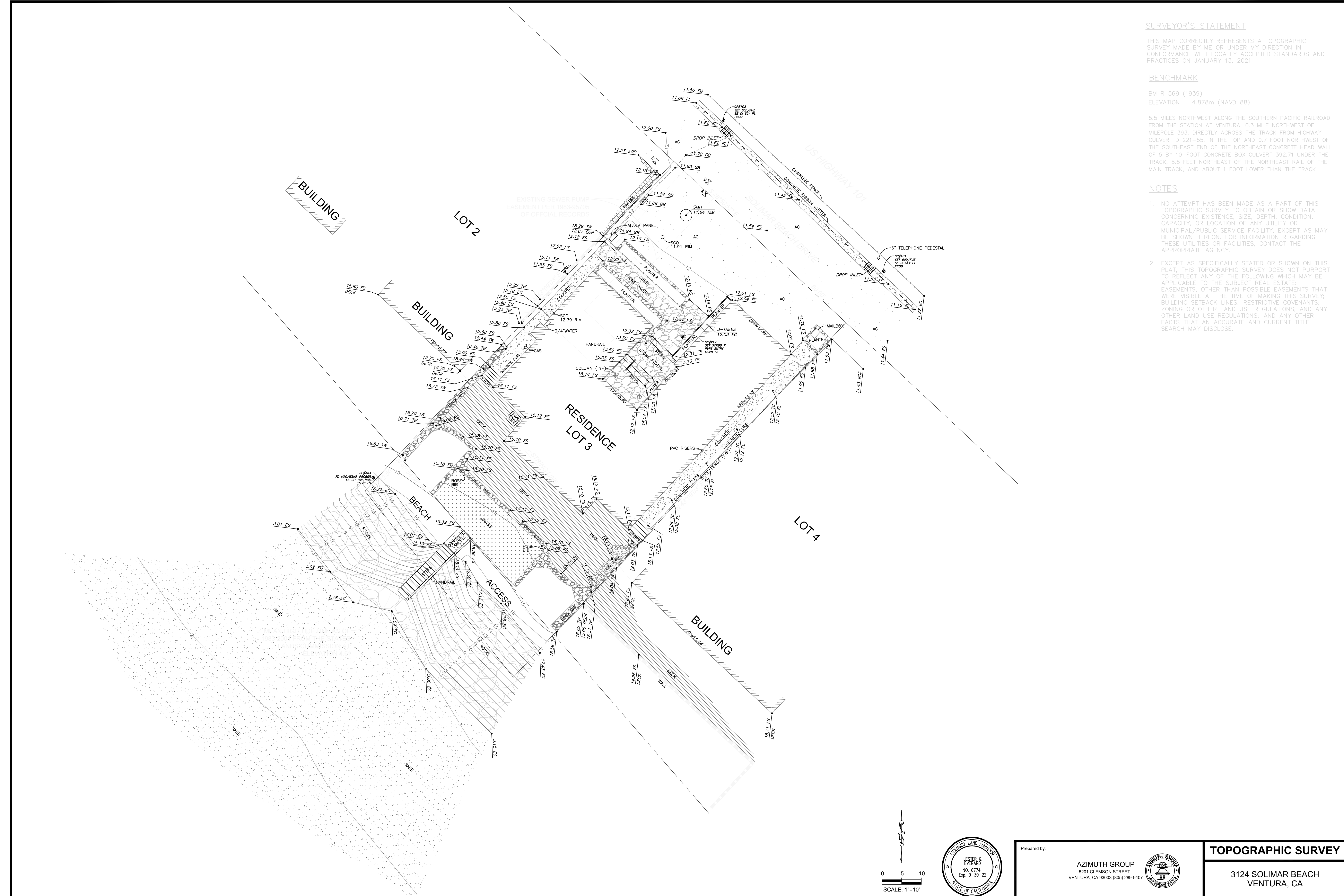
BENCHMARK

BM R 569 (1939)
ELEVATION = 4.878m (NAVD 88)

5.5 MILES NORTHWEST ALONG THE SOUTHERN PACIFIC RAILROAD FROM THE STATION AT VENTURA, 0.3 MILE NORTHWEST OF MILEPOLE 393, DIRECTLY ACROSS THE TRACK FROM HIGHWAY CULVERT D 221+55, IN THE TOP AND 0.7 FOOT NORTHWEST OF THE SOUTHEAST END OF THE NORTHEAST CONCRETE HEAD WALL OF 5 BY 10-FOOT CONCRETE BOX CULVERT 392.71 UNDER THE TRACK, 5.5 FEET NORTHEAST OF THE NORTHEAST RAIL OF THE MAIN TRACK, AND ABOUT 1 FOOT LOWER THAN THE TRACK

NOTES

1. NO ATTEMPT HAS BEEN MADE AS A PART OF THIS TOPOGRAPHIC SURVEY TO OBTAIN OR SHOW DATA CONCERNING EXISTENCE, SIZE, DEPTH, CONDITION, CAPACITY, OR LOCATION OF ANY UTILITY OR MUNICIPAL/PUBLIC SERVICE FACILITY, EXCEPT AS MAY BE SHOWN HEREON. FOR INFORMATION REGARDING THESE UTILITIES OR FACILITIES, CONTACT THE APPROPRIATE AGENCY.
2. EXCEPT AS SPECIFICALLY STATED OR SHOWN ON THIS PLAT, THIS TOPOGRAPHIC SURVEY DOES NOT PURPORT TO REFLECT ANY OF THE FOLLOWING WHICH MAY BE APPLICABLE TO THE SUBJECT REAL ESTATE: EASEMENTS, OTHER THAN POSSIBLE EASEMENTS THAT WERE VISIBLE AT THE TIME OF MAKING THIS SURVEY; BUILDING SETBACK LINES; RESTRICTIVE COVENANTS; ZONING OR OTHER LAND USE REGULATIONS; AND ANY OTHER FACTS THAT AN ACCURATE AND CURRENT TITLE SEARCH MAY DISCLOSE.



Prepared by:

AZIMUTH GROUP
5201 CLEMSON STREET
VENTURA, CA 93003 (805) 289-9407

DWG DATE: 7-20-2021

TOPOGRAPHIC SURVEY

3124 SOLIMAR BEACH
VENTURA, CA

EXHIBIT 4 – GENERAL PLAN CONSISTENCY ANALYSIS
3124 SOLIMAR LLC,
COASTAL PLANNED DEVELOPMENT PERMIT,
CASE NO. PL21-0056

CONSISTENCY WITH THE GENERAL PLAN

The 2040 Ventura County General Plan *Goals, Policies and Programs* (page 1-1) states:

All area plans, specific plans, subdivisions, public works projects, and zoning decisions must be consistent with the direction provided in the County's General Plan.

Finally, the Ventura County CZO (Section 8181-3.5.a) states that in order to be approved, a project must be found consistent with all applicable policies of the Ventura County Coastal Area Plan. Evaluated below is the consistency of the proposed project with the applicable policies of the General Plan *Goals, Policies and Programs* and *Coastal Area Plan*.

Land Use Element Policies

1. **General Plan Land Use Policy LU-16.1 Community Character and Quality of Life:** *The County shall encourage discretionary development to be designed to maintain the distinctive character of unincorporated communities, to ensure adequate provision of public facilities and services, and to be compatible with neighboring uses.*

LU-16.8 Residential Design that Complements the Natural Environment *The County shall encourage discretionary development that incorporates design features that provide a harmonious relationship between adjoining uses and the natural environment.*

LU-16.9 Building Orientation and Landscaping *The County shall encourage discretionary development to be oriented and landscaped to enhance natural lighting, solar access, and passive heating or cooling opportunities to maximize energy efficiency.*

Coastal Act Section 30250(a): *New residential, commercial, or industrial development, except as otherwise provided in this division, shall be located within, contiguous with, or in close proximity to, existing developed areas able to accommodate it, or where such areas are not able to accommodate it, in other areas with adequate public services and where it will not have significant adverse effects, either individually or cumulatively, on coastal resources. In addition, land divisions, other than leases for agricultural uses, outside existing developed areas shall be permitted only where 50 percent of the usable parcels in the area have*

been developed and the created parcels would be no smaller than the average size of surrounding parcels.

Coastal Act Section 30251 – Scenic and Visual Qualities: *The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural landforms, to be visually compatible with the character of the surrounding area and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.*

The proposed Project consists of the demolition of an existing single-family dwelling and the construction of a new single-family dwelling to be supported on piles above a garage and storage area. The proposed project will not degrade or significantly alter the existing scenic or visual qualities of the Solimar Beach Colony community nor the public beach . The Project would occur within the Solimar Beach Colony beach front residential development within an area defined by the Ventura County General Plan as an existing community. The Project site accommodates the applicable development standards for the underlying RB (Residential Beach) zoning and the proposed dwelling is within the allowable height limit. The Ventura County Coastal Zoning Ordinance (CZO) permits structure height measurement in the RB zone to be taken from the lowest elevation of the first floor as determined by the Public Works Agency. In this case, the 2nd Revised Wave Runup & Coastal Hazards Analysis (Exhibit 7) prepared for the project establishes the lowest horizontal structural member elevation of 1 foot above the Federal Emergency Management Agency’s base flood elevation of +18 above the National Vertical Datum of 1988 (NAVD88) putting the first/finished floor elevation (FFE) at approximately 20.5 NAVD88. The proposed building height is located at an elevation of 46.6 NAVD88, with a measured height of 26 feet 6 inches, below the height limit of 28 feet.

The Project does not include any grading or alterations to natural landforms. The structure, which proposes a flat roof design also accommodates the stringline rear yard setback, keeping the building envelop in line with the neighboring structures. The neighborhood is comprised of a blend of two-story architectural styles (i.e., the neighboring neocolonial structure, and split-level two story ranch structure) with conventional slab-on-grade construction. The proposed dwelling is a modern-style structure with wood siding stone veneer and smooth stucco exterior finishes, a flat-roof and seaward facing balconies and uses. The structure will blend with the existing residential forms in the surrounding area and the proposed building height will not impact views from public viewing locations either to the beach from Highway 101/ State Route 1 or views from the beach to the hills, therefore the impacts associated with the proposed Project are considered less than significant.

The subject property is approximately 340 feet from the southbound lane of the 101 freeway, elevated approximately 25 feet above the subject property (Ventura County Geographic Information System, 2022). Based on existing street view data, drivers from State Route 1 do not have any line of site to the Pacific Ocean or the sandy beach areas. The Project has been forwarded to the Solimar Beach Colony Homeowners Association; as of the date of this staff report, no project-related comments have been received.

Based on the discussion above, the proposed Project is consistent with Ventura County General Plan Policies LU-16.1, LU-16.8, LU16.9, and the applicable provisions of Coastal Act Sections 30250 (a) and 30251.

Public Facilities and Services Policies

2. **PFS-1.7 Public Facilities, Services, and Infrastructure Availability** *The County shall only approve discretionary development in locations where adequate public facilities, services, and infrastructure are available and functional, under physical construction, or will be available prior to occupancy.*

PFS-3.2 Fair Share of Improvement Costs *The County shall require development to pay its fair share of community improvement costs through impact fees, assessment districts, and other mechanisms.*

PFS-4.1 Wastewater Connections Requirement *The County shall require development to connect to an existing wastewater collection and treatment facility if such facilities are available to serve the development. An onsite wastewater treatment system shall only be approved in areas where connection to a wastewater collection and treatment facility is deemed unavailable.*

PFS-6.1 Flood Control and Drainage Facilities Required for Discretionary Development *The County shall require discretionary development to provide flood control and drainage facilities, as deemed necessary by the County Public Works Agency and Watershed Protection District. The County shall also require discretionary development to fund improvements to existing flood control facilities necessitated by or required by the development.*

Coastal Act Section 30254 Public Works Facilities *New or expanded public works facilities shall be designed and limited to accommodate needs generated by development or uses permitted consistent with the provisions of this division; provided, however, that it is the intent of the Legislature that State Highway Route 1 in rural areas of the coastal zone remain a scenic two-lane road. Special districts shall not be formed or expanded except where assessment for, and provision of, the service would not induce new development inconsistent with this division. Where existing or planned public works facilities can accommodate only a limited amount of new development, services to coastal dependent land use, essential public services and basic industries vital to the economic health of the region,*

state, or nation, public recreation, commercial recreation, and visitor-serving land uses shall not be precluded by other development.

The proposed Project has been reviewed for consistency with the applicable standards for public facilities, services, and infrastructure. The Project was found to have adequate access to the range of utilities, public services and infrastructure required for construction and occupancy of a new single-family dwelling without compromising existing levels of service. Casitas Municipal Water District will continue to serve the project site as confirmed by water will-serve letter dated March 23, 2021. The subject property is served by an ¾-inch water meter and has an existing Stage 1 allocation of 0.49 acre-feet of water per year (FY) for the meter. Proposed project will utilize an existing connection to County Service Area No. 29 for domestic sewage disposal; connection verified by sewer availability letter dated March 31, 2021. The sewer availability letter states the Project will require the installation of a new Septic Tank Effluent Pump (STEP) system; the proposed scope of work includes the installation of a new STEP tank. The proposed Project possesses all necessary utilities, services and facilities for the construction and use of a new single-family dwelling. The Project is subject to the assessment of a land development fee for the construction and maintenance of flood control facilities due to cumulative adverse impacts associated with the development of additional impervious surfaces. However, the project will not require the expansion or construction of new flood control facilities as the result of the development of the proposed single-family dwelling. The project has been conditioned to require the Applicant pay a Land Development Fee (Exhibit 5, Condition of Approval No. 24).

Based on the discussion above, the proposed Project is consistent with Ventura County General Plan Policies PFS1.7, PFS3.2, PFS-4.1, and PFS-6.1.

- 3. PFS-11.4 Emergency Vehicles Access** *The County shall require all discretionary development to provide, and existing development to maintain, adequate access for emergency vehicles, including two points of access for subdivisions and multifamily developments.*

PFS-12.3 Adequate Water Supply, Access, and Response Times for Firefighting Purposes *The County shall prohibit discretionary development in areas that lack and cannot provide adequate water supplies, access, and response times for firefighting purposes.*

PFS-12.4 Consistent Fire Protection Standards for New Development *The County, in coordination with local water agencies and the Fire Protection District, shall require new discretionary development to comply with applicable standards for fire flows and fire protection.*

CTM-2.28 Emergency Access *The County shall ensure that all new discretionary projects are fully evaluated for potential impacts to emergency access. Mitigation*

of these impacts shall be handled on a project-by-project basis to guarantee continued emergency service operations and service levels. (RDR)

HAZ-1.1 Fire Prevention Design and Practices *The County shall continue to require development to incorporate design measures that enhance fire protection in areas of high fire risk. This shall include but is not limited to incorporation of fire-resistant structural design, use of fire-resistant landscaping, and fuel modification around the perimeter of structures.*

HAZ-1.4 Development in High Fire Hazard Severity Zones and Hazardous Fire Areas *The County shall require the recordation of a Notice of Fire Hazard with the County Recorder for all new discretionary entitlements (including subdivisions and land use permits) within areas designated as Hazardous Fire Areas by the Ventura County Fire Department or High Fire Hazard Severity Zones by the California Department of Forestry and Fire Protection (CAL FIRE).*

With respect to public safety considerations, the proposed Project has been evaluated for the applicable requirements related to emergency access and the fire protection standards and has been found to comply with the minimum standards. According to the Ventura County Geographic Information System (VCGIS, 2022), the Project is located within the local responsibility area in the Very High Fire Severity Zone. The subject property is approximately 4 miles south of Fire Station 25 addressed as 5674 W Pacific Coast Highway. The redevelopment of the subject property will not degrade existing levels of service for fire protection. The Project has been evaluated by the Ventura County Fire Protection District (VCFPD). In conformance with the Conditions of Approval issued by the VCFPD (Exhibit 5, Condition of Approval Nos. 31 through 34), the applicant will be required to install address identification numbers, install fire sprinklers in the proposed dwelling, and submit construction documents for review by VCFPD under their procedures for the Fire Department Clearance. The implementation of these conditions ensures compliance with the applicable fire protection standards. Lastly, the Ventura County Sheriff's Office is responsible for law enforcement services in Ventura County. The proposed project is located within the West County Patrol area, the Sheriff's main office is located at 800 S Vitoria Avenue, Ventura, 10 miles to the southeast. The proposed Project will not have a significant impact on the provision of public safety services.

Based on the discussion above, the proposed Project is consistent with Ventura County General Plan Policies PFS-11.4, PFS-12.3, PFS-12.4, CTM-2.28, HAZ-1.1 and HAZ-1.4.

Conservation and Open Space Policies

- COS-2.6 Public Access** *The County shall continue to plan for the preservation, conservation, efficient use of, enjoyment of, and access to resources, as appropriate, within Ventura County for present and future generations.*

Coastal Area Plan North Coast Policy 4.2.2 B-1 Recreation and Access – Vertical *For all new development between the first public road and the ocean, granting of an easement to allow vertical access to the mean high tide line shall be mandatory unless:*

- a. Adequate public access is already available within a reasonable distance of the site measured along the shoreline, or*
- b. Access at the site would result in unmitigable adverse impacts on areas designated as sensitive habitats or tidepools by the land use plan, or*
- c. Findings are made, consistent with Section 30212 of the Act, that access is inconsistent with public safety, military security needs, or that agriculture would be adversely affected, or*
- d. The parcel is too narrow to allow for an adequate vertical access corridor without adversely affecting the privacy of the property owner, or*

Coastal Area Plan North Coast Policy 4.2.2 B-2 Recreation and Access – Lateral *For all new development between the first public road and the ocean, granting of lateral easements to allow for public access along the shoreline shall be mandatory unless subsection (a) below is found. In coastal areas, where the bluffs exceed five feet in height, all beach seaward of the base of the bluff shall be dedicated. In coastal areas where the bluffs are less than five feet, the area to be dedicated shall be determined by the County. At a minimum, the dedicated easement shall be adequate to allow for lateral access during periods of high tide. In no case shall the dedicated easement be required to be closer than 10 feet to a residential structure. In addition, all fences, no trespassing signs, and other obstructions that may limit public lateral access shall be removed as a condition of development approval.*

- a. Findings are made, consistent with Section 30212 of the Act that access is inconsistent with public safety, military security needs, or that agriculture would be adversely affected.*

Coastal Act Section 30211 *Development Shall Not Interfere with Coastal Access* *Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.*

The proposed Project is located wholly within the boundary of an existing lot and does not involve the development of sandy beach areas or public areas used to access the shore. The subject property is located within the Solimar Beach Colony, a private residential development, and is accessed by Solimar Beach Drive, a private road. Public access to the shore is located 500 feet to the northwest at the edge of the Solimar Beach Colony development, where the public has direct access to the beach and off highway parking is available to the public along State Route 1. No new or expanded vertical access is required for the

proposed Project. With regard to lateral access, the site is located adjacent to Parcel A owned by the Solimar Beach Colony, as shown on a Map Recorded in Book 38, Record of Surveys, Page 33, which contains a rock revetment and the seasonally accessibly sandy beach located at the toe of the revetment. No additional access easements are required to address expanded or additional horizontal access along the shore. Coastal Area Plan Figure 4.1-3 (North Coast) was reviewed as a part of the evaluation of this Project. The Project was found to be in proximity to planned multi-modal segments (N-2) of the Coastal Trail. The Project is not immediately adjacent to segment N-2, Old Pacific Coastal Highway, 2, as the private road contained on Parcel B occurs between the Project site and State Route 1.

Based on the discussion above, the proposed Project is determined to be consistent with Ventura County Policies COS-2.6, HAZ-3.1, and Coastal Area Plan Policies 4.2.2 B-1, 4.2.2 B-2, and Coastal Act Sections 30211.

5. **General Plan Policy COS-4.4 (Discretionary Development and Tribal, Cultural, Historical, Paleontological, and Archaeological Resource Preservation):** *The County shall require that all discretionary development projects be assessed for potential tribal, cultural, historical, paleontological, and archaeological resources by a qualified professional and shall be designed to protect existing resources. Whenever possible, significant impacts shall be reduced to a less-than-significant level through the application of mitigation and/or extraction of maximum recoverable data. Priority shall be given to measures that avoid resources.*

Coastal Area Plan - Archaeological Resources Policy 4.1.1-1: *Discretionary development shall be reviewed to identify potential locations for sensitive archaeological resources.*

Coastal Area Plan – Central Coast Policy Archaeological Resources Policy 4.1.1-2: *New development shall be sited and designed to avoid adverse impacts to archaeological resources to the maximum extent feasible. If there is no feasible alternative that can eliminate all impacts to archaeological resources, then the alternative that would result in the fewest or least significant impacts to resources shall be selected. Impacts to archaeological resources that cannot be avoided through siting and design alternatives shall be mitigated. When impacts to archaeological resources cannot be avoided, mitigation shall be required and shall be designed in accordance with established federal, state and/or County standards and shall be consistent with the policies and provisions of the LCP.*

Coastal Area Plan - Archaeological Resources Policy 4.1.1-6: *Protect and preserve archaeological resources from destruction and avoid impacts to such resources where feasible.*

Coastal Area Plan - Archaeological Resources Policy 4.1.1-7: *The unauthorized collection of archaeological artifacts is prohibited.*

Coastal Area Plan - Paleontology Policy 4.1.2-1: *Discretionary development shall be reviewed to determine the geologic unit(s) to be impacted and paleontological significance of the geologic rock units containing them.*

Coastal Area Plan - Paleontology Policy 4.1.2-2: *New development shall be sited and designed to avoid adverse impacts to paleontological resources to the maximum extent feasible. If there is no feasible alternative that can eliminate all impacts to paleontological resources, then the alternative that would result in the fewest or least significant impacts to resources shall be selected. Impacts to paleontological resources that cannot be avoided through siting and design alternatives shall be mitigated. When impacts to paleontological resources cannot be avoided, mitigation shall be required that includes procedures for monitoring grading and handling fossil discoveries that may occur during development.*

Coastal Area Plan - Paleontology Policy 4.1.2-3: *Protect and preserve paleontological resources from destruction and avoid impacts to such resources where feasible.*

Coastal Act Section 30244: *Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.*

For projects in an area (a) or (b), the applicant will have a qualified archaeologist assess the development impacts and cultural significance of the site. As may be appropriate, the Northridge Archaeological Research Center at Cal State Northridge should be contacted for a Native American approved Monitor to observe and aide the work during excavation of auger holes, test pits, trenches or exposures (Appendix 2).

The proposed Project consists of minimal ground disturbing activities associated with the demolition of the existing structure and the placement of piles supporting the proposed single-family dwelling. Based on the review of the California Department of Conservation Compilation of Quaternary Surficial Deposits map (2022), the Project site is located with an area of active beach deposits which has no paleontological importance (CZO Section 8178-3.2). In accordance with the applicable policies of the Ventura County General Plan, the Project was circulated to South Central Coastal Information Center (SCCIC), the regional office for the California Historical Resources Information System (CHRIS). The response, dated January 14, 2022, determined that the archeological sensitivity of the site was unknown, however no archaeological work would be required before the approval of the Project plans. Instead, SCCIC recommended a customary caution and halt-work condition be placed on the Project, which would require the Applicant and their contractors to halt work in the event that archaeological resources are

uncovered during ground disturbing activities and retain an archeological consultant and consultation with the local California Native Tribe (Exhibit 5, Condition of Approval No. 20). Representatives for Ventureño-Barbareño tribe were also notified of the determination of application completeness for the Project and responded with a request that the Applicant and their contractors undergo a preconstruction meeting to inform the responsible parties proposed activities have the potential to affect unknown archaeological resources and the protocol if cultural resources are encountered (Exhibit 5, Condition of Approval No. 23). The proposed Project will not result in any significant impacts upon archaeological or paleontological resources.

Based on the discussion above the proposed Project is determined to be consistent with the Ventura County General Plan Policy COS-4.4 and Coastal Area Plan Policies 4.1.1-1, 4.1.1-2, 4.1.1-6, 4.1.1-7, 4.1.2-1, 4.1.2-24.1.2-3 and Coastal Act Section 30244.

Hazards and Safety Policies

6. **HAZ-3.1 Sea Level Rise Planning and Adaptation** *HAZ-3.1 Sea Level Rise Planning and Adaptation The County shall continue to actively plan for sea level rise by using the best available science to analyze critical vulnerabilities, identify measures to conserve coastal resources, minimize impacts on residents and businesses, maintain public services, and strengthen resiliency.*

HAZ-2.5 Recordation of a Notice of Flood Hazard *The County shall require the recordation of a Notice of Flood Hazard with the County Recorder for all new discretionary entitlements (including subdivisions and land use permits) within areas subject to flooding as determined by the Federal Emergency Management Agency on the latest available Digital Flood Insurance Rate Maps (DFIRMs).*

HAZ-4.3 Structural Design *The County shall require that all structures designed for human occupancy incorporate engineering measures to reduce the risk of and mitigate against collapse from ground shaking.*

Coastal Act Section § 30253 Minimization of Adverse Impacts *New development shall do all of the following:*

- (a) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.*
- (b) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.*
- (c) Be consistent with requirements imposed by an air pollution control district or the State Air Resources Board as to each particular development.*

- (d) *Minimize energy consumption and vehicle miles traveled.*
- (e) *Where appropriate, protect special communities and neighborhoods that, because of their unique characteristics, are popular visitor destination points for recreational uses.*

North Coast Hazards Policy 4.2.4 A-2 *New development shall be sited and designed to minimize risks to life and property in areas of high geologic, flood, and fire hazards.*

North Coast Hazards Policy 4.2.4 A-3 *All new development will be evaluated for its impacts to, and from, geologic hazards (including seismics safety, landslides, expansive soils, subsidence, etc.), flood hazards, and fire hazards. Feasible mitigation measures shall be required where necessary.*

North Coast Hazards Policy 4.2.4 A-6 *New development shall be sited and designed so as not to cause or contribute to flood hazards, or lead to the expenditure of public funds for flood control works.*

The proposed project has been sited and designed to assure the stability and structural integrity of the proposed building, and neither creates nor contributes significantly to erosion, geologic instability, or destruction of the site or surrounding area. The subject property is located next to an existing rock revetment constructed by the Solimar Beach Colony development in 1982, however the Project has been designed without the need for a shoreline protection device. According to the Soil Engineering investigation (Exhibit 6, Heathcote Geotechnical, April 2021), the site is located in an area with natural sand soils overlying sandstone and claystone bedrock at a depth of 15 feet. The site is located with 1.6 kilometers of the Red Mountain Fault and 10 kilometers of the Santa Ana Fault, with the possibility to experience liquefaction and strong shaking in the event of a major earthquake. The Soils Engineering Investigation recommends the structure be constructed on piles with deepened foundations, no ground stabilization will be necessary with the foundations structurally reinforced from normal due to liquefiable soils. Piles will be drilled to a depth at 52 feet into firm bedrock.

As shown on the Flood Emergency Management Agency's (FEMA) Flood Rate Insurance Map (FIRM) Panel 06111C0728F (Effective January 29, 2021), a portion of the property is located within the offshore area just landward of the crest of the revetment mapped in the VE Special Flood Hazard Area with an established Base Flood Elevation (BFE) of 18 feet above the North American Vertical Datum 1988 (NAVD88). In consideration of the potential for flooding, the proximity of the Project to the coast and its associated hazards and the subject property's potential for flooding, the Project review included evaluation of a supporting site-specific coastal hazards analysis. The 2nd Revised Wave Runup & Coastal Hazard Analysis (Exhibit 7, GeoSoils, Inc., December 2021) analyzes the existing and future conditions of the site and provides recommendations based on the potential coastal hazards. With respect to the primary risk for the property, the report

indicates that the historic high-water level for the area is 7.6 feet NAVD88 and projects 6 feet of sea level rise based on a medium high risk scenario, indicating a design water elevation of 13.6 feet NAVD for future sea level rise, and the wave uprush analysis indicates a future Design Flood Elevation (DFE) in consideration of SLR is +17 feet NAVD88 with the revetment removed. The report concludes that the bottom of the lowest horizontal structural member should be BFE +1 foot or the Design Flood Elevation, whichever is higher. In this case the calculated future DFE is lower than the current FEMA BFE. Per the report, the elevation of the lowest horizontal member of the proposed structure will be based on the FEMA VE Zone BFE and will be +19 feet NAVD88.

The Project includes the construction of a building elevator which connects the ground level of the structure to the two habitable floors above. The submitted coastal hazards analysis indicates that wave runup may strike the bottom of the foundation or other site improvements and be subject to wave runup bore forces or broken wave forces with future sea level rise (a surge force per unit horizontal width of the improvement is ~1,200 lbs). Accordingly, the design engineer for the foundation and the other improvements for the building will be required to determine the proper design loading in consideration of the surge force for the wave runup projected in the coastal hazards report (Exhibit 7). Additionally, the design and siting of the elevator will follow the National Flood Insurance Program (NFIP) Technical Bulletin 4-93. The applicant will implement this requirement by submitting the appropriate construction documents to the Planning Division to verify that these specifications are reflected prior to the submittal of a plan check to the Building and Safety Division (Exhibit 5, Condition of Approval No. 22). Plans examiners with the Building and Safety Division will conduct the technical review of the construction documents during plan check review.

The report concludes that the Project is reasonably safe from coastal hazards including shoreline erosion, wave runup, and flooding without the shore protection in place, with the incorporation of the recommendations (foundation type, elevation, and potential wave runup forces) into the Project design.

Based on the discussion of above, the proposed Project is consistent with Ventura County General Plan Policies HAZ-3.1, HAZ-2.5, HAZ-4.3, Coastal Act Section 30253, and Coastal Area Plan Policies 4.2.4 A-2, A-3 and A-6.

7. **HAZ-9.2 Noise Compatibility Standards** *The County shall review discretionary development for noise compatibility with surrounding uses. The County shall determine noise based on the following standards:*
 1. *New noise sensitive uses proposed to be located near highways, truck routes, heavy industrial activities and other relatively continuous noise sources shall incorporate noise control measures so that indoor noise levels in habitable rooms do not exceed Community Noise Equivalent Level*

(CNEL) 45 and outdoor noise levels do not exceed CNEL 60 or Leq1H of 65 dB(A) during any hour.

2. *New noise sensitive uses proposed to be located near railroads shall incorporate noise control measures so that indoor noise levels in habitable rooms do not exceed Community Noise Equivalent Level (CNEL) 45 and outdoor noise levels do not exceed L10 of 60 dB(A)*
3. *New noise sensitive uses proposed to be located near airports:*
 - a. *Shall be prohibited if they are in a Community Noise Equivalent Level (CNEL) 65 dB or greater, noise contour; or*
 - b. *Shall be permitted in the Community Noise Equivalent Level (CNEL) 60 dB to CNEL 65 dB noise contour area only if means will be taken to ensure interior noise levels of CNEL 45 dB or less.*
4. *New noise generators, proposed to be located near any noise sensitive use, shall incorporate noise control measures so that ongoing outdoor noise levels received by the noise sensitive receptor, measured at the exterior wall of the building, does not exceed any of the following standards:*
 - a. *Leq1H of 55dB(A) or ambient noise level plus 3dB(A), whichever is greater, during any hour from 6:00 a.m. to 7:00 p.m.;*
 - b. *Leq1H of 50dB(A) or ambient noise level plus 3dB(A), whichever is greater, during any hour from 7:00 p.m. to 10:00 p.m.; and*
 - c. *Leq1H of 45dB(A) or ambient noise level plus 3dB(A), whichever is greater, during any hour from 10:00 p.m. to 6:00 a.m.*
 - d.
5. *Construction noise and vibration shall be evaluated and, if necessary, mitigated in accordance with the Construction Noise Threshold Criteria and Control Plan (Advanced Engineering Acoustics, November 2005).*

HAZ-9.4 Acoustical Analysis Required *The County shall require an acoustical analysis by a qualified acoustical engineer for discretionary development involving noise exposure or noise generation in excess of the established standards. The analysis shall provide documentation of existing and projected noise levels at on-site and off-site receptors and shall recommend noise control measures for mitigating adverse impacts.*

HAZ-9.5 Site and Building Design *The County shall require discretionary development and County-initiated projects to comply with adopted noise standards through proper site and building design features, such as building location and orientation, setbacks, natural barriers and vegetation, and building construction. The County shall only consider sound walls if noise mitigation measures have been evaluated or integrated into the project and found infeasible.*

The proposed single-family dwelling is categorized as a noise-sensitive land use. Noise sensitive uses include, but are not limited to, dwellings, schools, hospitals, nursing homes, churches, and libraries. The proposed Project is located within the 60 dB(A) community Noise Equivalent Level noise contour (RMA GIS View, Noise Contour Maps, 2022). In addition, the Project site is located near active railroad tracks operated by Union Pacific, which are located 100 feet to the northeast of the Project site. State Route 1 and the 101 Freeway are also located to the northeast, with State Route 1 within 20 feet of the property. The Project may be subject to exposure to unacceptable levels of noise from the nearby noise generating land uses. In accordance with General Plan Policy HAZ-9.2, the applicant has submitted a Project Noise Impact Assessment (Exhibit 8, Sespe Consulting, Inc., April 2021). Noise measurements were taken for at the Project site, monitored outdoor noise level were as follows: 67.2 CNEL (the long-term 24-hour time weighted average sound level), 70.4 Leq1h (average noise level over a 1-hour time period), and 63.9 L10 (the sound level that is exceeded 10 percent of the time within a given hour). Based on the information in the report, the new structure will include outdoor spaces are on the western elevation of the dwelling which will be adequately shielded form dominant noise sources by combination of the proposed building and neighboring structures, breaking the line of site between outdoor use areas of the new home and noise sources located to the northeast. Based these assumption, the future outdoor noise areas are expected to remain within the acceptable range without any additional noise attenuation measures. However, the noise assessment also finds that the proposed Project will require double-paned windows to sufficiently reduce interior noise levels to the projected interior noise production CNEL of 42.2 dBA (Exhibit 5, Condition of Approval No. 22).

While the proposed single-family dwelling is not considered a noise generating use, construction noise will be generated during the development phase of the proposed project that has the potential to adversely affect surrounding residential uses. Pursuant to the requirements of the Ventura County Construction Noise Threshold Criteria and Control Plan, the proposed project will be subject to a condition of approval to limit noise-generating activities to the days and times when construction-generated noise is least likely to adversely affect surrounding residential uses (Exhibit 5, Condition of Approval No. 21).

Based on the discussion above, the proposed Project is determined to be consistent with the Ventura County General Plan Policies HAZ-9.2, HAZ-9.4 and HAZ-9.5.

Water Resources Policies

8. **WR-1.11 Adequate Water for Discretionary Development** *The County shall require all discretionary development to demonstrate an adequate long-term supply of water.*

WR-1.12 Water Quality Protection for Discretionary Development *The County shall evaluate the potential for discretionary development to cause deposition and discharge of sediment, debris, waste and other pollutants into surface runoff, drainage systems, surface water bodies, and groundwater. The County shall require discretionary development to minimize potential deposition and discharge through point source controls, storm water treatment, runoff reduction measures, best management practices, and low impact development.*

The project includes the demolition of an existing single-family dwelling and construction of a new single-family dwelling on a 0.14 acre lot. Land disturbance from construction will be less than one acre. The project site is within the County Urban Unincorporated Area but not within a High-Risk Area. In accordance with the Ventura Countywide Municipal Stormwater NPDES Permit CAS004002, "Development Construction Program" Subpart 4.F, the applicant will be required to include Best Management Practices (BMPs) designed to ensure compliance and implementation of an effective combination of erosion and sediment control measures for a disturbed site area less than 1 acre (Table 6 in Subpart 4.F, SW-1). As such, neither the individual project nor the cumulative threshold for significance would be exceeded and the project is expected to have a Less than Significant (LS) impact related to water quality objectives or standards in the applicable MS4 Permit or any other NPDES Permits.

Domestic water supply for the proposed project will be provided via an existing connection to the Casitas Municipal Water District. The existing connection has been verified by a water will-serve letter dated March 23, 2021, submitted with the Project application. Casitas Municipal Water District is an approved urban water supplier with an approved Water Availability Letter on file with the Ventura County Public Works Agency. According to the District's Urban Water Management Plan (2020) the service area is projected to experience little growth, accordingly, the district is expected to adequately supply the existing user and the proposed redevelopment Project. The proposed Project will not have any project-specific or cumulative impacts to the domestic water supply.

Based on the discussion above, the proposed Project is determined to be consistent with Ventura County General Plan Policies WR-1.11 and WR-1.12.

**CONDITIONS OF APPROVAL FOR
3124 SOLIMAR LLC
COASTAL PD PERMIT CASE NO. PL21-0056**

RESOURCE MANAGEMENT AGENCY (RMA)

Planning Division Conditions

1. Project Description

This Coastal Planned Development (PD) Permit is based on and limited to compliance with the project description stated in this condition below, Exhibits 3 (Plans), 6 (Soil Engineering Investigation for Proposed Residence), 7 (2nd Revised Wave Runup & Coastal Hazard Analysis), and 8 (Noise Impact Assessment) of the Planning Director hearing on April 14, 2022, and conditions of approval set forth below. Together, these conditions and documents describe the "Project." Any deviations from the Project must first be reviewed and approved by the County in order to determine if the Project deviations conform to the Project as approved. Project deviations may require Planning Director approval for changes to the permit or further California Environmental Quality Act (CEQA) environmental review, or both. Any Project deviation that is implemented without requisite County review and approval(s) may constitute a violation of the conditions of this permit and applicable law.

The Project description is as follows:

This Coastal Planned Development (PD) Permit authorizes the demolition an existing 3,281 square foot beachfront single family dwelling and construction of a new 6,204 square foot 2-story single family dwelling with a ground level 3,480-square-foot attached 3-car garage and storage area. The Project includes the construction of a 152 square foot covered entry, 341 square feet covered patio, and a 175 sq. ft. second floor deck. The single-family dwelling will have a height of 26.5 feet, as measured from the from lowest elevation of the first floor as established by the Public Works Agency. Structural slabs for the dwelling will be supported on piles and grade beams which will elevate the dwelling in accordance with the recommendations provided in supporting Project background reports (2nd Revised Coastal Engineer's Report, GeoSoils, Inc., December 2021 and Soil Engineering Investigation, Heathcote Geotechnical, April 20, 2021). The Project includes the installation of a building elevator which extends from the ground level to the two habitable floors above the garage.

Access to the Project site is provided by a new private driveway which connects to Solimar Beach Drive, a private road. Potable water for domestic use will be provided by Casitas Municipal Water District and wastewater will be handled by a new Septic Tank Effluent Pump (STEP) system proposed at the front of the subject property which will connect to the County of Ventura Service Area No. 29.

The development, use, and maintenance of the property, the size, shape, arrangement, and location of structures, and the parking areas and landscape areas shall conform to the project description above and all approved County land use hearing exhibits in support of the Project and conditions of approval below.

2. Required Improvements for Coastal PD

Purpose: To ensure the project site conforms to the plans approved at the Planning Director hearing in support of the project [revise as needed if there was a modification that replaced any exhibits of the hearing for the entitlement].

Requirement: The Permittee shall ensure that all required off-site and on-site improvements for the Project, including structures, paving, parking, and landscaping are completed in conformance with the approved plans stamped as hearing exhibit 3 - Plans. The Permittee shall prepare and submit all final building and site plans for the County's review and approval in accordance with the approved plans.

Documentation: The Permittee shall obtain Planning Division staff's stamped approval on the project plans and submit them to the County for inclusion in the Project file. The Permittee shall submit additional plans to the Planning Division for review and stamped approval (e.g., tree protection and landscape plans) for inclusion in the Project file, as necessary.

Timing: Prior to the issuance of a Zoning Clearance for construction the Permittee shall submit all final development plans to the Planning Division for review and approval. Unless the Planning Director and/or Public Works Agency Director allow the Permittee to provide financial security and a final executed agreement, approved as to form by the County Counsel, that ensures completion of such improvements, the Permittee shall complete all required improvements prior to final inspection. The Permittee shall maintain the required improvements for the life of the Project.

Monitoring and Reporting: The County Building Inspector, Public Works Agency Grading Inspector, Fire Marshal, and/or Planning Division staff has the authority to conduct periodic site inspections to ensure the Permittee's ongoing compliance with this condition consistent with the requirements of § 8183-5 of the Ventura County Coastal Zoning Ordinance.

3. Site Maintenance

Purpose: To ensure that the Project site is maintained in a neat and orderly manner so as not to create any hazardous conditions or unsightly conditions which are visible from outside of the Project site.

Requirement: The Permittee shall maintain the Project site in a neat and orderly manner, and in compliance with the Project description set forth in Condition No. 1. Only equipment and/or materials which the Planning Director determines to substantially comply with the Project description shall be stored within the Project site during the life of the Project.

Documentation: The Permittee shall maintain the Project site in compliance with Condition No. 1 and the approved plans for the Project.

Timing: The Permittee shall maintain the Project site in a neat and orderly manner and in compliance with Condition No. 1 throughout the life of the Project.

Monitoring and Reporting: The County Building Inspector, Public Works Agency Grading Inspector, Fire Marshall, and/or Planning Division staff has the authority to conduct periodic site inspections to ensure the Permittee's ongoing compliance with this condition consistent with the requirements of § 8183-5 of the Ventura County Coastal Zoning Ordinance.

4. Coastal PD Modification

Prior to undertaking any operational or construction-related activity which is not expressly described in these conditions, the Permittee shall first contact the Planning Director to determine if the proposed activity requires a modification of this Coastal PD Permit. The Planning Director may, at the Planning Director's sole discretion, require the Permittee to file a written and/or mapped description of the proposed activity in order to determine if a Coastal PD Permit modification is required. If a Coastal PD Permit modification is required, the modification shall be subject to:

- a. The modification approval standards of the Ventura County Ordinance Code in effect at the time the modification application is acted on by the Planning Director; and
- b. Environmental review, as required pursuant to the California Environmental Quality Act (CEQA; California Public Resources Code, §§ 21000-21178) and the State CEQA Guidelines (California Code of Regulations, Title 14, Chapter 3, §§ 15000-15387), as amended from time to time.

5. Construction Activities

Prior to any construction or demolition, the Permittee shall obtain a Zoning Clearance for construction from the Planning Division, and a Demolition and a Building Permit from the Building and Safety Division.

6. Acceptance of Conditions and Schedule of Enforcement Responses

The Permittee's acceptance of this Coastal PD Permit and/or commencement of construction and/or operations under this Coastal PD Permit shall constitute the Permittee's formal agreement to comply with all conditions of this Coastal PD Permit. Failure to abide by and comply with any condition of this Coastal PD Permit shall constitute grounds for enforcement action provided in the Ventura County Coastal Zoning Ordinance (Article 13), which shall include, but is not limited to, the following:

- a. Public reporting of violations to the Planning Commission and/or Board of Supervisors;
- b. Suspension of the permitted land uses (Condition No. 1);
- c. Modification of the Coastal PD Permit conditions listed herein;
- d. Recordation of a "Notice of Noncompliance" on the deed to the subject property;
- e. The imposition of civil administrative penalties; and/or
- f. Revocation of this Coastal PD Permit.

The Permittee is responsible for being aware of and complying with the Coastal PD Permit conditions and all applicable federal, state, and local laws and regulations.

7. Time Limits

a. Use inauguration:

- (1) The approval decision for this Coastal PD Permit becomes effective upon the expiration of the 10 day appeal period following the approval decision, or when any appeals of the decision are finally resolved. Once the approval decision becomes effective, the Permittee must obtain a Zoning Clearance for construction in order to initiate the land uses set forth in Condition No. 1.
- (2) This Coastal PD Permit shall expire and become null and void if the Permittee fails to obtain a Zoning Clearance for construction within one year from the date the approval decision of this Coastal PD Permit becomes effective. The Planning Director may grant a one year extension of time to the Permittee in order to obtain the Zoning Clearance for construction if the Permittee can demonstrate to the satisfaction of the Planning Director that the Permittee has made a diligent effort to implement the Project, and the Permittee has requested the time extension in writing at least 30 days prior to the one year expiration date.
- (3) Prior to the issuance of the Zoning Clearance for construction, all fees and charges billed to that date by any County agency, as well as any fines, penalties, and sureties, must be paid in full. After issuance of the Zoning Clearance for construction, any final billed processing fees must be paid within 30 days of the billing date or the County may revoke this Coastal PD Permit.

8. Documentation Verifying Compliance with Other Agencies' Requirements Related to this Coastal PD Permit

Purpose: To ensure compliance with, and notification of, federal, state, and/or local government regulatory agencies that have requirements that pertain to the Project (Condition No. 1, above) that is the subject of this Coastal PD Permit.

Requirement: Upon the request of the Planning Director, the Permittee shall provide the Planning Division with documentation (e.g., copies of permits or agreements from other

agencies, which are required pursuant to a condition of this Coastal PD Permit) to verify that the Permittee has obtained or satisfied all applicable federal, state, and local entitlements and conditions that pertain to the Project.

Documentation: The Permittee shall provide this documentation to Planning Division staff in the form that is acceptable to the agency issuing the entitlement or clearance, to be included in the Planning Division Project file.

Timing: The documentation shall be submitted to the Planning Division prior to the issuance of the Zoning Clearance for construction.

Monitoring and Reporting: The Planning Division maintains the documentation provided by the Permittee in the respective Project file. In the event that the federal, state, or local government regulatory agency prepares new documentation due to changes in the Project or the other agency's requirements, the Permittee shall submit the new documentation within 30 days of receipt of the documentation from the other agency.

9. Notice of Coastal PD Permit Requirements and Retention of Coastal PD Permit Conditions On Site

Purpose: To ensure full and proper notice of these Coastal PD Permit conditions affecting the use of the subject property.

Requirement: Unless otherwise required by the Planning Director, the Permittee shall notify, in writing, the Property Owner(s) of record, contractors, and all other parties and vendors who regularly conduct activities associated with the Project, of the pertinent conditions of this Coastal PD Permit.

Documentation: The Permittee shall maintain a current set of Coastal PD Permit conditions and exhibits at the project site.

Timing: Prior to issuance of a Zoning Clearance for Construction and throughout the life of the Project.

Monitoring and Reporting: The Planning Division has the authority to conduct periodic site inspections to ensure ongoing compliance with this condition consistent with the requirements of § 8183-5 of the Ventura County Coastal Zoning Ordinance.

10. Recorded Notice of Land Use Entitlement

Purpose: The Permittee shall record a "Notice of Land Use Entitlement" form and the conditions of this Coastal PD Permit with the deed for the subject property that notifies the current and future Property Owner(s) of the conditions of Coastal PD Permit.

Requirement: The Permittee shall sign, have notarized, and record with the Office of the County Recorder, a "Notice of Land Use Entitlement" form furnished by the Planning

Division and the conditions of this Coastal PD Permit, with the deed of the property that is subject to this Coastal PD Permit.

Documentation: Recorded "Notice of Land Use Entitlement" form and conditions of this Coastal PD Permit.

Timing: The Permittee shall record the "Notice of Land use Entitlement" form and conditions of this Coastal PD Permit, prior to issuance of a Zoning Clearance for construction.

Monitoring and Reporting: The Permittee shall return a copy of the recorded "Notice of Land Use Entitlement" form and conditions of this Coastal PD Permit to Planning Division staff to be included in the Project file.

11. Financial Responsibility for Compliance Monitoring and Enforcement

- a. **Cost Responsibilities:** The Permittee shall bear the full costs of all County staff time, materials, and County-retained consultants associated with condition compliance review and monitoring, CEQA mitigation monitoring, other permit monitoring programs, and enforcement activities, actions, and processes conducted pursuant to the Ventura County Coastal Zoning Ordinance (§ 8183-5) related to this Coastal PD Permit. Such condition compliance review, monitoring and enforcement activities may include (but are not limited to): periodic site inspections; preparation, review, and approval of studies and reports; review of permit conditions and related records; enforcement hearings and processes; drafting and implementing compliance agreements; and attending to the modification, suspension, or revocation of permits. Costs will be billed at the rates set forth in the Planning Division or other applicable County Fee Schedule, and at the contract rates of County-retained consultants, in effect at the time the costs are incurred.
- b. **Billing Process:** The Permittee shall pay all Planning Division invoices within 30 days of receipt thereof. Failure to timely pay an invoice shall subject the Permittee to late fees and charges set forth in the Planning Division Fee Schedule, and shall be grounds for suspension, modification, or revocation of this Coastal PD Permit. The Permittee shall have the right to challenge any charge or penalty prior to payment.

12. Defense and Indemnification

- a. The Permittee shall defend, at the Permittee's sole expense with legal counsel acceptable to the County, against any and all claims, actions, or proceedings against the County, any other public agency with a governing body consisting of the members of the County Board of Supervisors, or any of their respective board members, officials, employees and agents (collectively, "Indemnified Parties")

arising out of or in any way related to the County's issuance, administration, or enforcement of this Coastal PD Permit. The County shall promptly notify the Permittee of any such claim, action or proceeding and shall cooperate fully in the defense.

- b. The Permittee shall also indemnify and hold harmless the Indemnified Parties from and against any and all losses, damages, awards, fines, expenses, penalties, judgments, settlements, or liabilities of whatever nature, including but not limited to court costs and attorney fees (collectively, "Liabilities"), arising out of or in any way related to any claim, action or proceeding subject to subpart (a) above, regardless of how a court apportions any such Liabilities as between the Permittee, the County, and/or third parties.
- c. Except with respect to claims, actions, proceedings, and Liabilities resulting from an Indemnified Party's sole active negligence or intentional misconduct, the Permittee shall also indemnify, defend (at Permittee's sole expense with legal counsel acceptable to County), and hold harmless the Indemnified Parties from and against any and all claims, actions, proceedings, and Liabilities arising out of, or in any way related to, the construction, maintenance, land use, or operations conducted pursuant to this Coastal PD Permit, regardless of how a court apportions any such Liabilities as between the Permittee, the County, and/or third parties. The County shall promptly notify the Permittee of any such claim, action, or proceeding and shall cooperate fully in the defense.
- d. Neither the issuance of this Coastal PD Permit, nor compliance with the conditions hereof, shall relieve the Permittee from any responsibility otherwise imposed by law for damage to persons or property; nor shall the issuance of this Coastal PD Permit serve to impose any liability upon the Indemnified Parties for injury or damage to persons or property.

13. Invalidation of Condition(s)

If any of the conditions or limitations of this Coastal PD Permit are held to be invalid in whole or in part by a court of competent jurisdiction, that holding shall not invalidate any of the remaining Coastal PD Permit conditions or limitations. In the event that any condition imposing a fee, exaction, dedication, or other mitigation measure is challenged by the Permittee in an action filed in a court of competent jurisdiction, or threatened to be filed therein, the Permittee shall be required to fully comply with this Coastal PD Permit, including without limitation, by remitting the fee, exaction, dedication, and/or by otherwise performing all mitigation measures being challenged. This Coastal PD Permit shall continue in full force unless, until, and only to the extent invalidated by a final, binding judgment issued in such action.

If a court of competent jurisdiction invalidates any condition in whole or in part, and the invalidation would change the findings and/or the mitigation measures associated with the approval of this Coastal PD Permit, at the discretion of the Planning Director, the

Planning Director may review the project and impose substitute feasible conditions/mitigation measures to adequately address the subject matter of the invalidated condition. The Planning Director shall make the determination of adequacy. If the Planning Director cannot identify substitute feasible conditions/mitigation measures to replace the invalidated condition, and cannot identify overriding considerations for the significant impacts that are not mitigated to a level of insignificance as a result of the invalidation of the condition, then this Coastal PD Permit may be revoked.

14. Consultant Review of Information and Consultant Work

The County and all other County permitting agencies for the Project have the option of referring any and all special studies that these conditions require to an independent and qualified consultant for review and evaluation of issues beyond the expertise or resources of County staff.

Prior to the County engaging any independent consultants or contractors pursuant to the conditions of this Coastal PD Permit, the County shall confer in writing with the Permittee regarding the necessary work to be contracted, as well as the estimated costs of such work. Whenever feasible, the County will use the lowest responsible bidder or proposer. Any decisions made by County staff in reliance on consultant or contractor work may be appealed pursuant to the appeal procedures contained in the Ventura County Zoning Ordinance Code then in effect.

The Permittee may hire private consultants to conduct work required by the County, but only if the consultant and the consultant's proposed scope-of-work are first reviewed and approved by the County. The County retains the right to hire its own consultants to evaluate any work that the Permittee or a contractor of the Permittee undertakes. In accordance with Condition No. 11 above, if the County hires a consultant to review any work undertaken by the Permittee, or hires a consultant to review the work undertaken by a contractor of the Permittee, the hiring of the consultant will be at the Permittee's expense.

15. Relationship of Coastal PD Permit Conditions, Laws, and Other Entitlements

The Permittee shall implement the Project in compliance with all applicable requirements and enactments of federal, state, and local authorities. In the event of conflict between various requirements, the more restrictive requirements shall apply. In the event the Planning Director determines that any Coastal PD Permit condition contained herein is in conflict with any other Coastal PD Permit condition contained herein, when principles of law do not provide to the contrary, the Coastal PD Permit condition most protective of public health and safety and environmental resources shall prevail to the extent feasible.

No condition of this Coastal PD Permit for uses allowed by the Ventura County Ordinance Code shall be interpreted as permitting or requiring any violation of law, lawful rules, or regulations, or orders of an authorized governmental agency. Neither the approval of this Coastal PD Permit, nor compliance with the conditions of this Co, shall relieve the

Permittee from any responsibility otherwise imposed by law for damage to persons or property.

16. Contact Person

Purpose: To designate a person responsible for responding to complaints.

Requirement: The Permittee shall designate a contact person(s) to respond to complaints from citizens and the County which are related to the permitted uses of this Coastal PD Permit.

Documentation: The Permittee shall provide the Planning Director with the contact information (e.g., name and/or position title, address, business and cell phone numbers, and email addresses) of the Permittee's field agent who receives all orders, notices, and communications regarding matters of condition and code compliance at the Project site.

Timing: Prior to the issuance of a Zoning Clearance for construction, the Permittee shall provide the Planning Division the contact information of the Permittee's field agent(s) for the Project file. If the address or phone number of the Permittee's field agent(s) should change, or the responsibility is assigned to another person, the Permittee shall provide Planning Division staff with the new information in writing within three calendar days of the change in the Permittee's field agent.

Monitoring and Reporting: The Planning Division maintains the contact information provided by the Permittee in the Project file. The Planning Division has the authority to periodically confirm the contact information consistent with the requirements of § 8183-5 of the Ventura County Coastal Zoning Ordinance.

17. Change of Permittee

Purpose: To ensure that the Planning Division is properly and promptly notified of any change of Permittee.

Requirement: The Permittee shall file, as an initial notice with the Planning Director, the new name(s), address(es), telephone/FAX number(s), and email addresses of the new owner(s), lessee(s), operator(s) of the permitted uses, and the company officer(s). The Permittee shall provide the Planning Director with a final notice once the transfer of ownership and/or operational control has occurred.

Documentation: The initial notice must be submitted with the new Permittee's contact information. The final notice of transfer must include the effective date and time of the transfer and a letter signed by the new Property Owner(s), lessee(s), and/or operator(s) of the permitted uses acknowledging and agreeing to comply with all conditions of this Coastal PD Permit.

Timing: The Permittee shall provide written notice to the Planning Director 10 calendar days prior to the change of ownership or change of Permittee. The Permittee shall provide

the final notice to the Planning Director within 15 calendar days of the effective date of the transfer.

Monitoring and Reporting: The Planning Division maintains notices submitted by the Permittee in the Project file and has the authority to periodically confirm the information consistent with the requirements of § 8183-5 of the Ventura County Coastal Zoning Ordinance.

18. Plans Conforming to Coastal Engineer's Recommendations

Purpose: To demonstrate that permitted buildings and structures comply with the recommendations in the coastal report.

Requirement: The final plans for the permitted development shall be in substantial conformance with the recommendations contained in the 2nd Revised Wave Runup & Coastal Hazard Analysis, 3124 Solimar Beach Drive, Ventura County, California (GeoSoils, Inc., December 6, 2021), relative to foundation, construction, drainage, and height of the structure. The plans and specifications (including any design and structural engineering) shall note the design flood elevation and height of the single-family dwelling and all other permitted structures. Structural engineering submitted for the construction of the proposed building shall affirm that the building elevator are constructed to resist hydrostatic, hydrodynamic and wave forces as well as potential erosion and scour and that accessory building equipment is installed above the Base Flood Elevation¹. Further, the construction documents shall be prepared in compliance with the recommendations within the National Floodplain Insurance Program (NFIP) Technical Bulletin 4-93, the Federal Emergency Management Agency's (FEMA) Construction Fact Sheet P-499 Home Builder's Guide to Coastal Construction, FEMA NFIP Free-of Obstruction Requirement Technical Bulletin 5 and the standard of the Ventura County Building Code.

Documentation: A copy of building plans and specifications and 2nd Revised Wave Runup & Coastal Hazard Analysis, 3124 Solimar Beach Drive, Ventura County, California (GeoSoils, Inc., December 6, 2021), for the permitted development that comply with all of the requirements set forth above.

Timing: Prior to issuance of a Zoning Clearance for construction, the Permittee shall submit a copy of the plans, specifications and reports to the Planning Division for review and approval. The Permittee shall maintain the County-approved building plans and specifications throughout the life of this Coastal PD.

Monitoring and Reporting: Prior to occupancy, the Planning Division has the authority to inspect the site to ensure that permitted development was constructed as approved. The Planning Division has the authority to conduct site inspections to ensure ongoing

¹ Ground level improvements may be required to include flood damage resistant elements such as float switch that send the elevator cab to a level above the Base Flood Elevation in the event of a flood or when power is lost.

compliance by the Permittee with this condition consistent with the requirements of § 8183-5 of the Ventura County Coastal Zoning.

19. Paleontological Resources Discovered During Grading

Purpose: In order to mitigate potential impacts to paleontological resources that may be encountered during ground disturbance or construction activities.

Requirement: If any paleontological remains are uncovered during ground disturbance or construction activities, the Permittee shall:

- a. Cease operations and assure the preservation of the area in which the discovery was made;
- b. Notify the Planning Director in writing, within three days of the discovery;
- c. Obtain the services of a paleontological consultant or professional geologist who shall assess the find and provide a report that assesses the resources and sets forth recommendations on the proper disposition of the site;
- d. Obtain the Planning Director's written concurrence with the recommended disposition of the site before resuming development; and
- e. Implement the agreed upon recommendations.

Documentation: The Permittee shall submit the paleontologist's or geologist's reports. Additional documentation may be required to demonstrate that the Permittee has implemented the recommendations set forth in the paleontological report.

Timing: If any paleontological remains are uncovered during ground disturbance or construction activities, the Permittee shall provide the written notification to the Planning Director within three days of the discovery. The Permittee shall submit the paleontological report to the Planning Division immediately upon completion of the report.

Monitoring and Reporting: The Permittee shall provide the paleontological report to the Planning Division to be made part of the Project file. The Permittee shall implement any recommendations made in the paleontological report to the satisfaction of the Planning Director. The paleontologist shall monitor all ground disturbance activities within the area in which the discovery was made, in order to ensure the successful implementation of the recommendations made in the paleontological report. The Planning Division has the authority to conduct site inspections to ensure that the Permittee implements the recommendations set forth in the paleontological report, consistent with the requirements of § 8183-5 of the Ventura County Coastal Zoning Ordinance.

20. Archaeological Resources Discovered During Ground Disturbance

Purpose: In order to mitigate potential impacts to archaeological resources discovered during ground disturbance.

Requirement: The Permittee shall implement the following procedures:

- a. If any archaeological or historical artifacts are uncovered during ground disturbance or construction activities, the Permittee shall:
 - (1) Cease operations and assure the preservation of the area in which the discovery was made;
 - (2) Notify the Planning Director in writing, within three days of the discovery;
 - (3) Obtain the services of a County-approved archaeologist who shall assess the find and provide recommendations on the proper disposition of the site in a written report format;
 - (4) Obtain the Planning Director's written concurrence of the recommended disposition of the site before resuming development; and
 - (5) Implement the agreed upon recommendations.
- b. If any human burial remains are encountered during ground disturbance or construction activities, the Permittee shall:
 - (1) Cease operations and assure the preservation of the area in which the discovery was made;
 - (2) Immediately notify the County Coroner and the Planning Director;
 - (3) Obtain the services of a County-approved archaeologist and, if necessary, Native American Monitor(s), who shall assess the find and provide recommendations on the proper disposition of the site in a written report format;
 - (4) Obtain the Planning Director's written concurrence of the recommended disposition of the site before resuming development on-site; and
 - (5) Implement the agreed upon recommendations.

Documentation: If archaeological remains are encountered, the Permittee shall submit a report prepared by a County-approved archaeologist including recommendations for the proper disposition of the site. Additional documentation may be required to demonstrate that the Permittee has implemented any recommendations made by the archaeologist's report.

Timing: If any archaeological remains are uncovered during ground disturbance or construction activities, the Permittee shall provide the written notification to the Planning Director within three days of the discovery. The Permittee shall submit the archaeological report to the Planning Division immediately upon completion of the report.

Monitoring and Reporting: The Permittee shall provide the archaeological report to the Planning Division to be made part of the Project file. The Permittee shall implement any recommendations made in the archaeological report to the satisfaction of the Planning Director. The archaeologist shall monitor all ground disturbance activities within the area in which the discovery was made, in order to ensure the successful implementation of the recommendations made in the archaeological report. The Planning Division has the authority to conduct site inspections to ensure that the Permittee implements the recommendations set forth in the archaeological report, consistent with the requirements of § 8183-5 of the Ventura County Coastal Zoning Ordinance.

21. Construction Noise

Purpose: In order for this project to comply with the Ventura County General Plan Goals, Policies and Programs Hazards Policy HAZ-9.2 and the County of Ventura Construction Noise Threshold Criteria and Control Plan (Amended 2010).

Requirement: The Permittee shall limit construction activity for site preparation and development to the hours between 7:00 a.m. and 7:00 p.m., Monday through Friday, and from 9:00 a.m. to 7:00 p.m. Saturday, Sunday, and State holidays. Construction equipment maintenance shall be limited to the same hours. Non-noise generating construction activities such as interior painting are not subject to these restrictions.

Documentation: The Permittee shall post a sign stating these restrictions in a conspicuous location on the Project site, in order so that the sign is visible to the general public. The Permittee shall provide photo documentation showing posting of the required signage to the Planning Division, prior to the commencement of grading and construction activities. The sign must provide a telephone number of the site foreman, or other person who controls activities on the jobsite, for use for complaints from the public. The Permittee shall maintain a "Complaint Log," noting the date, time, complainant's name, complaint, and any corrective action taken, in the event that the Permittee receives noise complaints. The Permittee must submit the "Complaint Log" to the Planning Division upon the Planning Director's request.

Timing: The Permittee shall install the sign prior to the issuance of a building permit and throughout all grading and construction activities. The Permittee shall maintain the signage on-site until all grading and construction activities are complete. If the Planning Director requests the Permittee to submit the "Complaint Log" to the Planning Division, the Permittee shall submit the "Complaint Log" within one day of receiving the Planning Director's request.

Monitoring and Reporting: The Planning Division reviews, and maintains in the Project file, the photo documentation of the sign and the “Complaint Log.” The Planning Division has the authority to conduct site inspections and take enforcement actions to ensure that the Permittee conducts grading and construction activities in compliance with this condition, consistent with the requirements of § 8183-5 of the Ventura County Coastal Zoning Ordinance.

22. Installation of Double-Paned Windows

Purpose: In order to comply with Ventura County General Plan Goals, Policies and Programs Hazards Policy HAZ-9.2.

Requirement: In accordance with the recommendations within the Noise Impact Assessment (Sespe Consulting, Inc., April 2021), the Permittee shall install double-paned or better windows throughout the residence which ensure that the dwelling interiors do not exceed the applicable noise standard.

Documentation: The Permittee shall submit photo-documentation, or some other evidence acceptable to the Planning Director, that the soundproofing is installed.

Timing: A copy of building plans and specifications which demonstrate compliance with the recommendations in the Noise Impact Assessment (Sespe Consulting, Inc., April 2021), for the permitted development that comply with all of the requirements set forth above.

Monitoring and Reporting: Prior to occupancy, the Planning Division has the authority to inspect the site to ensure that permitted development was constructed as approved. The Planning Division has the authority to conduct site inspections to ensure ongoing compliance by the Permittee with this condition consistent with the requirements of § 8183-5 of the Ventura County Coastal Zoning..

23. On-Site Pre-Construction Meeting

Purpose: To ensure compliance with CZO Section 8178-3.1.3(b), Condition of Approval No. 20 of Case No. PL21-0056 and to inform the Owner, Contractors and Construction Personnel of the archaeological sensitivity of the area and appropriate procedures to be carried out if necessary to avoid cultural resources.

Requirement: The field agent who receives all orders, notices, and communications regarding matters of condition and code compliance at the Project site is responsible for contacting the Resource Management Agency Planning Division to schedule an on-site preconstruction meeting.

Documentation: The Permittee shall have a copy of all conditions of approval for Case No. PL21-0056 onsite in an easily accessible location. The Planning Division maintains the field agent’s contact information in the Project file.

Timing: The field agent shall contact the Ventura County Resource Management Agency, Planning Division, Attention John Oquendo, at least two weeks prior to commencement of grading and construction activities to schedule an on-site pre-construction meeting with the Owner, Contractors and Construction Personnel. The on-site pre-construction meeting shall be conducted prior to any ground disturbance activities.

Monitoring and Reporting: The Planning Division has the authority to periodically conduct site inspections to ensure ongoing compliance with Condition No. PL21-0056 consistent with the requirements of § 8183-5 of the Ventura County Coastal Zoning Ordinance.

PUBLIC WORKS AGENCY (PWA)

Development and Inspection Services Conditions

24. Land Development Fee for Flood Control Facilities (AKA: Flood Acreage Fee (FAF))

Purpose: To address the cumulative adverse impacts of runoff from development on Watershed Protection District Facilities as required by Ordinance No. FC-24.

Requirement: The Permittee shall deposit with the PWA – Engineering Services Department a Flood Acreage Fee (FAF) in accordance with Ordinance No FC-24 and subsequent resolutions. The fee will be calculated based on the Permittee’s information. The Permittee may choose to submit additional information to supplement the information currently provided to establish the amount of the fee.

Documentation: The Permittee shall provide a site plan including a calculation of the new impervious surface being created by the project along with impervious surface for existing construction.

Timing: Permittee shall pay the Flood Acreage Fee (FAF) to the Ventura County Public Works Agency prior to obtaining the zoning clearance for construction.

Monitoring and Reporting: Public Works Agency staff will prepare a quote of the fee amount and provide a receipt when the fee is paid.

Integrated Waste Management Division (IWMD) Conditions

25. Construction & Demolition Debris Recycling Plan (Form B)

Purpose: Ordinance 4421 requires the Permittee to divert recyclable construction and demolition (C&D) materials generated by the Project (e.g., wood, metal, greenwaste, soil, concrete, asphalt, paper, cardboard, etc.) from local landfills through recycling, reuse, or salvage. Review Ordinance 4421 at:

<http://onestop.vcpublishworks.org/integrated-waste-management-laws-ordinances>.

Requirement: The Permittee must submit a comprehensive recycling plan (Form B – Recycling Plan) to the Integrated Waste Management (IWMD) for any proposed construction and/or demolition projects that require a building permit.

Documentation: The Form B – Recycling Plan must ensure a minimum of 65 percent of the recyclable C&D debris generated by the Project will be diverted from the landfill by recycling, reuse, or salvage. A copy of Form B is available at: <http://onestop.vcpublicworks.org/integrated-waste-management-forms>. A comprehensive list of permitted recyclers, County franchised haulers, and solid waste & recycling facilities in Ventura County is available at: <https://www.vcpublicworks.org/wsd/iwmd/construction/#solid-waste-collectors>. A list of local facilities permitted to recycle soil, wood, and greenwaste is available at: <https://www.vcpublicworks.org/wsd/iwmd/businessrecycling/#GreenWasteProcessing>

Timing: Upon Building & Safety's issuance of a building permit for the Project, the Permittee must submit a Form B – Recycling Plan to the IWMD for approval.

Monitoring & Reporting: The Permittee is required to keep a copy of their approved Form B – Recycling Plan until Building and Safety Division's issuance of final permit.

26. Construction & Demolition Debris Reporting Form (Form C)

Purpose: Ordinance 4421 requires the Permittee to divert recyclable construction and demolition (C&D) materials generated by their Project (e.g., wood, metal, greenwaste, soil, concrete, paper, cardboard, plastic containers, etc.) from local landfills through recycling, reuse, or salvage. Please review Ordinance 4421 at:

<http://onestop.vcpublicworks.org/integrated-waste-management-laws-ordinances>.

Requirement: The Permittee must submit a Form C – Reporting Form to the IWMD for approval prior to issuance of their final Building and Safety Division permit. Form C is available at <http://onestop.vcpublicworks.org/integrated-waste-management-forms>

Documentation: The Permittee must submit original recycling facility receipts and/or documentation of reuse with their Form C – Reporting Form to verify a minimum of 65% of the recyclable C&D debris generated by their Project was diverted from the landfill.

Timing: A completed Form C – Reporting Form, with required recycling facility receipts and/or documentation or reuse, must be submitted to the IWMD for approval prior to Building and Safety Division's issuance of a certificate of occupancy.

Monitoring & Reporting: The Permittee is required to keep a copy of their approved Form C – Reporting Form until Building and Safety Division's issuance of final permit.

Watershed Protection District (WPD) Conditions

Advanced Planning Section

27. **Floodplain Development Permit**

Purpose: To comply with the Ventura County Floodplain Management Ordinance and Ventura County General Plan policies HAZ-2.1, HAZ-2.2, HAZ-2.3 and HAZ-2.5.

Requirement: The Permittee shall obtain a Floodplain Development Permit from the Ventura County Public Works Agency Floodplain Manager.

Documentation: A Floodplain Development Permit issued by the Public Works Agency Floodplain Manager. Additional documentation required may include but is not limited to an Elevation Certificate, Floodproofing Certificate, and/or VE Zone Certificate.

Timing: The Floodplain Development Permit shall be obtained by the Applicant prior to Zoning Clearance for Use Inauguration. Other required documentation shall be provided in accordance with the requirements of Ordinance 4521 and the Permit conditions.

Monitoring and Reporting: A copy of the approved Floodplain Development Permit shall be provided to the Building and Safety Department as well as maintained in the case file by the Public Works Agency.

County Stormwater Program Section

28. **Compliance with Stormwater Development Construction Program**

Purpose: To ensure compliance with the Los Angeles Regional Water Quality Control Board NPDES Municipal Stormwater Permit No.CAS004002 (Permit) the proposed project will be subject to the construction requirements for surface water quality and storm water runoff in accordance with Part 4.F., "Development Construction Program" of the Permit.

Requirement: The construction of the proposed project shall meet requirements contained in Part 4.F. "Development Construction Program" of the Permit through the inclusion of effective implementation of the Construction BMPs during all ground disturbing activities.

Documentation: The Permittee shall submit to the Watershed Protection District – County Stormwater Program Section (CSP) for review and approval a completed and signed SW-1 form (Best Management Practices for Construction Less Than One Acre) which can be found at <http://onestop.vcpublicworks.org/stormwater-forms>.

Timing: The above listed item shall be submitted to the CSP for review and approval prior to issuance of a Zoning Clearance for Construction.

Monitoring and Reporting: CSP will review the submitted materials for consistency with the NPDES Municipal Stormwater Permit. Building Permit Inspectors will conduct inspections during construction to ensure effective installation of the required BMPs.

OTHER VENTURA COUNTY AGENCIES

Ventura County Air Pollution Control District (APCD) Conditions

29. Compliance with Rule 62.7 for Asbestos

Purpose: To ensure that the owner or operator of a facility shall remove all asbestos-containing material from a facility being demolished.

Requirement: Project demolition activities shall be operated in accordance with the Rules and Regulations of the Ventura County Air Pollution Control District, with emphasis on Rule 62.7, Asbestos – Demolition and Renovation.

Documentation: The project applicant shall ensure compliance with the following provision:

- I. The applicant shall submit an AB3205 Form to APCD for approval. In addition, the contractor shall notify APCD 10 business days prior to the abatement commencement, if applicable, by submitting a Notification of Demolition or Renovation Form. Demolition and/or renovation activities shall be conducted in compliance with APCD Rule 62.7, Asbestos – Demolition and Renovation.

Timing: Prior to issuance of a demolition permit(s) by Building & Safety or the applicable Jurisdiction agency.

Reporting and Monitoring: An AB3205 form must be submitted to and approved by APCD. Building & Safety Compliance Checklist includes AB3205 requirement prior to issuance of a demolition permit. The Notification of Demolition or Renovation Form must be submitted to APCD. Enforcement of notification requirements for both forms and compliance with the APCD Asbestos Rule will be enforced by APCD Asbestos Inspectors and/or on a complaint-driven basis.

30. Construction Dust

Purpose: To ensure that fugitive dust and particulate matter that may result from site preparation and construction activities are minimized to the greatest extent feasible.

Requirement: The Permittee shall comply with the provisions of applicable VCAPCD Rules and Regulations, which include, but are not limited to, Rule 50 (Opacity), Rule 51 (Nuisance), and Rule 55 (Fugitive Dust).

Documentation: The Permittee shall ensure compliance with the following provisions:

- I. The area disturbed by clearing, grading, earth moving, or excavation operations shall be minimized to prevent excessive amounts of dust;

- II. Pre-grading/excavation activities shall include watering the area to be graded or excavated before commencement of grading or excavation operations. Application of water should penetrate sufficiently to minimize fugitive dust during grading activities;
- III. All trucks shall cover their loads as required by California Vehicle Code §23114.
- IV. Fugitive dust throughout the site shall be controlled by the use of a watering truck or equivalent means (except during and immediately after rainfall). Water shall be applied to all unpaved roads, unpaved parking areas or staging areas, and active portions of the construction site. Environmentally safe dust control agents may be used in lieu of watering.
- V. Graded and/or excavated inactive areas of the construction site shall be monitored at least weekly for dust stabilization. Soil stabilization methods, such as water and roll compaction, and environmentally safe dust control materials, shall be periodically applied to portions of the construction site that are inactive for over four days.
- VI. Signs shall be posted onsite limiting traffic to 15 miles per hour or less.
- VII. All clearing, grading, earth moving, or excavation activities shall cease during periods of high winds (i.e., wind speed sufficient to cause fugitive dust to be a nuisance or hazard to adjacent properties). During periods of high winds, all clearing, grading, earth moving, and excavation operations shall be curtailed to the degree necessary to prevent fugitive dust created by onsite activities and operations from being a nuisance or hazard, either offsite or onsite.

Timing: Throughout the construction phases of the project.

Reporting and Monitoring: Monitoring and Enforcement of dust-related provisions shall also be conducted by APCD staff on a complaint-driven basis.

Ventura County Fire Protection District (VCFPD) Conditions

31. Address Numbers (Single-Family Homes)

Purpose: To ensure proper premise identification to expedite emergency response.

Requirement: The Permittee shall install a minimum of 4 inch (4") address numbers that are a contrasting color to the background and readily visible at night. Brass or gold plated numbers shall not be used. Where structures are setback more than 150 feet (150') from the street, larger numbers will be required so that they are distinguishable from the street. In the event the structure(s) is not visible from the street, the address number(s) shall be posted adjacent to the driveway entrance on an elevated post.

Documentation: A stamped copy of an approved addressing plan or a signed copy of the Ventura County Fire Protection District's Form #126 "Requirements for Construction".

Timing: The Permittee shall install approved address numbers before final occupancy.

Monitoring and Reporting: A copy of the approved addressing plan and/or signed copy of the Ventura County Fire Protection District's Form #126 "Requirements for Construction" shall be kept on file with the Fire Prevention Bureau. The Fire Prevention Bureau shall conduct a final inspection to ensure that all structures are addressed according to the approved plans/form.

32. Fire Flow

Purpose: To ensure that adequate water supply is available to the project for firefighting purposes.

Requirement: The Permittee shall verify that the water purveyor can provide the required volume and duration at the project. The minimum required fire flow shall be determined as specified by the current adopted edition of the Ventura County Fire Code and the applicable Water Manual for the jurisdiction (whichever is more restrictive). Given the present plans and information, the required fire flow is approximately 500 gallons per minute at 20 psi for a minimum 1 hour duration. A minimum flow of 1000 gallons per minute shall be provided from any one hydrant.

Documentation: A signed copy of the water purveyor's fire flow certification.

Timing: Prior to map recordation, the Permittee shall provide to the Fire District, verification from the water purveyor that the purveyor can provide the required fire flow. If there is no map recordation, the Permittee shall submit a signed copy of the water purveyor's certification to the Fire Prevention Bureau for approval before the issuance of building permits.

Monitoring and Reporting: A copy of the fire flow certification shall be kept on file with the Fire Prevention Bureau.

33. Fire Sprinklers

Purpose: To comply with current California Codes and Ventura County Fire Protection District Ordinance.

Requirement: The Permittee shall be responsible to have an automatic fire sprinkler system installed in all structures as required by the VCFPD. The fire sprinkler system shall be designed and installed by a properly licensed contractor under California State Law.

Documentation: A stamped copy of the approved fire sprinkler plans.

Timing: The Permittee shall submit fire sprinkler plans to the Fire Prevention Bureau for approval before the installation of the fire sprinkler system.

Monitoring and Reporting: A copy of the approved fire sprinkler plans shall be kept on file with the Fire Prevention Bureau. The Fire Prevention Bureau shall conduct on-site

inspections to ensure that the fire sprinkler system is installed according to the approved plans. Unless a modification is approved by the Fire Prevention Bureau, the Permittee, and their successors in interest, shall maintain the fire sprinkler system for the life of the development.

34. Fire Department Clearance

Purpose: To provide the Permittee a list of all applicable fire department requirements for their project.

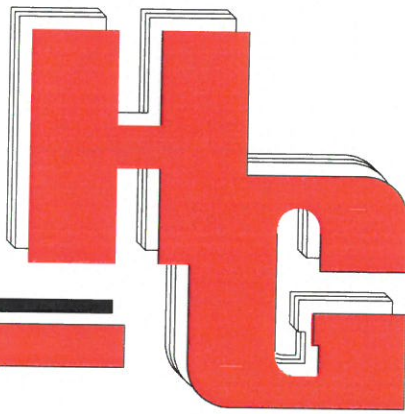
Requirement: The Permittee shall obtain VCFD Form #610 "Requirements for Construction" for any new structures or additions to existing structures before issuance of building permits.

Documentation: A signed copy of the Ventura County Fire Protection District's Form #610 "Requirements for Construction."

Timing: The Permittee shall submit VCFPD Form #610 Application to the Fire Prevention Bureau for approval before issuance of building permits.

Monitoring and Reporting: A copy of the completed VCFPD Form #610 shall be kept on file with the Fire Prevention Bureau. The Fire Prevention Bureau will conduct a final on-site inspection of the project to ensure compliance with all conditions and applicable codes / ordinances. insert conditions here]

**SOIL ENGINEERING INVESTIGATION
PROPOSED RESIDENCE
AT
3124 SOLIMAR BEACH DRIVE
VENTURA, CALIFORNIA
FOR
3124 SOLIMAR LLC**



**HEATHCOTE
GEOTECHNICAL**

SOIL TESTING • FOUNDATIONS • INSPECTION

County of Ventura
Planning Director Hearing
Case No. PL21-0056

Exhibit 6 - Soil Engineering
Investigation for Proposed Residence



HEATHCOTE GEOTECHNICAL

SOIL TESTING • FOUNDATIONS • INSPECTION
1884 EASTMAN AVENUE, SUITE 105, VENTURA, CALIFORNIA 93003



3124 Solimar LLC
C/O Donald Jones Manager
10508 Wyton Drive
Los Angeles, California 90024

Job: 21032
Date: April 22, 2021

Ladies/Gentlemen:

We are pleased to present this soil engineering report to aid in the design of the proposed project.

The project is located at 3128 Solimar Beach Drive, Ventura, California.

The project involves erecting a new residence with two stories. The structure will be built near existing grade. The residence will be of wood frame construction. The loads will be relatively light. Structural slabs supported on piles and grade beams will be used. It is anticipated that piles will be used to construct the residence. No septic studies or design are included in the report.

This project will be safe for intended use as long as the recommendations given are followed.

No grading is anticipated.

Submittal of this report to appropriate governmental agencies is the responsibility of the owner or his representatives.

The report will follow and includes; a comprehensive task list, observations and findings, recommendations, basis of report, results of testing, plot plan, and borings.

It has been our pleasure to serve you and if you have any questions or need additional service, please contact us.

Fred Heathcote
Civil Engineer
No. C48316



A handwritten signature in blue ink, appearing to read 'Fred Heathcote', written over the professional seal.

COMPREHENSIVE TASK LIST

GENERAL

This portion of the report specifies all the work that was performed and the procedures used. This investigation did not address the possibility of any geologic hazards or contaminants in the soil, although none were noted.

SITE WORK

1. Reviewed site for soil engineering problems.
2. Drilled two boring, up to 50 feet in depth, using hollow stem auger equipment. Choice drilling was used to do the drilling.
Undisturbed samples taken with a 2-1/2 inch I.D. sampler using a 140 pound weight dropped 30 inches. Standard penetration tests were performed to assess strong ground motion settlement using an automatic trip hammer to drive the samples. The samples are driven 18 inches with the blowcount from the bottom 12 inches being used as the standard penetration number.
3. Visual logging of the borings for classification of soil types and characteristics.
4. Obtained a bulk sample for laboratory testing.

LABORATORY TESTING

1. Determined in place density and moisture of undisturbed samples and is shown on boring logs.
2. Performed expansion index test of the soils. The test was performed according to the guidelines set forth in the latest ASTM version.
3. Performed compaction test of the soils to aid in grading and density testing. The test was performed according to latest version of ASTM (five layers, 25 blows/layer, 10 lb. hammer, 18" drop, 1/30 c.f. mold).

Results of testing are presented in the boring logs and following the Basis of Report.

REPORT

1. Comprehensive task list
2. Findings and Observations
 - a) site conditions
 - b) soil conditions
 - c) geologic conditions
 - d) liquefaction
 - e) subsidence

3. Recommendations
 - a) foundation: bearing values, depths, settlements, and lateral values
 - b) slabs on grade
 - c) drains and grades
 - d) construction procedures: earthwork, inspection
4. Basis of report
5. Results of testing
6. Boring logs

FINDINGS AND OBSERVATIONS

SITE CONDITIONS

Location description

The site is located along the south side of Solimar Beach Road. The proposed residence is about 2000 feet northwest of the western entrance to Solimar Beach Road.

Site access

The site is accessed from the western entrance to Solimar Beach Road.

Site relief

The area of the proposed building is located in a mildly sloping area. There is an existing structure. There is a rock seawall in the rear of the property to protect against the wave action.

Site drainage conditions-Erosion

There are no drainage patterns that exist. No erosion is evident in the area of the proposed residence.

Vegetation

The site has some vegetation in the area of the proposed structure.

Existing structures-performance

The site is occupied by a one story residence.

Past use

No known past use.

Adjacent properties

Residential use is present on adjacent properties.

SOIL CONDITIONS

Fill soils were not encountered in the borings. Fill soils may be encountered in the construction process. The soils are considered to have a very low expansion potential with an expansion index of 0.

There are natural soils are sands near the surface. These natural soils are moderately compressible. The soil has a medium strength. The soil has a low expansion potential.

Below the soils at a depth of 15 feet are sandstone and claystone bedrock. The bedrock is firm and moderately compressible.

Groundwater was first observed at a depth of 7 feet. Historical groundwater is at 6 feet. This historical groundwater is not within 5 feet of the finished floor elevation.

Hydrocollapse

Upper soils are not susceptible to hydrocollapse. The lower soils are dense. Typically soils with a relative density of 80% or more are less susceptible to hydrocollapse.

GEOLOGIC HAZARDS

This report is not a geology report, but certain things should be noted.

The site is close enough to the wave action that flooding is possible during storms and high tides. The seawall appears to be in moderate shape. No excessive erosion of sand is noted in the area of the seawall. Some reduction in sand replenishment has been obstructed by construction north of the site.

There is a potential for debris hazard during storms. Structurally, the house should be designed for easy repair of any storm damage. Residence should be designed for the impacts. Any damage sustained should be reviewed by a structural engineer to ascertain in additional stabilization.

We have included table 5-2 that includes the items that will need to be used in the design for the building.
Designer will need to use Type V for the design.

Tsunamis are a possibility. The last tsunami was over 150 years ago. Consequently, the chance of a tsunami affecting the site in the near future is considered remote. The question of when the next tsunami will occur is based in probability. This means that you are just as likely to see a tsunami in any given year. The probability of having a tsunami in any "one" given year does not go up or down with the passage of time. This means you could have 2 tsunamis in one year or have one in two thousand years. The mentioning of past events 150 years ago is to establish probabilities through history search in much the same way as we predict probabilities of earthquakes. The probability of having a tsunami increases with the time period considered. It is much likelier to see a tsunami in a 1000 year period as opposed to a 50 year period. In this manner, we expect that it is unlikely that the project will experience a tsunami in the next 100 years. No exact probability is given due to the limited nature of the observations of tsunamis over time in this area.

No known fault lines traverse the site. A geology report could address the exact distances to any known faults, if desired.

No slope instability problems are present.

LIQUEFACTION

The site is situated within the coastal area of north of Ventura. As with most of Southern California, this area is bordered by faults which are active, potentially active and inactive. Faults which are most concern from a ground shaking viewpoint are the San Andreas, Red Mountain, Santa Ana, Ventura Pitas Point, Santa Ynez, and Oak Ridge faults. Each are capable of generating large to moderate earthquakes and of causing significant shaking at the site. The site will experience significantly strong coseismic ground motions caused by activity on regional faults at some time in the future.

The earthquake magnitudes are listed using peak values. These values are used with the distances from the site to formulate the accelerations. The probabilistic methods are used to determine the accelerations from empirical data. The chart of this data is presented at the end of this letter. The fault data is shown below.

<u>FAULT</u>	<u>DISTANCE (k)</u>	<u>PEAK MAG.</u>	<u>ACCEL.</u>
RED MOUNTAIN	1.6	6.8	.60
SANTA ANA	10	6.7	.34
OAKRIDGE	28	6.9	.14
SAN ANDREAS	60	7.8	.10
SANTA YNEZ	18	7.0	.26
VENTURA PITAS	16	6.8	.27

The acceleration used in the liquefaction analysis is 0.63. We utilize the peak acceleration at the site to develop estimates of field loading equivalent uniform cyclic stress ratios used to represent cyclic loading.

Groundwater was found at 7 feet below the surface. We are assuming a historical high water level of 6 feet in the liquefaction analysis. The standard penetration numbers are presented on the boring logs.

To convert standard penetration data to a N_{160} value, corrections are made for the overburden, and rod length. No corrections are needed for the sampling method of a cathead. No corrections are needed for liners in the spt device.

The soil profile will most likely experience liquefaction. We have seen liquefaction results in the area. The calculations showed no liquefaction. We are assuming that the liquefaction induced settlement is on the order of 1/2 of an inch. Emperical data has been developed to relate standard penetration values with bulk modulus of settlement. These values are used to determine the settlement in the layers.

The water level fluctuates with the tide. Most of the slope to get down to the waters edge is above the water table. That being said, there is a slight slope of the beachfront going down into the water. This would not be a problem normally, but in this case, there is bedrock under the sands that is inclined. This creates a bottom of the liquifiable sands that is inclined along with the top layer that is inclined. Due to these factors, lateral spreading

is a possibility in this situation. Some surface displacements due to lateral spreading or faulting are possible.

SUBSIDENCE

The site is not listed in an area of subsidence.

3124 Solimar Beach Dr, Ventura, CA 93001, USA

Latitude, Longitude: 34.3149923, -119.3631217

Date	4/22/2021, 2:42:07 PM	
Design Code Reference Document	ASCE7-16	
Risk Category	II	
Site Class	C - Very Dense Soil and Soft Rock	
Type	Value	Description
S _s	2.039	MCE _R ground motion. (for 0.2 second period)
S ₁	0.761	MCE _R ground motion. (for 1.0s period)
S _{MS}	2.447	Site-modified spectral acceleration value
S _{M1}	1.066	Site-modified spectral acceleration value
S _{DS}	1.631	Numeric seismic design value at 0.2 second SA
S _{D1}	0.71	Numeric seismic design value at 1.0 second SA

RECOMMENDATIONS

PILE FOUNDATIONS FOR RESIDENCE

General

Due to ocean scour considerations and lateral spreading, the house and all floors will need to be supported on deepened foundations. Scour may be determined by firms handling this type of calculation. Deepened foundations will be in the form of drilled piles. The drilled piles will form the support for the residence.

Lateral pressure on foundations due to seismic loads are anticipated on the order of at least 1000 pounds per linear foot in the upper 8 feet.

Lateral loads or movement are expected on foundations due to liquefaction and will be resisted by the piles. There are no retaining walls that will be affected by liquefaction. There is no flotation of buried structures that will affect the project.

No ground stabilization is deemed necessary. Our foundations have been structurally reinforced from normal due to liquefiable soils. Differential settlement has been accounted for in the design.

The expansion potential of the soils indicates a foundation design for low expansion soils is needed for the foundations. Piles shall be designed for the corrosive elements of the seawater.

Supporting soils

Pile foundations for the residence will be founded in the firm, natural soils and claystone and sandstone bedrock.

Spacing and Size

The piles shall be no closer than 2-1/2 times the pile diameters. The piles must be at least 2 feet in diameter. Larger diameters may be used as needed for structural sections of the piles and for vertical and horizontal capacities. Maximum spacing is 20 feet.

Depth and vertical capacities

Piles must be drilled to a depth at least 25 feet into firm bedrock. The anticipated downward vertical capacity based on shear testing is as shown below. Upward vertical capacity is half the downward vertical capacities.

24" Diameter

75 kips

30" Diameter

100 kips

These values are based on the friction capabilities of the soil and bedrock on the piles. Actual capacities may be less due to the capacity of the concrete and steel in the piles. No group action reductions are needed.

Downdrag will affect the piles. Using the NAVFAC 7.2 211 formula.

$$F_n = B P_o$$

$$P_o = 10 * (2/3) * 110 = 730 \text{ psf}$$

$B = .35$ from Navfac manual for sand

$$F_n = .35 * 730 = 257 \text{ psf}$$

For 24 inch pile with 10 feet of liquefiable material

$$(2 * 3.1415 * 1 * 12) * (257 \text{ psf}) = 20,000 \text{ pounds}$$

All piles shall have a load of 20,000 pounds added to the design weights to compensate for downdrag.

Lateral Pile Capacity

All piles shall be designed for a lateral loading of 1000 pounds per lineal foot for lateral spreading down to a depth of 12 feet. The passive pressure of the bedrock shall be designed for 400 pounds per cubic foot. This value shall be limited to 10 times this amount. All seismic designs shall include this lateral loading. Depth of piles shall be a minimum of 25 feet into the bedrock. Depths may be deeper due to lateral loadings from structural and lateral spreading.

Water impact loadings shall be designed by the structural engineer.

The moment arm shall be considered at about 17 feet below existing ground surface for lateral loadings.

Settlement

The drilled piles should not settle more than 1/2 inch and less than 1/4 differential settlement.

Installation

Piles shall be installed by a competent company. There are some cobbles in the soil. The piles may need to be cased to reduce caving and raveling. Large equipment should be used for the drilling process. Drilling mud will need to be used and or casing to prevent caving in the sands above the bedrock. Piles will need to have steel and concrete placed immediately upon completion of drilling of each pile.

SLABS ON GRADE

The slabs shall be structurally supported on the piles. Slab thickness and reinforcing shall be designed by the structural engineer.

If a floor covering is used that will be affected by moisture, then we recommend that you use a 4 inch layer of gravel beneath the slab as a capillary break. The gravel should be of 3/4 inch variety with less than 10% sand with very little amount of fines.

A visquene covering must be used to serve as a water vapor barrier. To reduce problems associated with the concrete curing process, a 2 inch layer of sand should be placed on top of the visquene or a low slump concrete should be used.

CONSTRUCTION PROCEDURES

EARTHWORK

For any earthwork movement the following must be accomplished.

- 1) All bottoms of the excavations, areas to receive slabs, and foundations should be scarified and compacted to 90% compaction.
- 2) All fills and backfills should be placed in horizontal layers less than 8 inches in loose thickness.

- 3) The soils shall be compacted to a minimum of 90% of the maximum density rendered by the latest version of the ASTM(D-1557). Field density testing per latest ASTM version for Sand Cone Method.
- 4) The moisture content should not vary more than 2% from the optimum moisture content, although the grading process will be more easily accomplished with the soils being 1 to 2% wetter than optimum moisture content.
- 5) Any utility trenches will need to be properly backfilled as detailed in 2,3 and 4 above.
- 6) All on site soils may be used. Any import soils should be approved by our firm and should not have an expansion index greater than 35.

INSPECTION

This is an important step to obtain quality construction and to obtain correct design. The following will need inspection by our firm.

* Foundations

We shall inspect all pile foundation excavations continuously for penetration into bearing strata to develop design strengths. No load tests are required.

* All earthwork

- a) All fill and backfills
- b) Testing frequency is at all bottoms and every 2 vertical feet

Inspection, by our firm, is needed to assure that the soil conditions are consistent with this report and design assumptions. Inspection by local government agencies may also be needed.

BASIS OF REPORT

RIGHT OF USE

This report is intended exclusively for the use of the 3124 Solimar LLC and the project designers.

METHODS

This report has been developed based on our understanding of the project details, field review, boring excavations, laboratory testing, engineering analyses, and experience with similar soil conditions with similar use and loads.

DEGREE OF PERFORMANCE

The work was performed using the methods and degree of care used by other soil engineering firms operating in this vicinity, for similar projects, in this time period. This firm is responsible only for our own negligent errors and negligent omissions. Any error or omission that results in an unexpected cost that normally would have been present, is not the responsibility of our firm. Nothing else is warranted, implied or expressed, as to the details presented in this report.

VALIDITY OF REPORT

Changes

This report is valid for this specific project as described in the text of the report and on the plot plan. Any change in project size, loads, location, grade or use would require a review of this report.

Inspection

The recommendations given in this report are based on the assumption that all necessary inspection work will be performed during the construction phase of the project. The initial soil engineering investigation is only a part of the work needed to obtain correct engineering design. The soil conditions are only anticipated in the initial report. The inspection work verifies the conditions are as expected and allow our firm the ability to modify the recommendations in the event that the soil conditions are different.

The presence of inspection will provide the owner with the ability to obtain advice as to soil related construction procedures and answer related questions as to the implementation of the recommendations provided in this report.

If another firm is used to perform the construction inspection of the soil related aspects, our professional liability and responsibility would be drastically reduced to the point that we would no longer be the soils engineer of record.

RESULTS OF TESTING

EXPANSION INDEX TEST

Sample Location:	Boring 1@0-1'
Soil type:	Sand
Confining Pressure:	144 psf
Initial Moisture Content: (% of dry wt.)	9.2
Final Moisture Content: (% of dry wt.)	16.1
Dry Density:	100 pcf
Expansion Index:	0

TEST METHOD:
THE LATEST ASTM VERSION
EXPANSION INDEX TEST

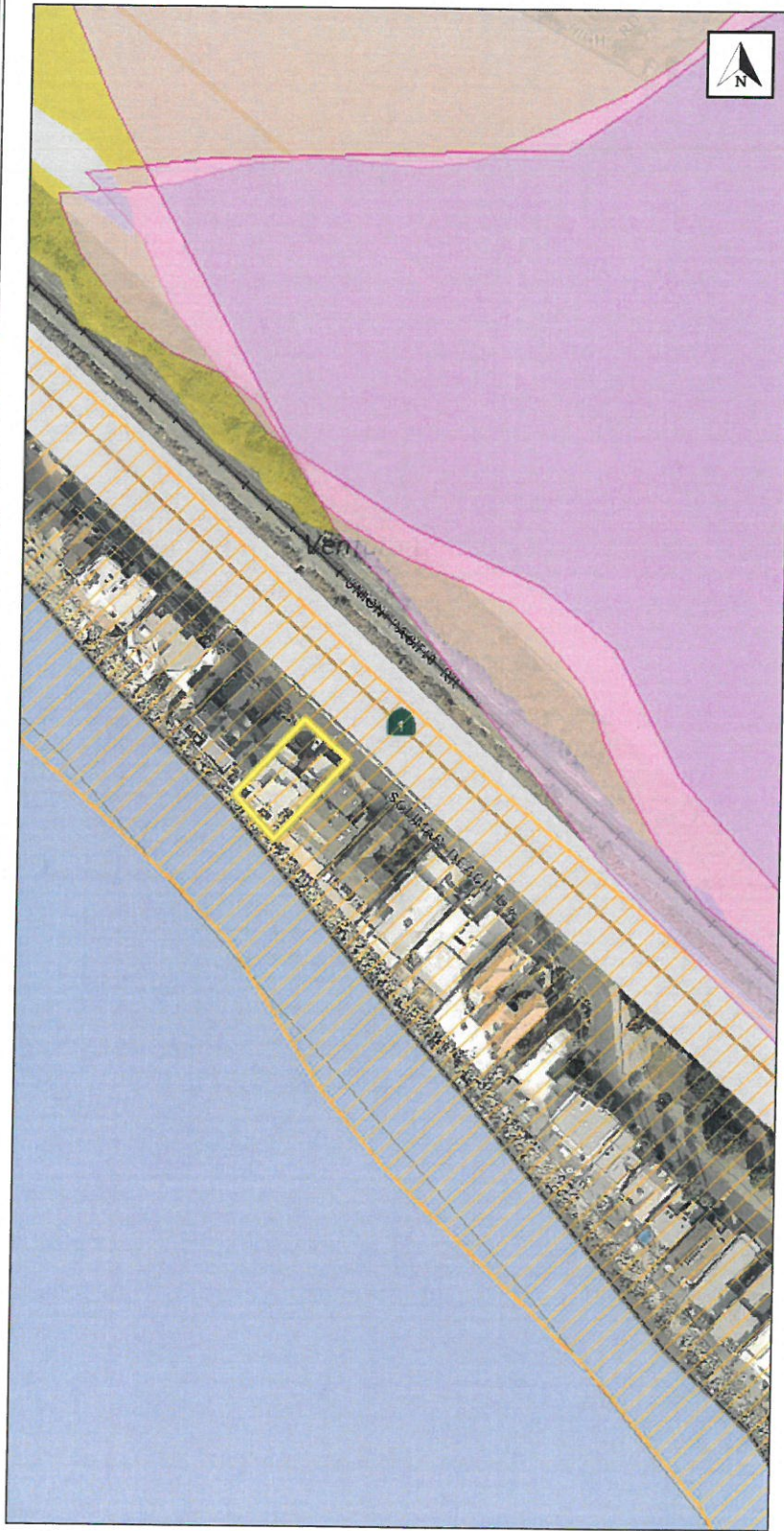
COMPACTION TEST

Sample Location:	Boring1@0-1'
Soil type:	Sand
Maximum Dry Density:	110 pcf
Optimum Moisture Content: (% of dry wt.)	10

TEST METHOD:
LATEST VERSION OF ASTM
COMPACTION TEST

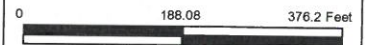


County View



Legend

- 100 Year Floodplain
- 500 Year Floodplain
- Actual and Potential Landslides
- All Faults
- Earthquake Fault Hazard Zones
- Liquefaction
- Potential EQ-Induced Landslides
- Subsidence Zone
- Parcels
- 1:9k



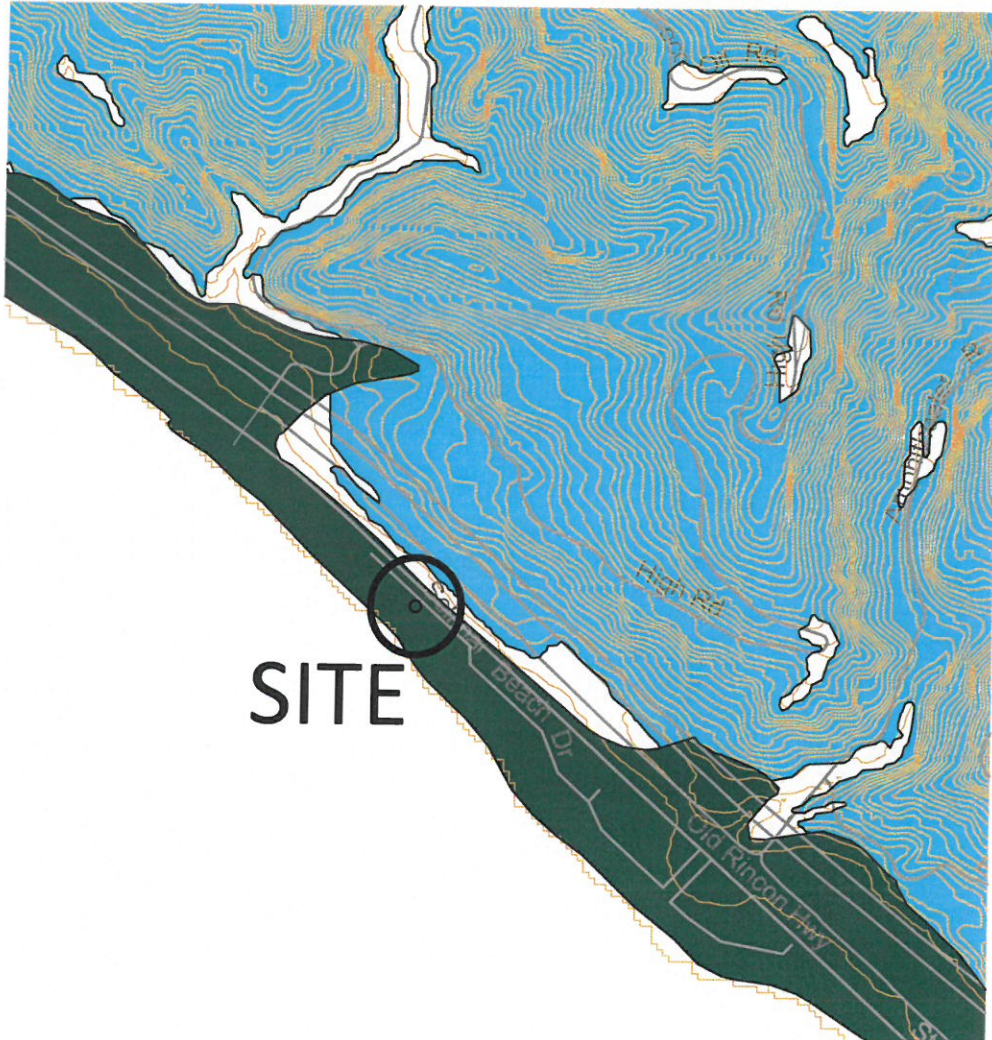
1: 2,256.99

Notes

Disclaimer: The information contained on the web site and in this application was created by the Ventura County Geographical Information System (GIS), which is designed and operated solely for the convenience of the County and related contract entities. The County does not warrant the accuracy of this information, and no decision involving a risk of economic loss or physical injury should be made in reliance thereon.

Earthquake Zones of Required Investigation Ventura Quadrangle

California Geological Survey

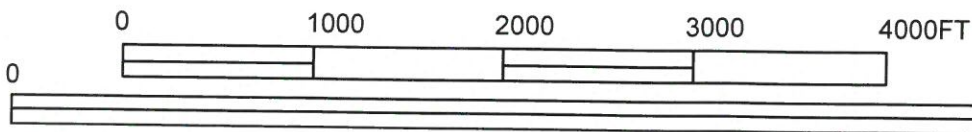


**3124 Solimar Beach Road
Ventura, California 93001**

Note:

⊙ Location

SCALE 1"=1000'



SEISMIC HAZARD ZONES

Liquefaction Zones

Areas where historical occurrences of liquefaction, or local geological, geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 26693(c) would be required.



Earthquake-Induced Landslide Zones
Areas where previous occurrences of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 26693(c) would be required.

EARTHQUAKE FAULT ZONES

Earthquake Fault Zones

Zone boundaries are delineated by straight-line segments; the boundaries define the zone encompassing active faults that constitute a potential hazard to structures from surface faulting or fault creep such that avoidance as described in Public Resources Code Section 2621.5(e) would be required.



Active Fault Traces

Faults considered to have been active during Holocene time and to have potential for surface rupture: Solid Line in Black or Red where Accurately Located; Long Dash in Black or Solid Line in Purple where Approximately Located; Short Dash in Black or Solid Line in Orange where Inferred; Dotted Line in Black or Solid Line in Rose where Concealed; Query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by fault creep.



BORING 1

JOB: 21032

FIELD ENGINEER: FRED HEATHCOTE

DATES DRILLED: MARCH 1, 2021

DRILLING EQUIPMENT: 8-INCH HOLLOW STEM AUGER

STANDARD PEN (blows per foot)	MOISTURE CONTENT (% of dry weight)	DRY DENSITY (lbs. per cubic foot)	DRIVE ENERGY (kip-feet)	ELEVATION (feet)	DEPTH (feet)	SAMPLE LOCATION
						SP SAND- fine, light greyish brown, damp, mod dense
	3.3	108	9			Grey, wet Water at 7'
	3.3	106	11		5	
	23.8	101	11		10	
26						CLAYSTONE- grey, wet, firm
					15	
	18.4	111	22		20	
71						
					25	
	19.5	114	45		30	
58						
32						
100						
					35	

CONTINUED

BORING 1						
CONTINUED						
JOB: 21032						
FIELD ENGINEER: FRED HEATHCOTE						
DATES DRILLED: MARCH 1, 2021						
DRILLING EQUIPMENT: 8-INCH HOLLOW STEM AUGER						
STANDARD PEN (blows per foot)	MOISTURE CONTENT (% of dry weight)	DRY DENSITY (lbs. per cubic foot)	DRIVE ENERGY (kip-foot)	ELEVATION (feet)	DEPTH (feet)	SAMPLE LOCATION
66						CLAYSTONE-grey, wet, firm
100					45	
67					50	

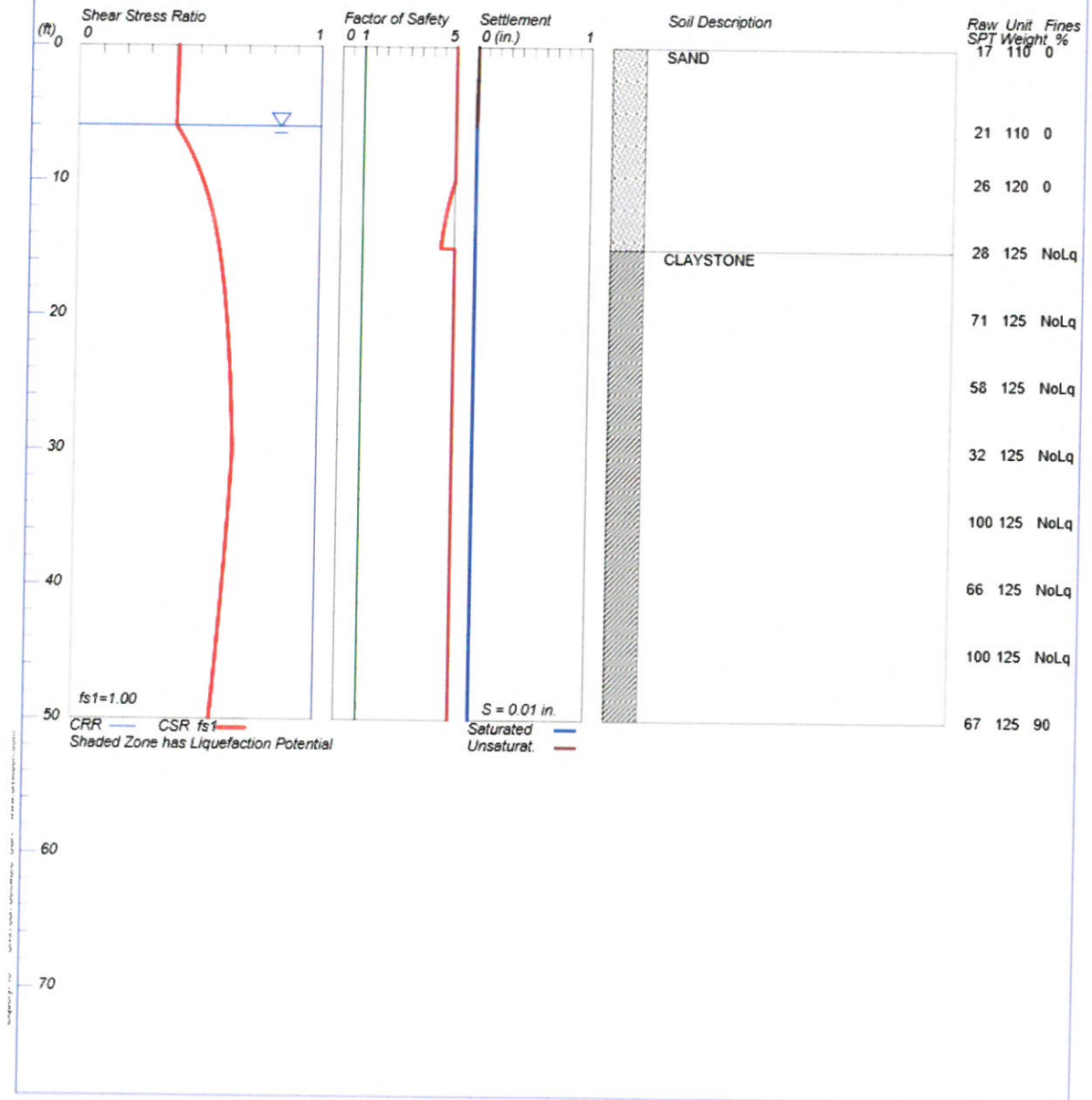
BORING 2						
JOB: 21032						
FIELD ENGINEER: FRED HEATHCOTE						
DATES DRILLED: MARCH 1, 2021						
DRILLING EQUIPMENT: 8-INCH HOLLOW STEM AUGER						
STANDARD PEN (blows per foot)	MOISTURE CONTENT (% of dry weight)	DRY DENSITY (lbs. per cubic foot)	DRIVE ENERGY (kip-foot)	ELEVATION (feet)	DEPTH (feet)	SAMPLE LOCATION
	4.5	102	10			SP SAND- fine, light greyish brown, damp, mod dense
					5	

LIQUEFACTION ANALYSIS

solimar

Hole No.=B-1 Water Depth=6 ft

Magnitude=6.8
Acceleration=.63g



CivilTech Corporation

Subtitle or Proj No.

Plate A-1

 LIQUEFACTION ANALYSIS CALCULATION SHEET
 Copyright by CivilTech Software
 www.civiltech.com
 (425) 453-6488 Fax (425) 453-5848

Licensed to , 4/22/2021 4:05:35 PM

Input File Name: C:\Users\Fred\Documents\liquefaction\21032.liq
 Title: solimar
 Subtitle: Subtitle or Proj No.

Input Data:

Surface Elev.=
 Hole No.=B-1
 Depth of Hole=50.0 ft
 Water Table during Earthquake= 6.0 ft
 Water Table during In-Situ Testing= 7.0 ft
 Max. Acceleration=0.63 g
 Earthquake Magnitude=6.8

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Ishihara / Yoshimine*
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1

10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth ft	SPT	GammaFines pcf	%
0.0	17.0	110.0	0.0
6.0	21.0	110.0	0.0
10.0	26.0	120.0	0.0
15.0	28.0	125.0	NoLiq
20.0	71.0	125.0	NoLiq
25.0	58.0	125.0	NoLiq
30.0	32.0	125.0	NoLiq
35.0	100.0	125.0	NoLiq
40.0	66.0	125.0	NoLiq
45.0	100.0	125.0	NoLiq
50.0	67.0	125.0	90.0

Output Results:

Calculation segment, dz=0.050 ft
 User defined Print Interval, dp=1.00 ft

CSR Calculation:

Depth ft	gamma pcf	sigma tsf	gamma' pcf	sigma' tsf	rd	CSR	x fs1	=CSRfs
0.00	110.0	0.000	110.0	0.000	1.00	0.41	1.0	0.41
1.00	110.0	0.055	110.0	0.055	1.00	0.41	1.0	0.41
2.00	110.0	0.110	110.0	0.110	1.00	0.41	1.0	0.41
3.00	110.0	0.165	110.0	0.165	0.99	0.41	1.0	0.41
4.00	110.0	0.220	110.0	0.220	0.99	0.41	1.0	0.41
5.00	110.0	0.275	110.0	0.275	0.99	0.40	1.0	0.40
6.00	110.0	0.330	47.6	0.330	0.99	0.40	1.0	0.40
7.00	112.5	0.386	50.1	0.354	0.98	0.44	1.0	0.44
8.00	115.0	0.442	52.6	0.380	0.98	0.47	1.0	0.47
9.00	117.5	0.501	55.1	0.407	0.98	0.49	1.0	0.49
10.00	120.0	0.560	57.6	0.435	0.98	0.51	1.0	0.51
11.00	121.0	0.620	58.6	0.464	0.97	0.53	1.0	0.53
12.00	122.0	0.681	59.6	0.494	0.97	0.55	1.0	0.55
13.00	123.0	0.742	60.6	0.524	0.97	0.56	1.0	0.56
14.00	124.0	0.804	61.6	0.554	0.97	0.57	1.0	0.57
15.00	125.0	0.866	62.6	0.585	0.97	0.58	1.0	0.58
16.00	125.0	0.929	62.6	0.617	0.96	0.59	1.0	0.59
17.00	125.0	0.991	62.6	0.648	0.96	0.60	1.0	0.60
18.00	125.0	1.054	62.6	0.679	0.96	0.61	1.0	0.61
19.00	125.0	1.116	62.6	0.710	0.96	0.61	1.0	0.61
20.00	125.0	1.179	62.6	0.742	0.95	0.62	1.0	0.62
21.00	125.0	1.241	62.6	0.773	0.95	0.63	1.0	0.63
22.00	125.0	1.304	62.6	0.804	0.95	0.63	1.0	0.63
23.00	125.0	1.366	62.6	0.836	0.95	0.63	1.0	0.63
24.00	125.0	1.429	62.6	0.867	0.94	0.64	1.0	0.64
25.00	125.0	1.491	62.6	0.898	0.94	0.64	1.0	0.64
26.00	125.0	1.554	62.6	0.930	0.94	0.64	1.0	0.64
27.00	125.0	1.616	62.6	0.961	0.94	0.65	1.0	0.65
28.00	125.0	1.679	62.6	0.992	0.93	0.65	1.0	0.65
29.00	125.0	1.741	62.6	1.023	0.93	0.65	1.0	0.65
30.00	125.0	1.804	62.6	1.055	0.93	0.65	1.0	0.65
31.00	125.0	1.866	62.6	1.086	0.92	0.65	1.0	0.65
32.00	125.0	1.929	62.6	1.117	0.91	0.65	1.0	0.65
33.00	125.0	1.991	62.6	1.149	0.91	0.64	1.0	0.64
34.00	125.0	2.054	62.6	1.180	0.90	0.64	1.0	0.64
35.00	125.0	2.116	62.6	1.211	0.89	0.64	1.0	0.64
36.00	125.0	2.179	62.6	1.243	0.88	0.63	1.0	0.63
37.00	125.0	2.241	62.6	1.274	0.87	0.63	1.0	0.63
38.00	125.0	2.304	62.6	1.305	0.86	0.63	1.0	0.63
39.00	125.0	2.366	62.6	1.336	0.86	0.62	1.0	0.62
40.00	125.0	2.429	62.6	1.368	0.85	0.62	1.0	0.62
41.00	125.0	2.491	62.6	1.399	0.84	0.61	1.0	0.61
42.00	125.0	2.554	62.6	1.430	0.83	0.61	1.0	0.61
43.00	125.0	2.616	62.6	1.462	0.82	0.60	1.0	0.60
44.00	125.0	2.679	62.6	1.493	0.82	0.60	1.0	0.60
45.00	125.0	2.741	62.6	1.524	0.81	0.59	1.0	0.59
46.00	125.0	2.804	62.6	1.556	0.80	0.59	1.0	0.59
47.00	125.0	2.866	62.6	1.587	0.79	0.59	1.0	0.59
48.00	125.0	2.929	62.6	1.618	0.78	0.58	1.0	0.58
49.00	125.0	2.991	62.6	1.649	0.78	0.58	1.0	0.58
50.00	125.0	3.054	62.6	1.681	0.77	0.57	1.0	0.57

CSR is based on water table at 6.0 during earthquake

CRR Calculation from SPT or BPT data:

Depth CRR7.5 ft	SPT	Cebs	Cr	sigma' tsf	Cn	(N1)60	Fines %	d(N1)60	(N1)60f
0.00	17.00	1.73	0.75	0.000	1.70	37.39	0.00	0.00	37.39 2.00
1.00	17.67	1.73	0.75	0.055	1.70	38.86	0.00	0.00	38.86 2.00
2.00	18.33	1.73	0.75	0.110	1.70	40.32	0.00	0.00	40.32 2.00
3.00	19.00	1.73	0.75	0.165	1.70	41.79	0.00	0.00	41.79 2.00
4.00	19.67	1.73	0.75	0.220	1.70	43.25	0.00	0.00	43.25 2.00
5.00	20.33	1.73	0.75	0.275	1.70	44.72	0.00	0.00	44.72 2.00
6.00	21.00	1.73	0.75	0.330	1.70	46.19	0.00	0.00	46.19 2.00
7.00	22.25	1.73	0.75	0.386	1.61	46.36	0.00	0.00	46.36 2.00
8.00	23.50	1.73	0.75	0.411	1.56	47.41	0.00	0.00	47.41 2.00
9.00	24.75	1.73	0.85	0.438	1.51	54.82	0.00	0.00	54.82 2.00
10.00	26.00	1.73	0.85	0.466	1.46	55.83	0.00	0.00	55.83 2.00
11.00	26.40	1.73	0.85	0.495	1.42	55.00	0.00	0.00	55.00 2.00
12.00	26.80	1.73	0.85	0.525	1.38	54.24	0.00	0.00	54.24 2.00
13.00	27.20	1.73	0.85	0.555	1.34	53.54	0.00	0.00	53.54 2.00
14.00	27.60	1.73	0.85	0.585	1.31	52.89	0.00	0.00	52.89 2.00
15.00	28.00	1.73	0.95	0.616	1.27	58.44	NoLiq	7.20	65.64 2.00
16.00	36.60	1.73	0.95	0.648	1.24	74.52	NoLiq	7.20	81.72 2.00
17.00	45.20	1.73	0.95	0.679	1.21	89.89	NoLiq	7.20	97.09 2.00
18.00	53.80	1.73	0.95	0.710	1.19	104.61	NoLiq	7.20	111.81 2.00
19.00	62.40	1.73	0.95	0.742	1.16	118.74	NoLiq	7.20	125.94 2.00
20.00	71.00	1.73	0.95	0.773	1.14	132.34	NoLiq	7.20	139.54 2.00
21.00	68.40	1.73	0.95	0.804	1.12	124.99	NoLiq	7.20	132.19 2.00
22.00	65.80	1.73	0.95	0.836	1.09	117.96	NoLiq	7.20	125.16 2.00
23.00	63.20	1.73	0.95	0.867	1.07	111.24	NoLiq	7.20	118.44 2.00
24.00	60.60	1.73	0.95	0.898	1.06	104.79	NoLiq	7.20	111.99 2.00
25.00	58.00	1.73	0.95	0.929	1.04	98.59	NoLiq	7.20	105.79 2.00
26.00	52.80	1.73	0.95	0.961	1.02	88.28	NoLiq	7.20	95.48 2.00
27.00	47.60	1.73	0.95	0.992	1.00	78.32	NoLiq	7.20	85.52 2.00
28.00	42.40	1.73	1.00	1.023	0.99	72.30	NoLiq	7.20	79.50 2.00
29.00	37.20	1.73	1.00	1.055	0.97	62.49	NoLiq	7.20	69.69 2.00
30.00	32.00	1.73	1.00	1.086	0.96	52.97	NoLiq	7.20	60.17 2.00
31.00	45.60	1.73	1.00	1.117	0.95	74.41	NoLiq	7.20	81.61 2.00
32.00	59.20	1.73	1.00	1.149	0.93	95.28	NoLiq	7.20	102.48 2.00
33.00	72.80	1.73	1.00	1.180	0.92	115.61	NoLiq	7.20	122.81 2.00
34.00	86.40	1.73	1.00	1.211	0.91	135.42	NoLiq	7.20	142.62 2.00
35.00	100.00	1.73	1.00	1.242	0.90	154.75	NoLiq	7.20	161.95 2.00
36.00	93.20	1.73	1.00	1.274	0.89	142.45	NoLiq	7.20	149.65 2.00
37.00	86.40	1.73	1.00	1.305	0.88	130.47	NoLiq	7.20	137.67 2.00
38.00	79.60	1.73	1.00	1.336	0.87	118.78	NoLiq	7.20	125.98 2.00
39.00	72.80	1.73	1.00	1.368	0.86	107.38	NoLiq	7.20	114.58 2.00
40.00	66.00	1.73	1.00	1.399	0.85	96.26	NoLiq	7.20	103.46 2.00
41.00	72.80	1.73	1.00	1.430	0.84	105.00	NoLiq	7.20	112.20 2.00
42.00	79.60	1.73	1.00	1.462	0.83	113.57	NoLiq	7.20	120.77 2.00
43.00	86.40	1.73	1.00	1.493	0.82	121.98	NoLiq	7.20	129.18 2.00
44.00	93.20	1.73	1.00	1.524	0.81	130.22	NoLiq	7.20	137.42 2.00
45.00	100.00	1.73	1.00	1.555	0.80	138.31	NoLiq	7.20	145.51 2.00

46.00	93.40	1.73	1.00	1.587	0.79	127.91	NoLiq	7.20	135.11	2.00
47.00	86.80	1.73	1.00	1.618	0.79	117.71	NoLiq	7.20	124.91	2.00
48.00	80.20	1.73	1.00	1.649	0.78	107.73	NoLiq	7.20	114.93	2.00
49.00	73.60	1.73	1.00	1.681	0.77	97.94	NoLiq	7.20	105.14	2.00
50.00	67.00	1.73	1.00	1.712	0.76	88.34	NoLiq	7.20	95.54	2.00

CRR is based on water table at 7.0 during In-Situ Testing

Factor of Safety, - Earthquake Magnitude= 6.8:

Depth ft	sigC' tsf	CRR7.5x Ksig tsf	=CRRv x MSF tsf	=CRRm/ CSRfs =F.S. tsf	tsf	tsf	CRRm/CSRfs	
0.00	0.00	2.00	1.00	2.00	1.28	2.57	0.41	5.00
1.00	0.04	2.00	1.00	2.00	1.28	2.57	0.41	5.00
2.00	0.07	2.00	1.00	2.00	1.28	2.57	0.41	5.00
3.00	0.11	2.00	1.00	2.00	1.28	2.57	0.41	5.00
4.00	0.14	2.00	1.00	2.00	1.28	2.57	0.41	5.00
5.00	0.18	2.00	1.00	2.00	1.28	2.57	0.40	5.00
6.00	0.21	2.00	1.00	2.00	1.28	2.57	0.40	5.00
7.00	0.25	2.00	1.00	2.00	1.28	2.57	0.44	5.00
8.00	0.27	2.00	1.00	2.00	1.28	2.57	0.47	5.00
9.00	0.28	2.00	1.00	2.00	1.28	2.57	0.49	5.00
10.00	0.30	2.00	1.00	2.00	1.28	2.57	0.51	4.99
11.00	0.32	2.00	1.00	2.00	1.28	2.57	0.53	4.82
12.00	0.34	2.00	1.00	2.00	1.28	2.57	0.55	4.68
13.00	0.36	2.00	1.00	2.00	1.28	2.57	0.56	4.57
14.00	0.38	2.00	1.00	2.00	1.28	2.57	0.57	4.47
15.00	0.40	2.00	1.00	2.00	1.28	2.00	0.58	5.00 ^
16.00	0.42	2.00	1.00	2.00	1.28	2.00	0.59	5.00 ^
17.00	0.44	2.00	1.00	2.00	1.28	2.00	0.60	5.00 ^
18.00	0.46	2.00	1.00	2.00	1.28	2.00	0.61	5.00 ^
19.00	0.48	2.00	1.00	2.00	1.28	2.00	0.61	5.00 ^
20.00	0.50	2.00	1.00	2.00	1.28	2.00	0.62	5.00 ^
21.00	0.52	2.00	1.00	2.00	1.28	2.00	0.63	5.00 ^
22.00	0.54	2.00	1.00	2.00	1.28	2.00	0.63	5.00 ^
23.00	0.56	2.00	1.00	2.00	1.28	2.00	0.63	5.00 ^
24.00	0.58	2.00	1.00	2.00	1.28	2.00	0.64	5.00 ^
25.00	0.60	2.00	1.00	2.00	1.28	2.00	0.64	5.00 ^
26.00	0.62	2.00	1.00	2.00	1.28	2.00	0.64	5.00 ^
27.00	0.64	2.00	1.00	2.00	1.28	2.00	0.65	5.00 ^
28.00	0.67	2.00	1.00	2.00	1.28	2.00	0.65	5.00 ^
29.00	0.69	2.00	1.00	2.00	1.28	2.00	0.65	5.00 ^
30.00	0.71	2.00	1.00	2.00	1.28	2.00	0.65	5.00 ^
31.00	0.73	2.00	1.00	2.00	1.28	2.00	0.65	5.00 ^
32.00	0.75	2.00	1.00	2.00	1.28	2.00	0.65	5.00 ^
33.00	0.77	2.00	1.00	2.00	1.28	2.00	0.64	5.00 ^
34.00	0.79	2.00	1.00	2.00	1.28	2.00	0.64	5.00 ^
35.00	0.81	2.00	1.00	2.00	1.28	2.00	0.64	5.00 ^
36.00	0.83	2.00	1.00	2.00	1.28	2.00	0.63	5.00 ^
37.00	0.85	2.00	1.00	2.00	1.28	2.00	0.63	5.00 ^
38.00	0.87	2.00	1.00	2.00	1.28	2.00	0.63	5.00 ^
39.00	0.89	2.00	1.00	2.00	1.28	2.00	0.62	5.00 ^
40.00	0.91	2.00	1.00	2.00	1.28	2.00	0.62	5.00 ^
41.00	0.93	2.00	1.00	2.00	1.28	2.00	0.61	5.00 ^

42.00	0.95	2.00	1.00	2.00	1.28	2.00	0.61	5.00 ^
43.00	0.97	2.00	1.00	2.00	1.28	2.00	0.60	5.00 ^
44.00	0.99	2.00	1.00	2.00	1.28	2.00	0.60	5.00 ^
45.00	1.01	2.00	1.00	2.01	1.28	2.00	0.59	5.00 ^
46.00	1.03	2.00	1.00	2.00	1.28	2.00	0.59	5.00 ^
47.00	1.05	2.00	1.00	2.00	1.28	2.00	0.59	5.00 ^
48.00	1.07	2.00	0.99	1.99	1.28	2.00	0.58	5.00 ^
49.00	1.09	2.00	0.99	1.98	1.28	2.00	0.58	5.00 ^
50.00	1.11	2.00	0.99	1.98	1.28	2.00	0.57	5.00 ^

* F.S.<1: Liquefaction Potential Zone. (If above water table: F.S.=5)
^ No-liquefiable Soils.
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

CPT convert to SPT for Settlement Analysis:

Fines Correction for Settlement Analysis:

Depth ft	lc	qc/N60	qc1 tsf	(N1)60	Fines %	d(N1)60	(N1)60s
0.00	-	-	-	37.39	0.00	0.00	37.39
1.00	-	-	-	38.86	0.00	0.00	38.86
2.00	-	-	-	40.32	0.00	0.00	40.32
3.00	-	-	-	41.79	0.00	0.00	41.79
4.00	-	-	-	43.25	0.00	0.00	43.25
5.00	-	-	-	44.72	0.00	0.00	44.72
6.00	-	-	-	46.19	0.00	0.00	46.19
7.00	-	-	-	46.36	0.00	0.00	46.36
8.00	-	-	-	47.41	0.00	0.00	47.41
9.00	-	-	-	54.82	0.00	0.00	54.82
10.00	-	-	-	55.83	0.00	0.00	55.83
11.00	-	-	-	55.00	0.00	0.00	55.00
12.00	-	-	-	54.24	0.00	0.00	54.24
13.00	-	-	-	53.54	0.00	0.00	53.54
14.00	-	-	-	52.89	0.00	0.00	52.89
15.00	-	-	-	65.64	NoLiq	0.00	65.64
16.00	-	-	-	81.72	NoLiq	0.00	81.72
17.00	-	-	-	97.09	NoLiq	0.00	97.09
18.00	-	-	-	100.00	NoLiq	0.00	100.00
19.00	-	-	-	100.00	NoLiq	0.00	100.00
20.00	-	-	-	100.00	NoLiq	0.00	100.00
21.00	-	-	-	100.00	NoLiq	0.00	100.00
22.00	-	-	-	100.00	NoLiq	0.00	100.00
23.00	-	-	-	100.00	NoLiq	0.00	100.00
24.00	-	-	-	100.00	NoLiq	0.00	100.00
25.00	-	-	-	100.00	NoLiq	0.00	100.00
26.00	-	-	-	95.48	NoLiq	0.00	95.48
27.00	-	-	-	85.52	NoLiq	0.00	85.52
28.00	-	-	-	79.50	NoLiq	0.00	79.50
29.00	-	-	-	69.69	NoLiq	0.00	69.69
30.00	-	-	-	60.17	NoLiq	0.00	60.17
31.00	-	-	-	81.61	NoLiq	0.00	81.61
32.00	-	-	-	100.00	NoLiq	0.00	100.00
33.00	-	-	-	100.00	NoLiq	0.00	100.00
34.00	-	-	-	100.00	NoLiq	0.00	100.00

35.00	-	-	-	100.00	NoLiq	0.00	100.00
36.00	-	-	-	100.00	NoLiq	0.00	100.00
37.00	-	-	-	100.00	NoLiq	0.00	100.00
38.00	-	-	-	100.00	NoLiq	0.00	100.00
39.00	-	-	-	100.00	NoLiq	0.00	100.00
40.00	-	-	-	100.00	NoLiq	0.00	100.00
41.00	-	-	-	100.00	NoLiq	0.00	100.00
42.00	-	-	-	100.00	NoLiq	0.00	100.00
43.00	-	-	-	100.00	NoLiq	0.00	100.00
44.00	-	-	-	100.00	NoLiq	0.00	100.00
45.00	-	-	-	100.00	NoLiq	0.00	100.00
46.00	-	-	-	100.00	NoLiq	0.00	100.00
47.00	-	-	-	100.00	NoLiq	0.00	100.00
48.00	-	-	-	100.00	NoLiq	0.00	100.00
49.00	-	-	-	100.00	NoLiq	0.00	100.00
50.00	-	-	-	95.54	NoLiq	0.00	95.54

(N1)60s has been fines corrected in liquefaction analysis, therefore d(N1)60=0.
 Fines=NoLiq means the soils are not liquefiable.

Settlement of Saturated Sands:

Settlement Analysis Method: Ishihara / Yoshimine*

Depth	CSR _f / MSF*	=CSR _m F.S.	Fines	(N1)60sDr	ec	dsz	dsp
ft	tsf	tsf	%	%	%	in.	in.

49.95	0.57	1.0	0.57	5.00	NoLiq	96.01	100.00	0.000	0.0E0	0.000
0.000										
49.00	0.58	1.0	0.58	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
48.00	0.58	1.0	0.58	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
47.00	0.59	1.0	0.59	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
46.00	0.59	1.0	0.59	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
45.00	0.59	1.0	0.59	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
44.00	0.60	1.0	0.60	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
43.00	0.60	1.0	0.60	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
42.00	0.61	1.0	0.61	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
41.00	0.61	1.0	0.61	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
40.00	0.62	1.0	0.62	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
39.00	0.62	1.0	0.62	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
38.00	0.63	1.0	0.63	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										

37.00	0.63	1.0	0.63	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
36.00	0.63	1.0	0.63	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
35.00	0.64	1.0	0.64	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
34.00	0.64	1.0	0.64	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
33.00	0.64	1.0	0.64	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
32.00	0.65	1.0	0.65	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
31.00	0.65	1.0	0.65	5.00	NoLiq	81.61	100.00	0.000	0.0E0	0.000
0.000										
30.00	0.65	1.0	0.65	5.00	NoLiq	60.17	100.00	0.000	0.0E0	0.000
0.000										
29.00	0.65	1.0	0.65	5.00	NoLiq	69.69	100.00	0.000	0.0E0	0.000
0.000										
28.00	0.65	1.0	0.65	5.00	NoLiq	79.50	100.00	0.000	0.0E0	0.000
0.000										
27.00	0.65	1.0	0.65	5.00	NoLiq	85.52	100.00	0.000	0.0E0	0.000
0.000										
26.00	0.64	1.0	0.64	5.00	NoLiq	95.48	100.00	0.000	0.0E0	0.000
0.000										
25.00	0.64	1.0	0.64	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
24.00	0.64	1.0	0.64	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
23.00	0.63	1.0	0.63	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
22.00	0.63	1.0	0.63	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
21.00	0.63	1.0	0.63	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
20.00	0.62	1.0	0.62	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
19.00	0.61	1.0	0.61	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
18.00	0.61	1.0	0.61	5.00	NoLiq	100.00	100.00	0.000	0.0E0	0.000
0.000										
17.00	0.60	1.0	0.60	5.00	NoLiq	97.09	100.00	0.000	0.0E0	0.000
0.000										
16.00	0.59	1.0	0.59	5.00	NoLiq	81.72	100.00	0.000	0.0E0	0.000
0.000										
15.00	0.58	1.0	0.58	5.00	NoLiq	65.64	100.00	0.000	0.0E0	0.000
0.000										
14.00	0.57	1.0	0.57	4.47	0.00	52.89	100.00	0.000	0.0E0	0.000
0.000										
13.00	0.56	1.0	0.56	4.57	0.00	53.54	100.00	0.000	0.0E0	0.000
0.000										
12.00	0.55	1.0	0.55	4.68	0.00	54.24	100.00	0.000	0.0E0	0.000
0.000										
11.00	0.53	1.0	0.53	4.82	0.00	55.00	100.00	0.000	0.0E0	0.000
0.000										
10.00	0.51	1.0	0.51	4.99	0.00	55.83	100.00	0.000	0.0E0	0.000
0.000										

9.00	0.49	1.0	0.49	5.00	0.00	54.82	100.00	0.000	0.0E0	0.000
0.000										
8.00	0.47	1.0	0.47	5.00	0.00	47.41	100.00	0.000	0.0E0	0.000
0.000										
7.00	0.44	1.0	0.44	5.00	0.00	46.36	100.00	0.000	0.0E0	0.000
0.000										
6.00	0.40	1.0	0.40	5.00	0.00	46.19	100.00	0.000	0.0E0	0.000
0.000										

No Settlement of Saturated Sands

Settlement of Saturated Sands=0.000 in.
 qc1 and (N1)60 is after fines correction in liquefaction analysis
 dsz is per each segment, dz=0.05 ft
 dsp is per each print interval, dp=1.00 ft
 S is cumulated settlement at this depth

Settlement of Unsaturated Sands:

Depth	sigma'	sigC'	(N1)60s	CSRsf	Gmax	g*Ge/Gm	g_eff	ec7.5	Cec	
ec	dsz	dsp	S	tsf	tsf		%		%	
ft	tsf	tsf								
in.	in.	in.								
5.95	0.33	0.21	46.11	0.40	738.7	1.8E-4	0.0337	0.0107	0.87	0.0093
1.11E-40.000		0.000								
5.00	0.28	0.18	44.72	0.40	670.3	1.7E-4	0.0304	0.0096	0.87	0.0083
1.00E-40.002		0.002								
4.00	0.22	0.14	43.25	0.41	592.9	1.5E-4	0.0295	0.0093	0.87	0.0081
9.73E-50.002		0.004								
3.00	0.17	0.11	41.79	0.41	507.6	1.3E-4	0.0245	0.0078	0.87	0.0067
8.09E-50.002		0.006								
2.00	0.11	0.07	40.32	0.41	409.6	1.1E-4	0.0229	0.0072	0.87	0.0063
7.55E-50.002		0.007								
1.00	0.06	0.04	38.86	0.41	286.1	7.9E-5	0.0136	0.0047	0.87	0.0040
4.86E-50.001		0.009								
0.00	0.00	0.00	37.39	0.41	3.8	1.1E-6	0.0010	0.0004	0.87	0.0003
4.00E-60.001		0.009								

Settlement of Unsaturated Sands=0.009 in.
 dsz is per each segment, dz=0.05 ft
 dsp is per each print interval, dp=1.00 ft
 S is cumulated settlement at this depth

Total Settlement of Saturated and Unsaturated Sands=0.009 in.
 Differential Settlement=0.005 to 0.006 in.

Units Depth = ft, Stress or Pressure = tsf (atm), Unit Weight = pcf, Settlement
 = in.

SPT	Field data from Standard Penetration Test (SPT)
BPT	Field data from Becker Penetration Test (BPT)
qc	Field data from Cone Penetration Test (CPT)
fs	Friction from CPT testing

gamma	Total unit weight of soil
gamma'	Effective unit weight of soil
Fines	Fines content [%]
D50	Mean grain size
Dr	Relative Density
sigma	Total vertical stress [tsf]
sigma'	Effective vertical stress [tsf]
sigC'	Effective confining pressure [tsf]
rd	Stress reduction coefficient
CRRv	CRR after overburden stress correction, $CRRv = CRR_{7.5} * K_{sig}$
CRR7.5	Cyclic resistance ratio (M=7.5)
Ksig	Overburden stress correction factor for CRR7.5
CRRm	After magnitude scaling correction $CRRm = CRRv * MSF$
MSF	Magnitude scaling factor from M=7.5 to user input M
CSR	Cyclic stress ratio induced by earthquake
CSRfs	$CSRfs = CSR * fs_1$ (Default $fs_1 = 1$)
fs1	First CSR curve in graphic defined in #9 of Advanced page
fs2	2nd CSR curve in graphic defined in #9 of Advanced page
F.S.	Calculated factor of safety against liquefaction $F.S. = CRRm / CSRsf$
Cebs	Energy Ratio, Borehole Dia., and Sampling Method Corrections
Cr	Rod Length Corrections
Cn	Overburden Pressure Correction
(N1)60	SPT after corrections, $(N1)60 = SPT * Cr * Cn * Cebs$
d(N1)60	Fines correction of SPT
(N1)60f	(N1)60 after fines corrections, $(N1)60f = (N1)60 + d(N1)60$
Cq	Overburden stress correction factor
qc1	CPT after Overburden stress correction
dqc1	Fines correction of CPT
qc1f	CPT after Fines and Overburden correction, $qc1f = qc1 + dqc1$
qc1n	CPT after normalization in Robertson's method
Kc	Fine correction factor in Robertson's Method
qc1f	CPT after Fines correction in Robertson's Method
lc	Soil type index in Suzuki's and Robertson's Methods
(N1)60s	(N1)60 after settlement fines corrections
CSRm	After magnitude scaling correction for Settlement calculation
$CSRm = CSRsf / MSF *$	
CSRfs	Cyclic stress ratio induced by earthquake with user inputed fs
MSF*	Scaling factor from CSR, $MSF^* = 1$, base on Item 2 of Page C.
ec	Volumetric strain for saturated sands
dz	Calculation segment, $dz = 0.050$ ft
dsz	Settlement in each segment, dz
dp	User defined print interval
dsp	Settlement in each print interval, dp
Gmax	Shear Modulus at low strain
g_eff	gamma_eff, Effective shear Strain
g^*Ge/Gm	gamma_eff * G_eff/G_max, Strain-modulus ratio
ec7.5	Volumetric Strain for magnitude=7.5
Cec	Magnitude correction factor for any magnitude
ec	Volumetric strain for unsaturated sands, $ec = Cec * ec_{7.5}$
NoLiq	No-Liquefy Soils

References:

1. NCEER Workshop on Evaluation of Liquefaction Resistance of Soils. Youd, T.L., and Idriss, I.M., eds., Technical Report NCEER 97-0022.

SP117. Southern California Earthquake Center. Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California. University of Southern California. March 1999.

2. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING AND SEISMIC SITE RESPONSE EVALUATION, Paper No. SPL-2, PROCEEDINGS: Fourth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, San Diego, CA, March 2001.

3. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING: A UNIFIED AND CONSISTENT FRAMEWORK, Earthquake Engineering Research Center, Report No. EERC 2003-06 by R.B Seed and etc. April 2003.

FREE HEAD

LATERAL PILE ANALYSIS

24" ROUND

$$K_{0.3} (\text{MN/m}^3) = 1.8 N \quad N = \text{CORRECTED STANDARD PEN.}$$

REFERENCE BRAJAM DAS pg 201 4.41

$$K_{0.3} = (1.8)(50) = 90 \text{ MN/m}^3 \quad N_{60} = 50 @ 15' \quad K = \text{YOUNG'S MODULUS}$$

$$K_{0.3} = 3.677(90) = 330 \text{ PCI}$$

FOR PILES

REFERENCE BRAJAM DAS PAGE 200

$$K = 0.67 K_{0.3}$$

$$K = 0.67(330) = 220 \text{ PCI}$$

$$T = \left(\frac{EI}{K} \right)^{1/5} \quad E = 4,070,000 \text{ PSI}$$

$$I = \frac{\pi R^4}{4} = \frac{\pi (12)^4}{4} = 16,300 \text{ IN}^4$$

$$T = \left(\frac{(4,070,000)(16,300)}{220} \right)^{1/5} = (301,550,000)^{1/5} = 50 \text{ IN}$$

$$Z_{\text{MAX}} = \frac{L}{T} = \frac{15 \times 12}{50} = 3.6$$

FOR LATERAL DEFLECTION
SEE FIG 13

DEFLECTION COEFFICIENT A_y
 $A_y = 2.5$

FOR $P = 45,000$ LBS

$$\Delta_p = \frac{2.5 (45,000) (50)^3}{(16,300) (4,070,000)} = .21'' \leftarrow$$

FOR MOMENT SEE FIG 18

Defl. coeff. $\rightarrow B_y = 1.6$

FOR 15' SCORE $M = 45,000 (15) (12) = 8,100,000$ lb-in

$$\Delta_m = \frac{B_y (M + T^2)}{EI} = \frac{1.6 (8,100,000) (50)^2}{16,300 (4,070,000)}$$
$$= .5'' \leftarrow$$

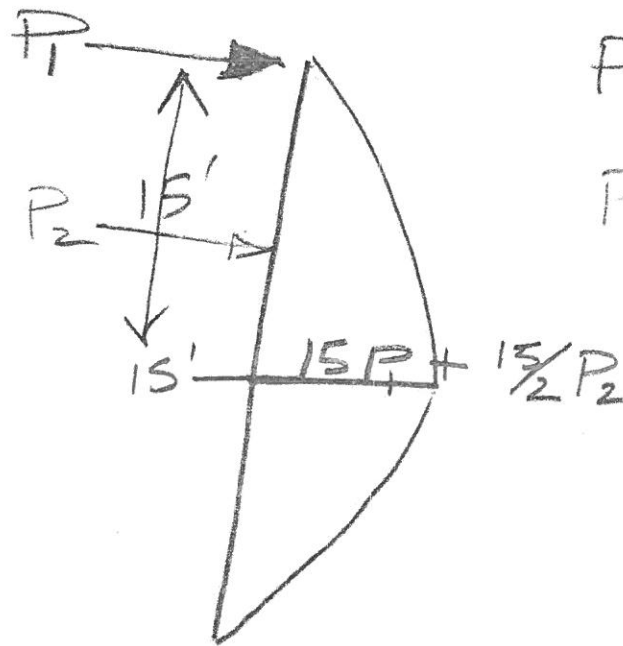
TOTAL DEFLECTION FOR 24" PILE

$$.5'' + .21 = .71''$$

$\frac{3}{4}''$ DEFLECTION FOR 45K \leftarrow

DIAGRAM - MOMENT

MAX MOMENT TO OCCUR AT 15 feet



P_1 = STRUCTURE LOAD

P_2 = CREEP LOAD

Principles of Foundation Engineering

Braja M. Das

Civil Engineering Department
The University of Texas at El Paso



Brooks/Cole Engineering Division
Monterey, California 93940

square plates measuring $0.3 \text{ m} \times 0.3 \text{ m}$ ($1 \text{ ft} \times 1 \text{ ft}$), and values of k can be calculated. The value of k can be related to large foundations measuring $B \times B$ as follows:

Foundations on Sandy Soils:

$$k = k_{0.3} \left(\frac{B + 0.3}{2B} \right)^2 \quad (4.38)$$

where $k_{0.3}$ and k = coefficients of subgrade reaction of footings measuring $0.3 \text{ (m)} \times 0.3 \text{ (m)}$ and $B \text{ (m)} \times B \text{ (m)}$, respectively (unit kN/m^3).

Foundations on Clays:

$$k \text{ (kN/m}^3\text{)} = k_{0.3} \text{ (kN/m}^3\text{)} \left[\frac{0.3 \text{ (m)}}{B \text{ (m)}} \right] \quad (4.39)$$

The definition of k in Eqs. (4.39) is the same as that given in Eq. (4.35). For rectangular foundations having dimensions of $B \times L$ (for similar soil and q)

$$k = \frac{k_{B \times B} \left(1 + \frac{B}{L} \right)}{1.5} \quad (4.40)$$

where k = coefficient of subgrade modulus of the rectangular foundation ($L \times B$)

$k_{B \times B}$ = coefficient of subgrade modulus of a square foundation having dimension of $B \times B$

USE The preceding equation indicates that the value of k of a very long foundation with a width B is approximately equal to $0.67k_{B \times B}$.

The Young's modulus of granular soils increases with depth. Because of the fact that the settlement of a foundation is dependent on the Young's modulus, the value of k increases as the depth of the foundation increases.

Following are some typical ranges of value for the coefficient of subgrade reaction $k_{0.3}$ for sandy and clayey soils.

Sand (dry or moist)	
Loose:	8–25 MN/m^3 (29–92 lb/in.^3)
Medium:	25–125 MN/m^3 (91–460 lb/in.^3)
Dense:	125–375 MN/m^3 (460–1380 lb/in.^3)
Sand (saturated)	
Loose:	10–15 MN/m^3 (35–55 lb/in.^3)
Medium:	35–40 MN/m^3 (125–147 lb/in.^3)
Dense:	130–150 MN/m^3 (475–552 lb/in.^3)
Clay	
Stiff ($q_u = 100\text{--}200 \text{ kN/m}^2$):	12–25 MN/m^3 (44–92 lb/in.^3)
Very stiff ($q_u = 200\text{--}400 \text{ kN/m}^2$):	25–50 MN/m^3 (92–184 lb/in.^3)
Hard ($q_u > 400 \text{ kN/m}^2$):	$> 50 \text{ MN/m}^3$ ($> 184 \text{ lb/in.}^3$)

(Note: q_u = unconfined compression strength)

Scott (1981) has proposed that for sandy soils, the value of $k_{0.3}$ can be obtained from standard penetration resistance at any given depth as

$$k_{0.3} \text{ (MN/m}^3\text{)} = 1.8N \quad \text{USE} \quad (4.41)$$

where N = corrected standard penetration resistance

For long beams, Vesic (1961) proposed an equation for estimation of subgrade reaction that can be expressed as

$$k' = Bk = 0.65 \sqrt[12]{\frac{E_s B^4}{E_f I_f}} \frac{E_s}{1 - \mu^2}$$

or

$$k = 0.65 \sqrt[12]{\frac{E_s B^4}{E_f I_f}} \frac{E_s}{B(1 - \mu^2)} \quad (4.42)$$

where E_s = Young's modulus of soil

B = foundation width

E_f = Young's modulus of foundation material

I_f = moment of inertia of the cross section of the foundation

μ = Poisson's ratio of soil

For most practical purposes, Eq. (4.42) can be approximated as

$$k = \frac{E_s}{B(1 - \mu^2)} \quad (4.43)$$

The coefficient of subgrade reaction is also a very useful parameter in the design of rigid highway and airfield pavements. The pavement with a concrete wearing surface is generally referred to as a *rigid pavement*, and the pavement with an asphaltic wearing surface is called a *flexible pavement*. For a surface load acting on a rigid pavement, the maximum tensile stress occurs at the base of the slab. To estimate the magnitude of the maximum horizontal tensile stress developed at the base of the rigid pavement, elastic solutions involving slabs on Winkler foundations are extremely useful. Some of the early work in this area was done by Westergaard (1926, 1939, 1947).

Now that we have discussed the coefficient of subgrade reaction, we will proceed with the discussion of the approximate flexible method of designing mat foundations. This method, as proposed by the American Concrete Institute Committee 436 (1966) is described below in a step-by-step manner. The design procedure is primarily based on the theory of plates. Its use allows the effects (that is, moment, shear, and deflection) of a concentrated column load in the area surrounding it to be evaluated. If the zones of influence of two or more columns overlap, the method of superposition can be used to obtain the net moment, shear, and deflection at any point.

1. Assume a thickness (h) for the mat. This can be done according to Step 6 as outlined in the preceding section on the conventional rigid method. (Note: h is the total thickness of the mat.)

Proceedings of the

Eighth Texas Conference

on

SOIL MECHANICS

and

FOUNDATION ENGINEERING

September 14 and 15, 1956



Special Publication No. 57

BUREAU OF ENGINEERING RESEARCH
THE UNIVERSITY OF TEXAS



**LEROY CRANDALL
AND ASSOCIATES**
CONSULTING GEOTECHNICAL ENGINEERS

A SUBSIDIARY OF LAW ENGINEERING TESTING COMPANY

NON-DIMENSIONAL SOLUTIONS FOR LATERALLY LOADED PILES
WITH SOIL MODULUS ASSUMED PROPORTIONAL TO DEPTH

by

Lymon C. Reese and Hudson Matlock*

SYNOPSIS

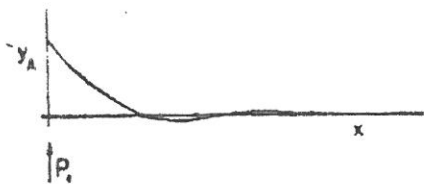
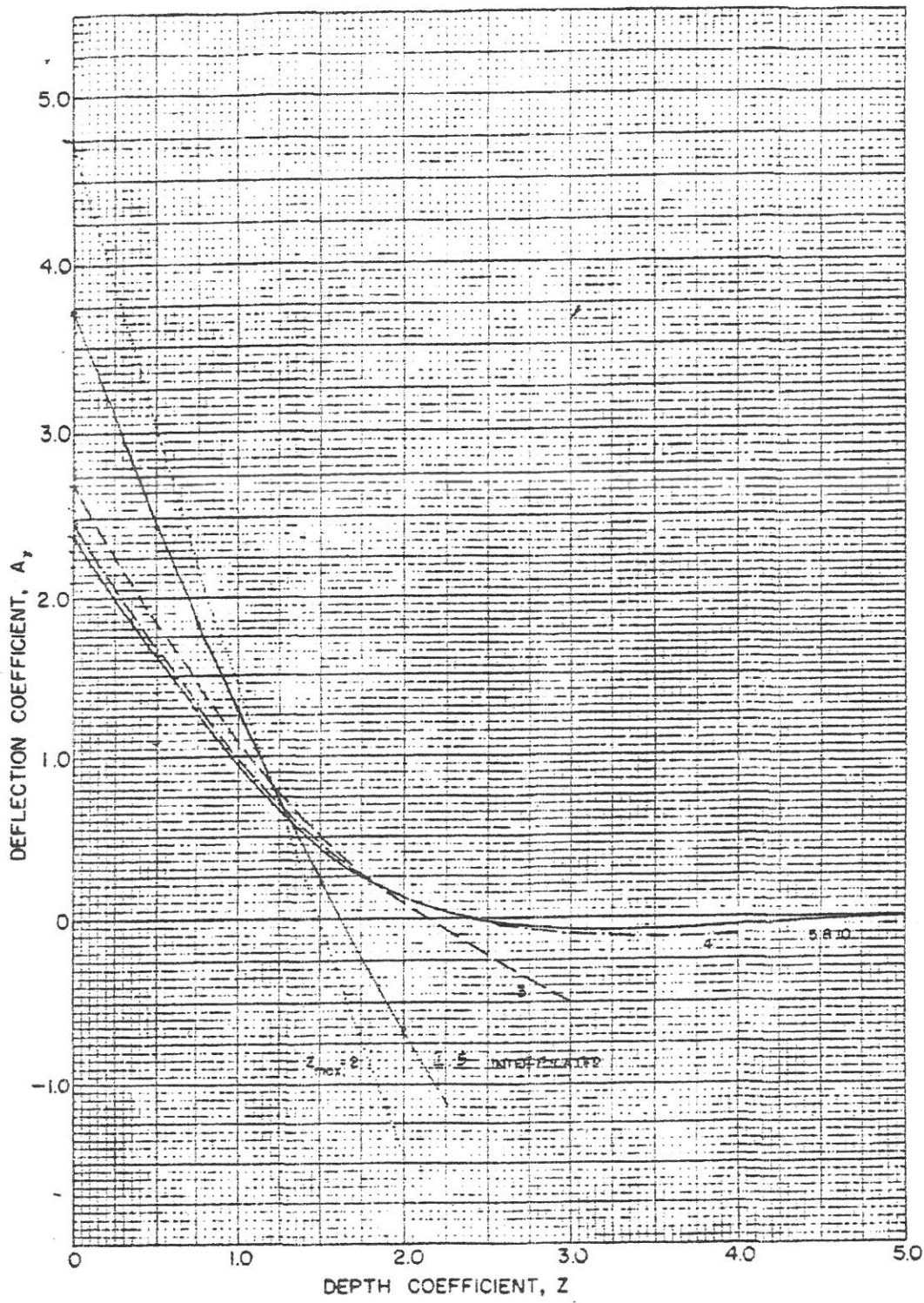
Non-dimensional curves are presented which enable rapid analysis of laterally loaded piles for cases where the soil modulus is assumed to vary linearly with depth. A discussion of the general problem of laterally loaded piles suggests limitations to this method of analysis.

I. THE GENERAL PROBLEM OF LATERALLY LOADED PILES

The two usual approaches to the problem of laterally loaded piles involve either (1) limit analysis methods or (2) elastic methods. The method presented in this paper is an elastic method, but it will be shown that the method does have possible application when the soils are acting plastically.

Limit analysis methods assume that the limiting or maximum soil resistance is acting against the pile when the ultimate load is placed against the pile. Under some assumptions of loading, such as that shown in Fig. 1, the problem is statically determinate. The limit analysis method which is shown in Fig. 1 assumes (1) a soil of constant strength with depth, and (2) that the pile deflects sufficiently to develop the full soil resistance all along the length considered. The second assumption is obviously untrue where there are small deflections, but any improvement would require some knowledge of pile deflection - soil reaction characteristics of the soil. If the reaction-pressure relationships of a soil are known, it would seem preferable to use one of the elastic methods

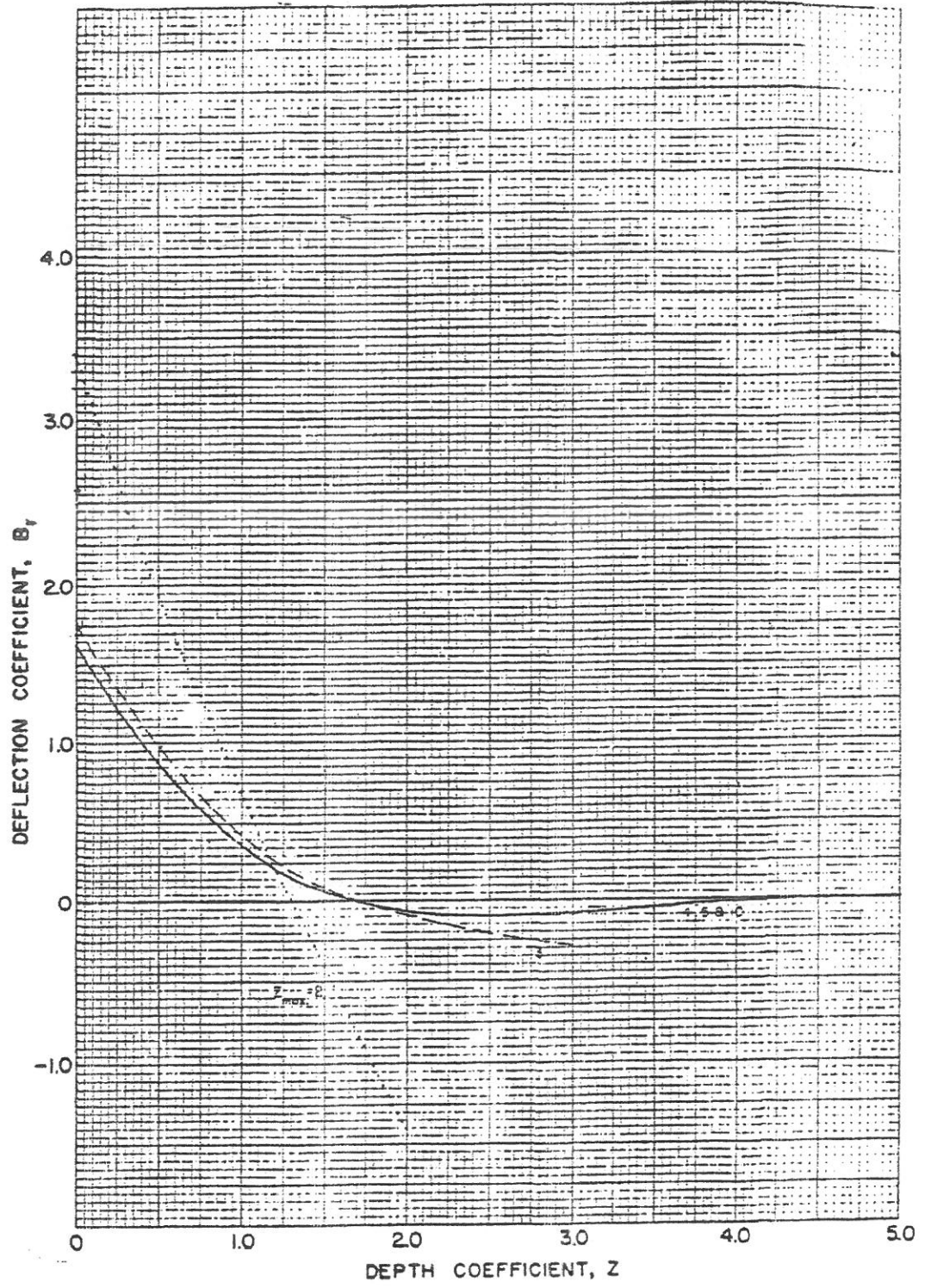
* Assistant and Associate Professors, respectively. Department of Civil Engineering, The University of Texas, Austin.



$$y_A = A_v \left(\frac{P_1 T^3}{EI} \right) \quad x = Z(T)$$

where $T = (EI/k)^{1/5}$

Fig. 13. Pile deflection produced by lateral load at mud line.



$$y_B = B_y \left(\frac{M_1 T^2}{EI} \right) \quad x = Z(T)$$

where $T = (EI/k)^{1/3}$

Fig. 18. Pile deflection produced by moment applied at mud line.

APPENDIX G

Summary of NFIP Requirements and Best Practices

This table, updated from FEMA P-55, *Coastal Construction Manual* (FEMA, 2011), summarizes NFIP regulatory requirements for Zone V, Coastal A Zone, and Zone A, and best practices for exceeding the requirements. These requirements and recommendations are in addition to the minimum building code requirements.

Table G-1. Summary of NFIP Regulatory Requirements and Recommendations for Exceeding the Requirements

	Zone A		Coastal A Zone		Zone V	
	Recommendations and Requirements ⁽¹⁾	Cross-Reference ⁽²⁾	Recommendations and Requirements	Cross-Reference	Recommendations and Requirements	Cross-Reference
GENERAL REQUIREMENTS						
Siting	<p>Recommendation: Define and evaluate vulnerability to all hazards. Site building outside of SFHA or on highest and most stable part of lot.</p> <p>Requirement: For floodways, fill is permitted only if it has been demonstrated that the fill will not result in any increase in flood levels during the base flood.</p>	<p>NFIP: 60.3(d)(3) IRC: R301.2.4, R322.1, R322.1.4.2 IBC: 1612.3.4, 1804.4, App. G 103.5, App. G 401.1 ASCE 24: 2.2 FEMA P-259: 3.2.3, 3.3.2, 3.5, Ch. 5R FEMA P-55: 2.3.2, Ch. 4</p>	<p>Recommendation: Follow Zone V recommendations and requirements.</p> <p>Requirement: Buildings governed by IRC – meet Zone A requirements (unless AHJ has adopted ASCE 24 for buildings governed by IRC). Buildings governed by IBC – follow Zone V requirements.</p>	<p>IBC: 1804.4 ASCE 24: 4.3 FEMA P-259: 3.2.3, 3.3.2, 3.5, Ch. 5R FEMA P-55: 2.3.2, Ch. 4 FEMA P-499: 2.1, 2.2</p>	<p>Recommendation: Define and evaluate vulnerability to all coastal hazards and site building as far landward as possible.</p> <p>Requirement: New construction is landward of the reach of mean high tide. Manmade alterations of sand dunes and mangrove stands that increase potential flood damage are prohibited.</p>	<p>NFIP: 60.3(e)(3), 60.3(e)(7) IRC: R322.3.1 IBC: App. G401.2, App. G103.7 ASCE 24: 4.3 FEMA P-259: 3.2.3, 3.3.2, 3.5, Ch. 5R FEMA P-55: 2.3.2, Ch. 4, 7.5.1 FEMA P-499: 2.1, 2.2</p>
Design and Construction	<p>Recommendation: Follow ASCE 24 requirements.</p> <p>Requirement: Building and foundation must be designed, constructed, and adequately anchored to prevent flotation, collapse, and lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.</p>	<p>NFIP: 60.3(a)(3)(f) IRC: R301.1, R301.2.4, R322.1.2, R322.2 IBC: 1603.1.7, 1604, 1605.2.2, 1605.3.1.2, 1612 ASCE 7: Ch. 5 ASCE 24: 1.5, 2.2 FEMA P-259: 2.1.4, 2.4, Ch. 5 FEMA P-55: 2.3.3, 2.3.4, 5.4.1, Ch. 8, 9.1, 9.2 Other: FEMA P-550</p>	<p>Recommendation: Follow Zone V recommendations and requirements.</p> <p>Requirement: Building and foundation must be designed, constructed, and adequately anchored to prevent flotation, collapse, and lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.</p>	<p>NFIP: 60.3(a)(3)(i) IRC: R301.1, R301.2.4, R322.1.2, R322.2 IBC: 1603.1.7, 1604, 1605.2.2, 1605.3.1.2, 1612 ASCE 7: Ch. 5 ASCE 24: 1.5, Ch. 4 FEMA P-259: 2.4, Ch. 4, Ch. 5 FEMA P-55: 2.3.3, 2.3.4, 5.4.2, Ch. 8, 9.1, 9.2 FEMA P-499: 3.1, 3.2, 3.3, 3.4, 4.1, 4.3 Other: FEMA P-550</p>	<p>Recommendation: Redundant and continuous load paths should be employed to transfer all loads to the ground. Designs should explicitly account for all design loads and conditions.</p> <p>Requirement: Building and foundation must be designed, constructed, and adequately anchored to prevent flotation, collapse, and lateral movement due to simultaneous wind loads, and flood loads, including the effects of buoyancy.</p>	<p>NFIP: 60.3(a)(3)(i), 60.3(e)(4) IRC: R301.1, R301.2.4, R322.1, R322.3.3 IBC: 1603.1.7, 1604, 1605.2.2, 1605.3.1.2, 1612 ASCE 7: Ch. 5 ASCE 24: 1.5, Ch. 4 FEMA P-259: 2.4, Ch. 4, Ch. 5 FEMA P-55: 2.3.3, 2.3.4, 5.4.2, Ch. 8, 9.1, 9.2 FEMA P-499: 3.1, 3.2, 3.3, 3.4, 4.1, 4.3 Other: FEMA P-550</p>

Table G-1. Summary of NFIP Regulatory Requirements and Recommendations for Exceeding the Requirements (continued)

		Zone A		Coastal A Zone		Zone V	
		Recommendations and Requirements ⁽¹⁾	Cross-Reference ⁽²⁾	Recommendations and Requirements	Cross-Reference	Recommendations and Requirements	Cross-Reference
Flood Damage-Resistant Materials	<p>Recommendation: Consider use of flood damage-resistant materials above BFE.</p> <p>Requirement: Structural and nonstructural building materials below the DFE must be flood damage-resistant.</p>	<p>NFIP: 60.3(a)(3)(ii)</p> <p>IRC: R322.1.8</p> <p>IBC: 801.5, 1403.5</p> <p>ASCE 24: Ch. 5</p> <p>FEMA P-259: 1.3.4, 2.1.4, 5W.2</p> <p>FEMA P-55: 5.2.3.1, 9.4</p> <p>FEMA P-499: 1.7, 1.8</p> <p>Other: FEMA TB-2 and TB-8</p>	<p>NFIP: 60.3(a)(3)(ii)</p> <p>IRC: R322.1.8</p> <p>IBC: 801.5, 1403.5</p> <p>ASCE 24: Ch. 5</p> <p>FEMA P-259: 1.3.4, 5W.2</p> <p>FEMA P-55: 5.2.3.1, 9.4</p> <p>FEMA P-499: 1.7, 1.8, 4.3</p> <p>Other: FEMA TB-2 and TB-8</p>	<p>Recommendation: Consider use of flood damage-resistant materials above BFE.</p> <p>Requirement: Structural and nonstructural building materials below the DFE must be flood damage-resistant.</p>	<p>NFIP: 60.3(a)(3)(ii)</p> <p>IRC: R322.1.8</p> <p>IBC: 801.5, 1403.5</p> <p>ASCE 24: Ch. 5</p> <p>FEMA P-259: 1.3.4, 5W.2</p> <p>FEMA P-55: 5.2.3.1, 9.4</p> <p>FEMA P-499: 1.7, 1.8, 4.3</p> <p>Other: FEMA TB-2 and TB-8</p>	<p>Recommendation: Consider use of flood damage-resistant materials above BFE.</p> <p>Requirement: Structural and nonstructural building materials below the DFE must be flood damage-resistant.</p>	<p>NFIP: 60.3(a)(3)(ii)</p> <p>IRC: R322.1.8</p> <p>IBC: 801.5, 1403.5</p> <p>ASCE 24: Ch. 5</p> <p>FEMA P-259: 1.3.4, 5W.2</p> <p>FEMA P-55: 5.2.3.1, 9.4</p> <p>FEMA P-499: 1.7, 1.8, 4.3</p> <p>Other: FEMA TB-2 and TB-8</p>
Free of Obstructions	<p>Recommendation: If riverine flood velocities are high or large debris load is anticipated, open foundations are recommended. Obstructions include any building element, equipment, or other fixed objects that can transfer flood loads to the foundation, or that can cause floodwaters or waves to be deflected into the building.</p> <p>Requirement: None.</p>	<p>FEMA P-55: 10.7, 10.9</p>	<p>Follow Zone V recommendation and requirement.</p> <p>Requirement: No limitations are imposed on obstructions below elevated floors unless the design is governed by IBC/ASCE 24 (in which case the space below the lowest floor must be free of obstructions).</p>	<p>Recommendation: Use lattice or insect screening or louvers instead of solid breakaway walls.</p> <p>Requirement: Open Foundation required. The space below the lowest floor must be free of obstructions, or constructed with non-supporting breakaway walls, open lattice, or insect screening.</p>	<p>IBC: 1612.4</p> <p>ASCE 24: 4.5.1</p> <p>FEMA P-55: 5.2.3.3, 7.6.1.1.6, 10.5, 10.6</p> <p>FEMA P-499: 1.2, 3.1, 8.1</p> <p>Other: FEMA TB-5</p>	<p>Recommendation: Use lattice or insect screening or louvers instead of solid breakaway walls.</p> <p>Requirement: Open Foundation required. The space below the lowest floor must be free of obstructions, or constructed with non-supporting breakaway walls, open lattice, or insect screening.</p>	<p>NFIP: 60.3(e)(5)</p> <p>IRC: R322.3.3</p> <p>IBC: 1612.4</p> <p>ASCE 24: 4.5.1</p> <p>FEMA P-55: 5.2.3.3, 7.6.1.1.6, Table 7-3, Table 7-4, 10.5, 10.6</p> <p>FEMA P-499: 1.2, 3.1, 8.1</p> <p>Other: FEMA TB-5</p>

Table G-1. Summary of NFIP Regulatory Requirements and Recommendations for Exceeding the Requirements (continued)

ELEVATION	Zone A		Coastal A Zone		Zone V	
	Recommendations and Requirements ⁽¹⁾	Cross-Reference ⁽²⁾	Recommendations and Requirements	Cross-Reference	Recommendations and Requirements	Cross-Reference
Lowest Floor Elevation ⁽³⁾	<p>Recommendation: See Freeboard (additional height above required lowest floor elevation).</p> <p>Requirement: Top of floor must be at or above BFE.</p>	<p>NFIP: 60.3(c)(2)</p> <p>IRC: R322.2.1, R322.1.5</p> <p>IBC: 1612.4</p> <p>ASCE 24: 1.5.2, 2.3</p> <p>FEMA P-259: 2.1.4, 5E</p> <p>FEMA P-55: 5.2.3</p> <p>FEMA P-499: 1.4</p>	<p>Recommendation: See Freeboard (additional height above required lowest floor elevation).</p> <p>Requirement: NFIP: Top of floor must be at or above BFE. IRC: Same as Zone A, plus 1 foot, if the LIMWA is delineated. IBC/ASCE 24: Same as Zone V.</p>	<p>NFIP: 60.3(c)(2)</p> <p>IRC: R322.2.1, R322.1.5</p> <p>IBC: 1612.4</p> <p>ASCE 24: 1.5.2, 4.4</p> <p>FEMA P-259: 5E</p> <p>FEMA P-55: 5.2.3</p> <p>FEMA P-499: 1.4</p>	<p>Recommendation: See Freeboard (additional height above required lowest floor elevation).</p> <p>Requirement: NFIP: Bottom of the lowest horizontal structural member (LHSM) of the lowest floor must be at or above the BFE. IRC: Elevation based on orientation of LHSM. IBC/ASCE 24: Elevation based on orientation of LHSM and structure category.</p>	<p>NFIP: 60.3(e)(4)</p> <p>IRC: R322.3.2, R322.1.5</p> <p>IBC: 1612.4</p> <p>ASCE 24: 1.5.2, 4.4</p> <p>FEMA P-259: 5E</p> <p>FEMA P-55: 5.2.3</p> <p>FEMA P-499: 1.4</p>
Freeboard (additional height above required Lowest Floor Elevation) ⁽³⁾	<p>Recommendation: Elevating buildings higher than the required lowest floor elevation provides more protection against flood damage and reduces the cost of Federal flood insurance.</p> <p>Requirement: See Lowest Floor Elevation</p>	<p>IBC: 1612.4</p> <p>ASCE 24: 1.5.2, 2.3, FEMA P-259: 2.2</p> <p>FEMA P-55: 2.3.3, 5.4.1, 6.2.1, 7.5.2 (text box)</p> <p>FEMA P-499: 1.6</p> <p>Other: NFIP Evaluation Study</p>	<p>Recommendation: Elevating building higher than the required lowest floor elevation provides more protection against flood damage and reduces the cost of Federal flood insurance.</p> <p>Requirement: See Lowest Floor Elevation</p>	<p>IRC: R322.2.1</p> <p>IBC: 1612.4</p> <p>ASCE 24: 1.5.2, 4.4</p> <p>FEMA P-259: 2.2</p> <p>FEMA P-55: 2.3.3, 5.4.2, 6.2.1, 7.5.2 (text box)</p> <p>FEMA P-499: 1.6</p> <p>Other: NFIP Evaluation Study</p>	<p>Recommendation: Elevate buildings higher than the required lowest floor elevation to provide more protection against flood damage and to reduce the cost of Federal flood insurance.</p> <p>Requirement: See Lowest Floor Elevation</p>	<p>IRC: R322.3.2</p> <p>IBC: 1612.4</p> <p>ASCE 24: 1.5.2, 4.4</p> <p>FEMA P-259: 2.2</p> <p>FEMA P-55: 2.3.3, 5.4.2, 6.2.1, 7.5.2 (text box)</p> <p>FEMA P-499: 1.6</p> <p>Other: NFIP Evaluation Study</p>

Table G-1. Summary of NFIP Regulatory Requirements and Recommendations for Exceeding the Requirements (continued)

FOUNDATION	Zone A		Coastal A Zone		Zone V	
	Recommendations and Requirements ⁽¹⁾	Cross-Reference ⁽²⁾	Recommendations and Requirements	Cross-Reference	Recommendations and Requirements	Cross-Reference
Open Foundation	<p>Recommendation: If riverine flood velocities are high or large debris load is anticipated, open foundations are recommended.</p> <p>Requirement: None⁽⁴⁾</p>	<p>IBC: 1612.4 ASCE 24: 1.5.3, 2.4, 2.5 FEMA P-259: 1.3.1.2, 5E.1.3 FEMA P-55: 2.3.3, 5.2.3, 10.2, 10.3 FEMA P-499: 3.5 Other: FEMA P-550</p>	<p>Recommendation: Follow Zone V requirement. Requirement⁽⁴⁾: Not required unless the design is governed by IBC/ASCE 24 (in which case an open foundation is required).</p>	<p>IBC: 1612.4 ASCE 24: 1.5.3, 4.5 FEMA P-259: 1.3.1.2, 5E.1.3 FEMA P-55: 2.3.3, 5.2.3, 10.2, 10.3 FEMA P-499: 3.1, 3.2, 3.3, 3.4, 3.5 Other: FEMA P-550</p>	<p>Recommendation: Fullflow requirement. Requirement: Open foundations are required.</p>	<p>NFIP: 60.3(e)(4) IRC: R322.3.3, R401.1 IBC: 1612.4 ASCE 24: 1.5.3, 4.5 FEMA P-259: 1.3.1.2, 5E.1.3 FEMA P-55: 2.3.3, 5.2.3, 10.2, 10.3 FEMA P-499: 3.1, 3.2, 3.3, 3.4 Other: FEMA P-550</p>
Solid Foundation Walls (including walls forming crawlspace, and stemwall foundations)	<p>Recommendation: If velocities are high or debris load is anticipated, open foundations are recommended in lieu of elevation on solid walls.</p> <p>Requirement⁽⁴⁾: NFIP: Solid foundation walls are required to have flood openings. IRC: Wall height is limited, unless designed; walls are required to have flood openings. IBC/ASCE 24: Solid foundation walls are required to have flood openings.</p>	<p>NFIP: 60.3(c)(5) IRC: R322.2.2, R322.2.3 IBC: 1612.4 ASCE 24: 2.6 FEMA P-259: 1.3.1.1, 5E.1.1, 5E.1.2, 5E.1.4 FEMA P-55: 10.2, 10.3, 10.8 FEMA P-499: 3.1, 3.5 Other: FEMA P-550, FEMA TB-1</p>	<p>Recommendation: Use open foundations. Requirement⁽⁴⁾: NFIP: Solid foundation walls are required to have flood openings. IRC: Wall height is limited, unless designed. IBC/ASCE 24: Solid foundation walls are not permitted if design is governed by IBC/ASCE 24.</p>	<p>NFIP: 60.3(c)(5) IRC: R322.2.2, R322.2.3 IBC: 1612.4 FEMA P-259: 1.3.1.1, 5E.1.1, 5E.1.2, 5E.1.4 FEMA P-55: 10.2, 10.3, 10.8 FEMA P-499: 3.1, 3.5 Other: FEMA P-550, FEMA TB-1</p>	<p>Not Permitted</p>	<p>NFIP: 60.3(e)(4) IRC: R322.3.3 FEMA P-259: 1.3.1.1, 5E.1.1, 5E.1.2, 5E.1.4 FEMA P-55: 5.2.3.3, 7.6.1.6, 10.2, 10.3 FEMA P-499: 3.1, 3.5 Other: FEMA TB-5, FEMA P-550</p>

Table G-1. Summary of NFIP Regulatory Requirements and Recommendations for Exceeding the Requirements (continued)

	Zone A		Coastal A Zone		Zone V	
	Recommendations and Requirements ⁽¹⁾	Cross-Reference ⁽²⁾	Recommendations and Requirements	Cross-Reference	Recommendations and Requirements	Cross-Reference
Structural Fill (including slab-on-grade foundation)	<p>Recommendation: If velocities are high or debris load is anticipated, open foundations are recommended in lieu of elevation on fill.</p> <p>Requirement: If structural fill is used, compaction is necessary to meet requirements for stability during the base flood.</p>	<p>NFIP: 60.3(a)(3)(i) IRC: R322.1.2, R506 IBC: 1612.4, 1804.4, App. G 401.1 ASCE 24: 2.4 FEMA P-55: 10.3.1</p>	<p>Recommendation: Use open foundations.</p> <p>Requirement: If structural fill is used, compaction is necessary to meet requirements for stability during the base flood.</p>	<p>NFIP: 60.3(a)(3)(i) IRC: R322.1.2, R506 IBC: 1612.4, 1804.4 ASCE 24: 4.5.4 FEMA P-55: 10.3.1</p>	<p>Not Permitted</p>	<p>NFIP: 60.3(e)(6) IRC: R322.3.2 IBC: 1612.4, 1804.4, App. G401.2 ASCE 24: 4.5.4 FEMA P-55: 5.2.3.3</p>
ENCLOSURES BELOW ELEVATED BUILDINGS						
Use of Enclosed Areas Below Elevated Lowest Floor⁽⁵⁾	<p>Recommendation: Avoid storage of damageable items and hazardous materials in flood-prone spaces.</p> <p>Requirement: Enclosures are permitted only for parking of vehicles, building access, and storage.</p>	<p>NFIP: 60.3(c)(5) IRC: R322.2.2 IBC: 1612.4 ASCE 24: 2.6 FEMA P-259: 2.1.4 FEMA P-55: 5.2.3.2</p>	<p>Recommendation: Follow Zone V recommendations and requirements.</p> <p>Requirement: Enclosures are permitted only for parking of vehicles, building access, and storage.</p>	<p>NFIP: 60.3(c)(5) IRC: R322.2.2 IBC: 1612.4 ASCE 24: 4.6 FEMA P-55: 5.2.3.2 FEMA P-499: 8.1</p>	<p>Recommendation: Minimize use of enclosed areas and avoid storage of damageable items and hazardous materials.</p> <p>Requirement: Enclosures are permitted only for parking of vehicles, building access, and storage.</p>	<p>NFIP: 60.3(e)(5) IRC: R322.3.5 IBC: 1612.4 ASCE 24: 4.6 FEMA P-55: 5.2.3.3 FEMA P-499: 8.1</p>
Walls of Enclosures⁽⁶⁾	<p>Recommendation: Follow requirement.</p> <p>Requirement: Walls of enclosures must have flood openings to allow passage of floodwaters.</p>	<p>NFIP: 60.3(c)(5) IRC: R322.2.2 IBC: 1612.4 ASCE 24: 2.6 FEMA P-259: 2.1.4, 5E.1.2.1 FEMA P-55: 2.3.5, 5.2.3.2, 7.6.1.1.5 FEMA P-499: 3.1, 3.5 Other: FEMA TB-1</p>	<p>Recommendation: Follow Zone V recommendations and requirements.</p> <p>Requirement: Solid foundation wall enclosures and solid breakaway wall enclosures must have flood openings.</p>	<p>NFIP: 60.3(c)(5) IRC: R322.2.2 IBC: 1612.4 ASCE 24: 4.6 FEMA P-259: 5E.1.2.1 FEMA P-55: 2.3.5, 5.2.3.2, 7.6.1.1.5 FEMA P-499: 3.1, 3.5, 8.1 Other: FEMA TB-1 and TB-9</p>	<p>Recommendation: Enclose areas with lattice or insect screening or louvers. Use flood openings to minimize collapse of solid breakaway walls.</p> <p>Requirement: Walls must be designed to break away under flood loads without damaging the structure or supporting foundation system.</p>	<p>NFIP: 60.3(e)(5) IRC: R322.3.4 IBC: 1612.4 ASCE 24: 4.6 FEMA P-55: 2.3.5, 5.2.3.2 FEMA P-499: 8.1 Other: FEMA TB-9</p>

Table G-1. Summary of NFIP Regulatory Requirements and Recommendations for Exceeding the Requirements (continued)

	Zone A		Coastal A Zone		Zone V	
	Recommendations and Requirements ⁽¹⁾	Cross-Reference ⁽²⁾	Recommendations and Requirements	Cross-Reference	Recommendations and Requirements	Cross-Reference
UTILITIES						
Electrical, Heating, Ventilation, Plumbing and Air Conditioning Equipment	<p>Recommendation: Locate equipment on the downstream or landward side of building, and/or behind structural element.</p> <p>Requirement: Utilities and equipment must be located (elevated) and designed to prevent floodwaters from entering and accumulating in components during flooding.</p>	<p>NFIP: 60.3(a)(3)(iv)</p> <p>IRC: R322.1.6, RM1301.1.1, RM1401.5, RM1601.4.9, RM1701.2, RM2001.4, RM2201.6, RG2404.7, RP2601.3, RP2602.2, RP2705.1, RP2101.5</p> <p>IBC: 1403.5, 1612.4</p> <p>ASCE 24: Ch. 7</p> <p>FEMA P-259: 2.1.4, 5.1.5, Ch. 5W</p> <p>FEMA P-55: Ch. 12</p> <p>FEMA P-499: 8.3</p> <p>Other: FEMA P-348</p>	<p>Recommendation: Follow Zone V recommendations.</p> <p>Requirement: Utilities and equipment must be located (elevated) and designed to prevent floodwaters from entering and accumulating in components during flooding.</p>	<p>NFIP: 60.3(a)(3)(iv)</p> <p>IRC: R322.1.6, RM1301.1.1, RM1401.5, RM1601.4.9, RM1701.2, RM2001.4, RM2201.6, RG2404.7, RP2601.3, RP2602.2, RP2705.1, RP2101.5</p> <p>IBC: 1403.5, 1612.4</p> <p>ASCE 24: Ch. 7</p> <p>FEMA P-259: 5.1.5, Ch. 5W</p> <p>FEMA P-55: Ch. 12</p> <p>FEMA P-499: 8.3</p> <p>Other: FEMA P-348, FEMA TB-5</p>	<p>Recommendation: Locate equipment on the landward side of building, and/or behind structural element.</p> <p>Requirement: Utilities and equipment must be located (elevated) and designed to prevent floodwaters from entering and accumulating in components during flooding.</p>	<p>NFIP: 60.3(a)(3)(iv)</p> <p>IRC: R322.1.6, RM1301.1.1, RM1401.5, RM1601.4.9, RM1701.2, RM2001.4, RM2201.6, RG2404.7, RP2601.3, RP2602.2, RP2705.1, RP2101.5</p> <p>IBC: 1403.5, 1403.6, 1612.4</p> <p>ASCE 24: Ch. 7</p> <p>FEMA P-259: 5.1.5, Ch. 5W</p> <p>FEMA P-55: Ch. 12</p> <p>FEMA P-499: 8.3</p> <p>Other: FEMA P-348, FEMA TB-5</p>
Water Supply and Sanitary Sewerage Systems	<p>Recommendation: Follow requirement.</p> <p>Requirement: Systems must be designed to minimize or eliminate infiltration of floodwaters into systems. Sanitary sewerage systems must be located to avoid impairment or contamination during flooding.</p>	<p>NFIP: 60.3(a)(5), 60.3(a)(6)</p> <p>IRC: R322.1.7, RP2602.2, RP3001.3</p> <p>IBC: App. G401.3, App. G401.4, App. G701</p> <p>ASCE 24: 7.3</p> <p>FEMA P-259: 5.1.5, 5W.11, 5W.12</p> <p>FEMA P-55: Ch. 12</p> <p>FEMA P-499: 8.3</p> <p>Other: FEMA P-348</p>	<p>Recommendation: Follow Zone V recommendation.</p> <p>Requirement: Systems must be designed to minimize or eliminate infiltration of floodwaters into systems. Sanitary sewerage systems must be located to avoid impairment or contamination during flooding.</p>	<p>NFIP: 60.3(a)(5), 60.3(a)(6)</p> <p>IRC: R322.1.7, RP2602.2, RP3001.3</p> <p>IBC: App. G401.3, App. G401.4, App. G701</p> <p>ASCE 24: 7.3</p> <p>FEMA P-259: 5.1.5, 5W.11, 5W.12</p> <p>FEMA P-55: Ch. 12</p> <p>FEMA P-499: 8.3</p> <p>Other: FEMA P-348, FEMA TB-5</p>	<p>Recommendation: Install shutoff valves to isolate water and sewer lines that extend into flood-prone areas.</p> <p>Requirement: Systems must be designed to minimize or eliminate infiltration of floodwaters into systems. Sanitary sewerage systems must be located to avoid impairment or contamination during flooding.</p>	<p>NFIP: 60.3(a)(5), 60.3(a)(6)</p> <p>IRC: R322.1.7, RP2602.2, RP3001.3</p> <p>IBC: App. G401.3, App. G401.4, App. G701</p> <p>ASCE 24: 7.3</p> <p>FEMA P-259: 5.1.5, 5W.11, 5W.12</p> <p>FEMA P-55: Ch. 12</p> <p>FEMA P-499: 8.3</p> <p>Other: FEMA P-348, FEMA TB-5</p>

Table G-1. Summary of NFIP Regulatory Requirements and Recommendations for Exceeding the Requirements (continued)

CERTIFICATION	Zone A		Coastal A Zone		Zone V	
	Recommendations and Requirements ⁽¹⁾	Cross-Reference ⁽²⁾	Recommendations and Requirements	Cross-Reference	Recommendations and Requirements	Cross-Reference
Design Certifications (foundations, breakaway walls, flood openings)	<p>Recommendation: Follow requirement.</p> <p>Requirement: Registered design professional must certify performance of engineered flood openings (flood openings that do not conform to prescriptive requirement).</p>	<p>NFIP: 60.3(c)(5) IRC: R322.2.2(2.2) IBC: 1612.5(1.2) Other: FEMA TB-1</p>	<p>Recommendation: Follow Zone V requirement.</p> <p>Requirement: Registered design professional must certify performance of engineered flood openings (flood openings that do not conform to prescriptive requirement). If designs are governed by IBC or ASCE 24, registered design professional must certify that the design and methods of construction are in accordance with accepted standards of practice for meeting design requirements, including design of breakaway walls if designed to fail under loads more than 20 pounds per square foot.</p>	<p>NFIP: 60.3(c)(5) IRC: R322.2.2(2.2) IBC: 1612.5(1.2) FEMA P-55: 5.4.2 FEMA P-499: 1.5, 3.1, 8.1 Other: FEMA TB-1 and TB-9</p>	<p>Recommendation: Follow requirement.</p> <p>Requirement: Registered design professional must certify that the design and methods of construction are in accordance with accepted standards of practice for meeting design requirements, including design of breakaway walls if designed to fail under loads more than 20 pounds per square foot.</p>	<p>NFIP: 60.3(e)(4), 60.3(e)(5) IRC: R322.3.6 IBC: 1612.5(2.2) and (2.3) FEMA P-55: 5.2.2.3, 5.4.2 FEMA P-499: 1.5, 3.1, 8.1 Other: FEMA TB-9</p>

Table G-1. Summary of NFIP Regulatory Requirements and Recommendations for Exceeding the Requirements (continued)

Certification of Elevation	Zone A		Coastal A Zone		Zone V	
	Recommendations and Requirements ⁽¹⁾	Cross-Reference ⁽²⁾	Recommendations and Requirements	Cross-Reference	Recommendations and Requirements	Cross-Reference
	<p>Recommendation: Surveyed elevation of the lowest floor should be submitted upon placement and prior to further vertical construction, and re-surveyed and submitted prior to the final inspection.</p> <p>Requirement: Surveyed elevation of the lowest floor must be submitted to the community (as-built).</p>	<p>NFIP: 60.3(b)(5) IRC: R109.1.3, R322.1.10 IBC: 110.3.3, 1612.5(1.1) FEMA P-499: 1.4, 8.3 Other: NFIP FMB 467-1</p>	<p>Recommendation: Follow Zone V recommendations and requirements.</p> <p>Requirement: Surveyed elevation of the lowest floor must be submitted to the community (as-built).</p>	<p>NFIP: 60.3(b)(5) IRC: R109.1.3, R322.1.10 IBC: 110.3.3, 1612.5(1.1) FEMA P-499: 1.4, 8.3 Other: NFIP FMB 467-1</p>	<p>Recommendation: Surveyed elevation of the bottom of the LHSM should be submitted when that member is placed and prior to further vertical construction, and re-surveyed and submitted prior to the final inspection.</p> <p>Requirement: Surveyed elevation of the bottom of the lowest horizontal structural member must be submitted to the community (as-built).</p>	<p>NFIP: 60.3(b)(5), 60.3(e)(2) IRC: R109.1.3, R322.1.10 IBC: 110.3.3, 1612.5(2.1) FEMA P-499: 1.4, 8.3 Other: NFIP FMB 467-1</p>
OTHER						
Non-Structural Fill	<p>Recommendation: Follow requirement.</p> <p>Requirement^{(7)(a)}: Encroachments into floodways are permitted only if it is demonstrated that the encroachment will not result in any increase in flood levels during the base flood.</p>	<p>NFIP: 60.3(d)(3) IRC: R301.2.4, R322.1, R322.1.4.2 IBC: 1612.3.4, 1804.4, App. G 103.5, App. G 401.1 ASCE 24: 2.2</p>	<p>Recommendation⁽⁷⁾: Follow Zone V recommendation.</p> <p>Requirement: None</p>		<p>Recommendation: Minimize use of non-structural fill if flow diversion, wave runup, or reflection are concerns. Non-structural fill should be similar to existing soils where possible.</p> <p>Requirement: Minor quantities can be used for site grading, landscaping and drainage, and to support parking slabs, patios, walkways, and pool decks. Non-structural fill must not prevent the free passage of floodwaters and waves beneath elevated buildings.</p>	<p>NFIP: 60.3(e)(5) IRC: R322.3.2 ASCE 24: 4.5.4 FEMA P-55: 5.2.3.3 Other: FEMA TB-5</p>

Table G-1. Summary of NFIP Regulatory Requirements and Recommendations for Exceeding the Requirements (continued)

	Zone A		Coastal A Zone		Zone V	
	Recommendations and Requirements ⁽¹⁾	Cross-Reference ⁽²⁾	Recommendations and Requirements	Cross-Reference	Recommendations and Requirements	Cross-Reference
Decks, Concrete Pads, Patios	<p>Recommendation: Follow requirement.</p> <p>Requirement: If located below the DFE, decks, concrete pads, patios and similar appurtenances must be stable under flood loads.</p>	<p>NFIP: 60.3(a)(3)</p> <p>ASCE 24: 9.2</p> <p>FEMA P-499: 8.2</p>	<p>Recommendation: Follow Zone V recommendations.</p> <p>Requirement: If located below the DFE, decks, concrete pads, patios and similar appurtenances must be stable under flood loads.</p>	<p>NFIP: 60.3(a)(3)</p> <p>ASCE 24: 4.8, 9.2</p> <p>FEMA P-499: 8.2</p> <p>Other: FEMA TB-5</p>	<p>Recommendation: Decks should be built using the same foundation as the main building, or cantilevered from the main building.</p> <p>Requirement: If structurally attached to buildings, decks, concrete pads and patios must be elevated.</p>	<p>NFIP: 60.3(e)(3)</p> <p>IRC: R322.3.3</p> <p>ASCE 24: 4.8, 9.2</p> <p>FEMA P-55: 9.5</p> <p>FEMA P-499: 8.2</p> <p>Other: FEMA TB-5</p>
Swimming Pools	<p>Recommendation: Follow requirement.</p> <p>Requirement: Swimming pools and pool decks must be stable under flood loads.</p>	<p>NFIP: 60.3(a)(3)</p> <p>IRC: App. G101.2</p> <p>ASCE 24: 9.5</p>	<p>Recommendation: Follow Zone V recommendation.</p> <p>Requirement: Swimming pools and pool decks must be stable under flood loads.</p>	<p>NFIP: 60.3(a)(3)</p> <p>IRC: App. G101.2</p> <p>ASCE 24: 9.5</p> <p>FEMA P-499: 8.2</p>	<p>Recommendation: Pool should be located as far landward as possible and should be oriented in such a way that flood forces are minimized.</p> <p>Requirement: Swimming pools and pool decks must be stable under flood loads and elevated, designed to break away during the design flood, or be sited to remain in-ground without obstructing flow that results in damage to adjacent structures.</p>	<p>NFIP: 60.3(e)(3)</p> <p>IRC: R322.3.3, App. G101.2</p> <p>ASCE 24: 9.5</p> <p>FEMA P-55: 9.5</p> <p>FEMA P-499: 8.2</p> <p>Other: FEMA TB-5</p>

Table G-1. Summary of NFIP Regulatory Requirements and Recommendations for Exceeding the Requirements (concluded)

	Zone A		Coastal A Zone		Zone V	
	Recommendations and Requirements ⁽¹⁾	Cross-Reference ⁽²⁾	Recommendations and Requirements	Cross-Reference	Recommendations and Requirements	Cross-Reference
Tanks Associated with Building Utilities	<p>Recommendation: Locate above-ground tanks on the landward or downstream side of buildings and raise inlets, fill openings, and vents above the DFE.</p> <p>Requirement: Tanks must be elevated or anchored to be stable under flood loads, whether above-ground or underground.</p>	<p>NFIP: 60.3(a)(3) IRC: R2201.6 IBC: App. G701 ASCE 24: 7.4.1 FEMA P-259: 5W.10 Other: FEMA P-348</p>	<p>Recommendation: Follow Zone V recommendations.</p> <p>Requirement: Tanks must be elevated or anchored to be stable under flood loads, whether above-ground or underground.</p>	<p>NFIP: 60.3(a)(3) IRC: R2201.6 IBC: App. G701 ASCE 24: 7.4.1 FEMA P-259: 5W.10 FEMA P-499: 8.3 Other: FEMA TB-5, FEMA P-348</p>	<p>Recommendation: Locate above-ground tanks on the landward side of buildings and raise inlets, fill openings and vents above the DFE. Install underground tanks below the eroded ground elevation.</p> <p>Requirement: Above-ground tanks must be elevated.</p>	<p>NFIP: 60.3(e)(3) IRC: R2201.6 IBC: App. G701 ASCE 24: 7.4.1 FEMA P-259: 5W.10 FEMA P-499: 8.3 Other: FEMA TB-5, FEMA P-348</p>
Sustainable Design	<p>Recommendation: Building for natural hazards resistance reduces the need to rebuild and is a sustainable design approach. Verify that other green building practices do not reduce the building's ability to resist flood loads or other natural hazards.</p> <p>Requirement: Meet overall NFIP performance requirements.</p>	<p>FEMA P-55: 7.7 Other: FEMA P-798, ICC 700</p>	<p>Recommendation: Building for natural hazards resistance reduces the need to rebuild and is a sustainable design approach. Verify that other green building practices do not reduce the building's ability to resist flood loads or other natural hazards.</p> <p>Requirement: Meet overall NFIP performance requirements.</p>	<p>FEMA P-55: 7.7 Other: FEMA P-798, ICC 700</p>	<p>Recommendation: Building for natural hazards resistance reduces the need to rebuild and is a sustainable design approach. Verify that other green building practices do not reduce the building's ability to resist flood loads or other natural hazards.</p> <p>Requirement: Meet overall NFIP performance requirements.</p>	<p>FEMA P-55: 7.7 Other: FEMA P-798, ICC 700</p>

NOTES

- (1) Individual States and communities may enforce more stringent requirements that supersede those summarized here. **Exceeding minimum NFIP requirements will provide increased flood protection and may result in lower flood insurance premiums.**
- (2) The references in this section cite the latest available publications at the time of publication of this Manual. The specific editions of these references are:
 - **ASCE 7:** ASCE 7-10, *Minimum Design Loads for Buildings and Other Structures*
 - **ASCE 24:** ASCE 24-05, *Flood Resistant Design and Construction*
 - **IBC:** *2012 International Building Code*. Appendix G includes provisions for flood-resistant construction. The provisions in IBC Appendix G are not mandatory unless specifically referenced in the adopting ordinance. Many States have not adopted Appendix G. Section references are the same as 2009 IBC.
 - **ICC 700:** *National Green Building Standard* (ICC 2008)
 - **IRC:** *2012 International Residential Code for One- and Two-Family Dwellings*. Section references are the same as 2009 IRC.
 - **FEMA P-55:** Specific sections or chapters of FEMA P-55, *Coastal Construction Manual* (2011a)
 - **FEMA P-259:** Specific sections or chapters of this Manual, FEMA P-259, *Engineering Principles and Practices for Retrofitting Flood-Prone Residential Structures* (2011b)
 - **FEMA P-348:** 1999 Edition of FEMA P-348, *Protecting Building Utilities From Flood Damage*
 - **FEMA P-499:** Specific fact sheets in the 2010 edition of FEMA P-499, *Home Builder's Guide to Coastal Construction Technical Fact Sheet Series*
 - **FEMA P-550:** *Recommended Residential Construction for Coastal Areas* (Second Edition, 2009)
 - **FEMA P-798:** *Natural Hazards and Sustainability for Residential Buildings* (2010)
 - **FEMA TB:** Specific numbered FEMA NFIP Technical Bulletins (available at <http://www.fema.gov/plan/prevent/floodplain/techbul.shtm>)
 - **NFIP:** *U.S. Code of Federal Regulations* – 44 CFR 60.3 “Flood plain management criteria for flood-prone areas.” Current as of June 30, 2011.
 - **NFIP Evaluation Study:** *Evaluation of the National Flood Insurance Program's Building Standards* (American Institutes for Research 2006)
 - **NFIP FMB 467-1:** *Floodplain Management Bulletin on the NFIP Elevation Certificate*. Note that this bulletin was published in 2004, while the Elevation Certificate (FEMA Form 81-31) has been updated since 2004, and is updated periodically.
- (3) State or community may regulate to a higher elevation (DFE).
- (4) Some coastal communities require open foundations in Zone A.
- (5) There are some differences between what is permitted under floodplain management regulations and what is covered by NFIP flood insurance. Building designers should be guided by floodplain management requirements, not by flood insurance policy provisions.
- (6) Some coastal communities prohibit breakaway walls and allow only open lattice or screening.
- (7) Placement of nonstructural fill adjacent to buildings in Zone AO in coastal areas is not recommended.
- (8) Some communities may allow encroachments to cause a 1-foot rise in the flood elevation, while others may allow no rise.



Geotechnical • Geologic • Coastal • Environmental

5741 Palmer Way • Carlsbad, California 92010 • (760) 438-3155 • FAX (760) 931-0915 • www.geosoilsinc.com

December 6, 2021

WO S8070

3124 Solimar LLC
c/o Mr. Donald Jones
10508 Wyton Drive
Los Angeles, CA 90024

SUBJECT: 2nd Revised Wave Runup & Coastal Hazard Analysis, 3124 Solimar Beach Drive, Ventura County, California.

Dear 3124 Solimar LLC:

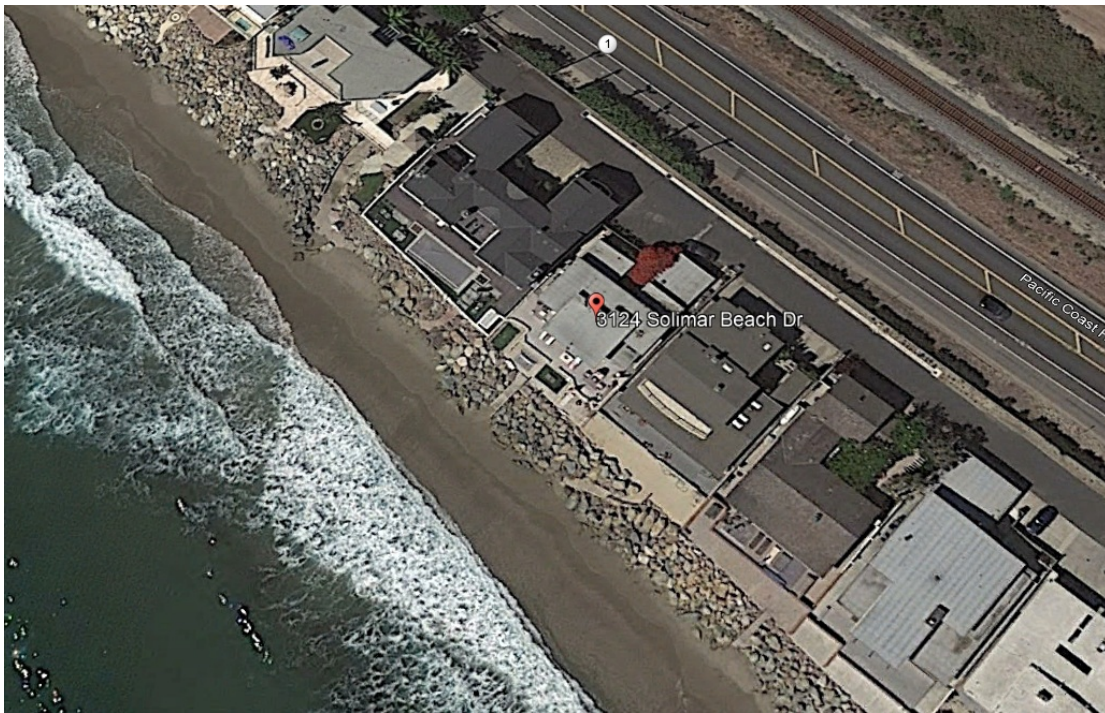
At your request, we are pleased to present the following revised wave runup and coastal hazard analysis for the proposed new residence at 3124 Solimar Beach Drive. The revisions herein respond to comments in the November 10, 2021 memorandum from the County of Ventura Public Works. The information provided herein is based upon our reconnaissance of the coastal area, published regional information, FEMA flood analysis methodology, United States Geologic Survey (USGS) studies, site specific topographic survey, preliminary development plans, and knowledge of the area. The purpose of this revised report is to provide the necessary coastal processes and engineering permit information to support the construction of a new pile supported residence on the site. Specifically, this report provides the design flood elevation (per ASCE24-14) and potential wave forces on the proposed development in consideration of SLR. The information provided herein is intended to provide Ventura County and the California Coastal Commission (CCC) the required discussion of coastal hazards at the site including consideration of the CCC Sea-Level Rise (SLR) Policy Guidance document.

INTRODUCTION

The subject site is a rectangularly shaped lot (~60 feet of ocean frontage) with an existing residential structure. Photograph 1 is a 2019 aerial photograph of the site downloaded from the internet. Photograph 2, taken in 1972, was downloaded from the Coastal Records website. Comparison of these photos shows that the shoreline has not moved significantly landward over the +50-year time period. The 1972 photograph shows the revetment seaward of the site pre-dates the Coastal Act. The revetment is located on Solimar Beach Home Owners Association land and has been regularly maintained under CCC permits, including Permit 216-21 and CDP 4-04-071. The revetment is fronted by a sand and cobble beach. The cobbles lie below the sand and on the shallow erosion resistant claystone shore platform. Additional comparison of available historical photographs reveals that the shore protection appears to have had no long-term impact on the beach or shore platform.

County of Ventura
Planning Director Hearing
Case No. PL21-0056

Exhibit 7 - 2nd Revised Wave Runup
& Coastal Hazards Analysis



Photograph 1. Subject site and shoreline in 2019. Note the continuous community revetment fronting the properties.



Photograph 2. Subject site and shoreline in 1972. Note that the continuous revetment fronting the properties in the site area.

DATUM

The datum used in this report is North American Vertical Datum 1988 (NAVD88), which is about 2.75 feet lower than Mean Tide Level (MTL). Tides are taken from the National Oceanic and Atmospheric Administration (NOAA) tidal station at Santa Barbara, see **Table 1**. The historical design ocean water level will be 7.6 feet NAVD88, the “100 Year” water level. A site topographic map, prepared by Azimuth Group to the NAVD88 datum (APPENDIX A), was used for site elevations. Preliminary plans were discussed with MP Design, the project designer. The development on site is mapped in the FEMA VE Zone on Panel 06111C0728F (effective date 1/29/2021). The VE zone has a Base Flood Elevation (BFE) of +18 feet NAVD88. The units of measurement in this report are feet (ft), pounds force (lbs), and second (sec).

Table 1 - NOAA Tide Data, Santa Barbara (9411340)

Tidal Datum	Vertical Datum			
	MLLW (m)	MLLW (ft)	NAVD88 (ft)	NGVD29 (ft)
100 Year	2.35	7.71	7.57	4.93
Highest Observed	2.25	7.39	7.25	4.61
MHHW	1.65	5.40	5.26	2.62
MHW	1.42	4.64	4.50	1.86
MTL	0.86	2.81	2.67	0.03
MSL	0.85	2.79	2.65	0.01
NGVD29	0.85	2.78	2.64	0.00
MLW	0.30	0.98	0.84	-1.80
NAVD88	0.04	0.14	0.00	-2.64
MLLW	0.00	0.00	-0.14	-2.78
Lowest Observed	-0.88	-2.89	-3.03	-5.67

COASTAL PROCESSES

The subject site lies within the Santa Barbara Littoral Cell. A littoral cell is a coastal compartment that contains a complete cycle of littoral sedimentation including sources, transport pathways, and sediment sinks. The Santa Barbara Littoral Cell extends from Point Conception to Point Mugu, a distance of 96 miles. It is one of the longest littoral cells in southern California and contains a variety of coastal types and shoreline orientations. An extensive shoreline management study was conducted for the section of the littoral cell from Goleta to Point Mugu by Noble Consultants (BEACON 1989).

The BEACON study divided the Santa Barbara Littoral Cell into sub cells based upon shoreline characteristics and the location of sediment sources and sinks. The subject site, 3124 Solimar Beach Drive, lies within the sub cell from Rincon Point to Ventura River. This shoreline sub cell is also referred to by BEACON as the Rincon Parkway. This area has always been an sub cell of thin sand and/or cobble beaches. Historical photographs as far back as the late 1800s show cobble beaches and a narrow sandy coastline. The movement of sand (and cobbles) is generally from the west to the east. The closest BEACON beach profile monitoring range is BEACON #22 (Solimar). Figure 1 below is the data from BEACON Line 22. The monitoring shows that from the year 1987 to 2007 there was no net change in the beach profile. Some of the BEACON data (profiles) in the area reviewed in the BEACON study implied that there was a net accumulation of sand offshore of this section of coastline. The net accumulation offshore was estimated to be about 35,000 cubic yards per year. The reported longshore transport rate at nearby Emma Wood State Park is estimated to be about 215,000 cubic yards per year.

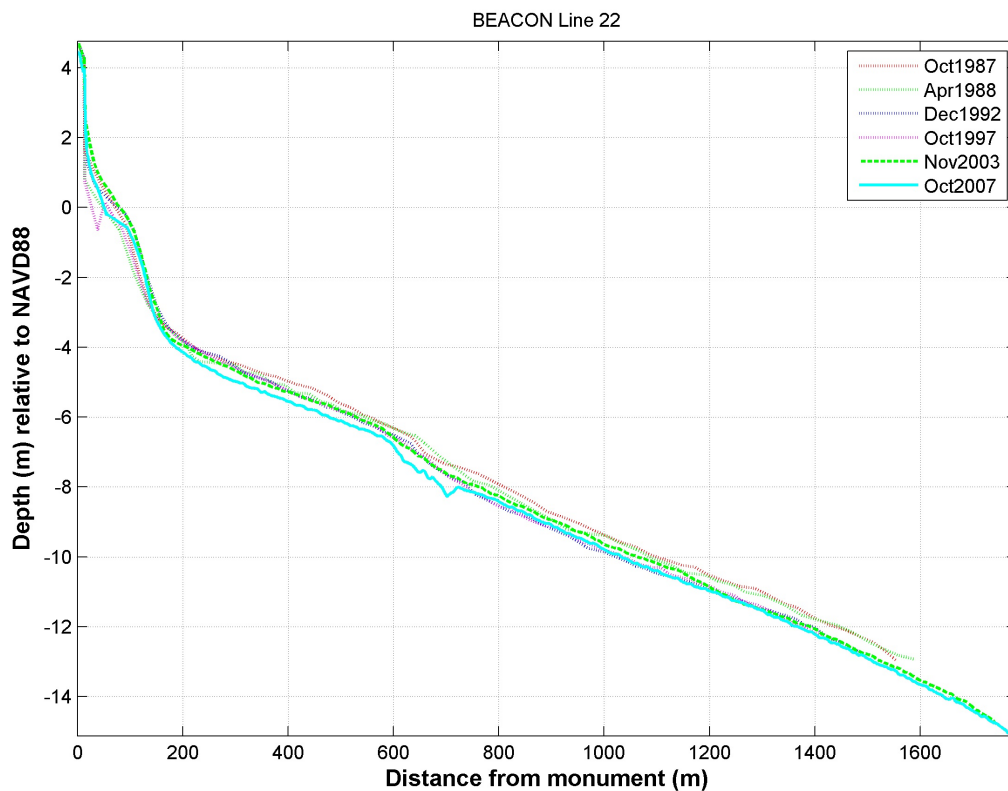


Figure 1. BEACON beach profile data near the site.

In 2006, the U.S. Geologic Survey published a comprehensive report about shoreline change for the coast of California (Hapke, et al., 2006). This report uses data from the late 1800s to the early 2000s, and covers the section of shoreline fronting the subject site.

Using Figure 35 from the report and the ruler/path tool on Google Earth, the distance from the site to the Rincon Point is 13.78 kilometers. A portion of Figure 35 from the USGS report is reproduced below as Figure 2 to show the short-term and long-term shoreline change rates at the site.

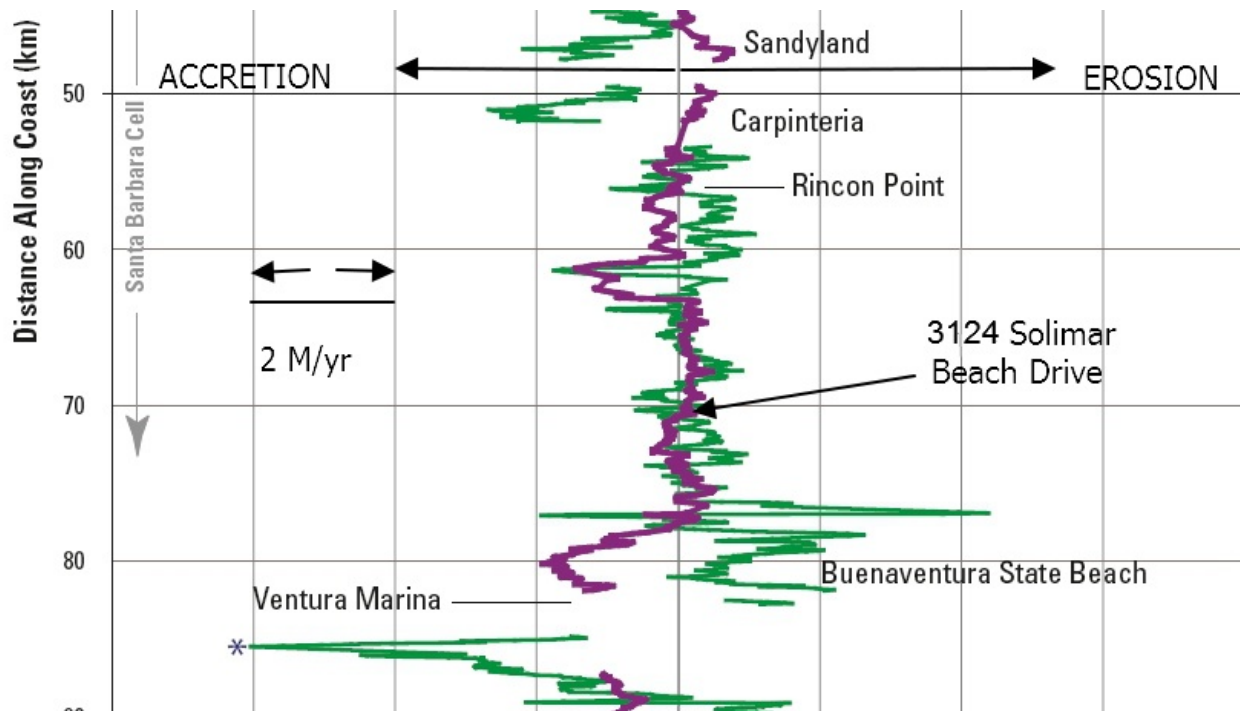


Figure 2. Short-term and long-term shoreline change at the subject site (USGS, 2006).

Figure 2 shows that in the short-term (green line), the beaches in the area are accreting about 0.3 meter per year. The USGS study does show that there is a long-term trend of slight erosion at about $0.2 \text{ m/yr} = 0.65 \text{ ft/yr}$. This long-term erosion trend is a result of the construction of Santa Barbara Harbor, which prior to the by-passing program resulted in erosion on all of the beaches to the southeast of the harbor. The shoreline fronting the site has been slightly accreting over the last several decades as a result of the by-passing program returning the sand to the littoral system. The long-term trend determined by USGS is basically movement of the sand at the shoreline. The USGS long-term trend does not take into account that the beach is made up of sand overlying cobbles, which sit on an erosion resistant bedrock. Once the sand is eroded, the beach is composed of cobble overlying an erosion resistant bedrock material. The cobbles in the beach profile can also be seen in some of the historical photographs and commonly at low tide.

Setting aside the fact that in the short-term the beach is accreting, and that as the beach erodes during extreme events the littoral material changes to a much more erosion resistant cobbles and bedrock, a very conservative shoreline movement analysis would be to use the USGS shoreline/sand erosion rate. Using the 0.65 ft/yr rate and a design life of 75 years the projected shoreline erosion, WITHOUT THE REVETMENT IN PLACE OR IN CONSIDERATION OF THE COBBLES, is about 49 feet. However, this assumes that the shoreline erosion rate will be the same as in the future with SLR. It is highly speculative to assume that the existing revetment could or will be removed at any time in the future in front of the subject property, or in its entirety because it protects several properties to either side of the subject site.

As stated in the CCC Sea-Level Rise Policy Guidance document (Appendix B, page 237), “predictions of future beach, bluff, and dune erosion are complicated by the uncertainty associated with future waves, storms and sediment supply. As a result, there is no accepted method for predicting future beach erosion. As stated above, with the shore protection in place, the erosion rate for the next 75 years will be 0.0 ft/yr. Additionally, the USGS historical shoreline movement analysis does not take into account that as the beach erodes, the littoral material changes. While the SLR document generally recommends use of a higher rate, it specifically acknowledges that based on site specific evidence, a lower rate may be used provided “future erosion will encounter more resistant material, in which case lower erosion rates may be used.” As discussed above, this is exactly what will occur along this beach. Once the sand is gone, the “future erosion” will encounter cobbles and the erosion resistant claystone. Cobbles do not behave in the same manner as sand when subjected to wave runup. Cobbles do move/transport, but at a rate that is much slower than sand. Cobble beaches tend to be steeper because the beach slope is a function of the littoral material grain size. Cobble transport is bed load transport, while sand transport is suspended load transport. Stated very simply, the transport rate of any beach material is inversely proportional to the weight. That is to say, the larger the sediment size, the heavier it is, and the slower it moves. The beach cobbles are about 6 inches (146 mm) or greater in size as compared to sand at about 0.1 mm in size. Cobbles are over 1,000 times heavier than the sand. A conservative estimate of the erosion rate of the cobbles versus the sand is that the cobble erode at a rate of 1/3 or lower than the rate at which the sand erodes.

In order for the site to erode, the beach must be eroded away (the revetment removed). With the beach eroded away, the remaining beach material will be cobbles. The cobble erosion rate for the 75 year design life, under these conditions, will be a about 1/3(0.65 ft/yr) or 0.21 ft/yr, based upon the discussion in the paragraph above. Following the guidelines of the CCC SLR document, the expected shoreline movement over the next 75 years at the site will be $(75)(0.21) = \sim 16$ feet. The design erosion shown on the attached Design Beach Profile is the average of 49 feet and 16 feet determined above or roughly about 35 feet of erosion over 75 years.

WAVES AND WATER LEVELS

Waves of all periods approach the Rincon Parkway sub cell shoreline; however, almost all of the energy is contained in the medium and long period waves (approximately 5 to 20 seconds). These waves approach the Southern California Bight and encounter the offshore islands. The offshore islands such as Santa Cruz, Santa Rosa, Santa Catalina, and San Miguel partially shelter this section of coast from ocean swells. Between these islands are the windows that waves can pass through and approach the Rincon Parkway sub cell shoreline. Waves can approach the study area through wave windows from the west and north and from a small window to the south. The BEACON study contains a summary of historical storms as far back as 1905. These storms have resulted in significant damage to existing structures such as homes and roadways.

As waves travel into shallower and shallower water, the wave crest is bent and becomes nearly parallel to shore, and the wave heights are modified depending on whether waves are being focused or de-focused at a particular location along the shoreline. Extreme wave conditions in shallow water have been calculated using historical wave data. The California Department of Boating and Waterways in partnership with the US Army Corps of Engineers (USACOE) maintain wave recording buoys throughout Southern California. The record of historical waves for this region, both from direct observation or recording and from hindcast analysis, is very extensive. Waves as high as 20 feet were recorded on January 17, 1998 and 14- to 16-foot high waves with period in excess of 20 seconds were recorded during the 1982-83 El Niño.

Future Water Levels Due to Sea Level Rise

The 1% design water elevation near the site is ~+7.6 feet (page 3, **Table 1**). This sea level includes short term effects that would increase sea level, such as wave set up and El Niño. The California Coastal Commission (CCC) SLR Guidance document recommends that a project designer determine the range of SLR using the “best available science.” When the SLR Guidance document was adopted by the CCC in 2015, it stated that the best available science for quantifying future SLR was the 2012 National Research Council (NRC) report. The NRC report is no longer considered the state of the art for assessing the magnitude of SLR in the marine science communities. The “State of California Sea Level Rise Guidance 2018” by the California Natural Resources Agency provides more current SLR estimates within a probability frame work (available online) . The 2018 report provides SLR estimates in the Santa Barbara area based upon various carbon emission scenarios known as a “representative concentration pathway” or RCP. The Santa Barbara estimates are valid for the 3124 Solimar Beach Drive site. **Table 2** below is from the 2018 document (TABLE 23, page 58, CCC SLR Guidance) for Santa Barbara.

SANTA BARBARA		Probabilistic Projections (in feet) (based on Kopp et al. 2014)				H++ scenario (Sweet et al. 2017) *Single scenario
		MEDIAN	LIKELY RANGE	1-IN-20 CHANCE	1-IN-200 CHANCE	
		50% probability sea-level rise meets or exceeds...	66% probability sea-level rise is between...	5% probability sea-level rise meets or exceeds...	0.5% probability sea-level rise meets or exceeds...	
			Low Risk Aversion		Medium - High Risk Aversion	Extreme Risk Aversion
High emissions	2030	0.3	0.2 - 0.4	0.5	0.7	1.0
	2040	0.5	0.3 - 0.7	0.8	1.1	1.6
	2050	0.7	0.4 - 1.0	1.2	1.8	2.5
Low emissions	2060	0.7	0.4 - 1.0	1.4	2.2	
High emissions	2060	0.9	0.6 - 1.3	1.6	2.5	3.6
Low emissions	2070	0.9	0.5 - 1.3	1.7	2.8	
High emissions	2070	1.1	0.7 - 1.7	2.1	3.3	4.9
Low emissions	2080	1.0	0.5 - 1.5	2.0	3.6	
High emissions	2080	1.4	0.9 - 2.1	2.7	4.3	6.3
Low emissions	2090	1.1	0.6 - 1.8	2.4	4.4	
High emissions	2090	1.7	1.1 - 2.6	3.3	5.3	7.9
Low emissions	2100	1.2	0.6 - 2.0	2.9	5.3	
High emissions	2100	2.1	1.2 - 3.1	4.1	6.6	9.8

Table 2. SLR Projection for Santa Barbara

The project has a design life of 75 years or until about the year 2096. For the analysis the ~0.5% probability SLR scenario will be used, which represents a very conservative estimate of future SLR. The SLR tables in the CCC 2018 Guidance have been modified by the CCC and do not provide the complete data set from the COPC document with the best available science. Table 2 illustrates that SLR in the year 2100 for the likely range and, considering the most severe RCP (8.5), is 1.2 feet to 3.1 feet above the 1991-2009 mean. Interpolating Table 2, the very low probability SLR (0.5%) for the year 2096, low emissions, SLR is ~4.8 feet, and the high emissions, SLR is ~6 feet. Based upon this table there is a much lower probability (0.5%) of SLR of about 5.4 feet $((4.8+6.0)/2)$.

Using the 1% historical water level of 7.6 feet NAVD88 and 6 feet of SLR, the design water elevation for the SLR scenario is 13.6 feet NAVD88. The design scour elevation is estimated to be +3.5 feet NAVD88. It should be noted that beneath the sand fronting the site are cobbles which will not scour down and lie on an erosion resistant claystone. The design scour elevation is fixed by the elevation of the claystone and overlying cobbles (~+3.5 feet NAVD88). Using the design scour at the seawall of +3.5 feet NAVD88 yields the design water height of ~10.1 feet at the seawall.

Project Design Wave Design Beach Profile

Waves from distant storms and nearby hurricanes (chubascos) have pounded the coastline of Rincon Parkway sub cell several times within the last few centuries. However, these extreme waves break further offshore and lose a significant portion of their energy before they reach the shoreline. The offshore area allows for energy from large waves to

dissipate before reaching the shoreline. Once a wave reaches a water depth that is about 1.28 times the wave height, the wave breaks and runs up onto the revetment or cobble slope at the site. The wave that generates the greatest runup is the wave that has not yet broken when it reaches the toe of the beach or the revetment. Using the water depth at the revetment of 10.1 feet the design wave at the seawall is 7.8 feet high. As part of the project analysis the County requires that the project design consider that no shore protection is in place. This requires the determination of a hypothetical beach profile at the site. Natural berm crest elevations (based upon BEACON profile data at Ventura County area natural beaches) are typically from about +13 feet NAVD88, at cobble beaches, to about +14 feet NAVD88, at sand beaches. The beach slopes vary from about 8:1 (h:v) to as flat as about 15:1. The design beach slope is from +0 NAVD88 to beneath the seaward side of the building (considering that the revetment is gone) where the site grade (typical area berm crest elevation) is +13.5 feet NAVD88 (-10:1 slope). The cotangent of nearshore slope is measured from the BEACON Line 22 plot (Figure 1), and is -50. The design period for both cases will be a 15 second, which is a mean spectral wave period for the area. With no shore protection the site elevations are based upon the theoretical design beach profile and not the existing man made grades post development. The slope and the berm elevation are determined by using the coastal engineering principal of equilibrium beach profile (Dean, 1991). The equilibrium beach profile principal is illustrated in the graphic below provided as Figure 3. The project design beach profile (DBP) is provided in APPENDIX B.

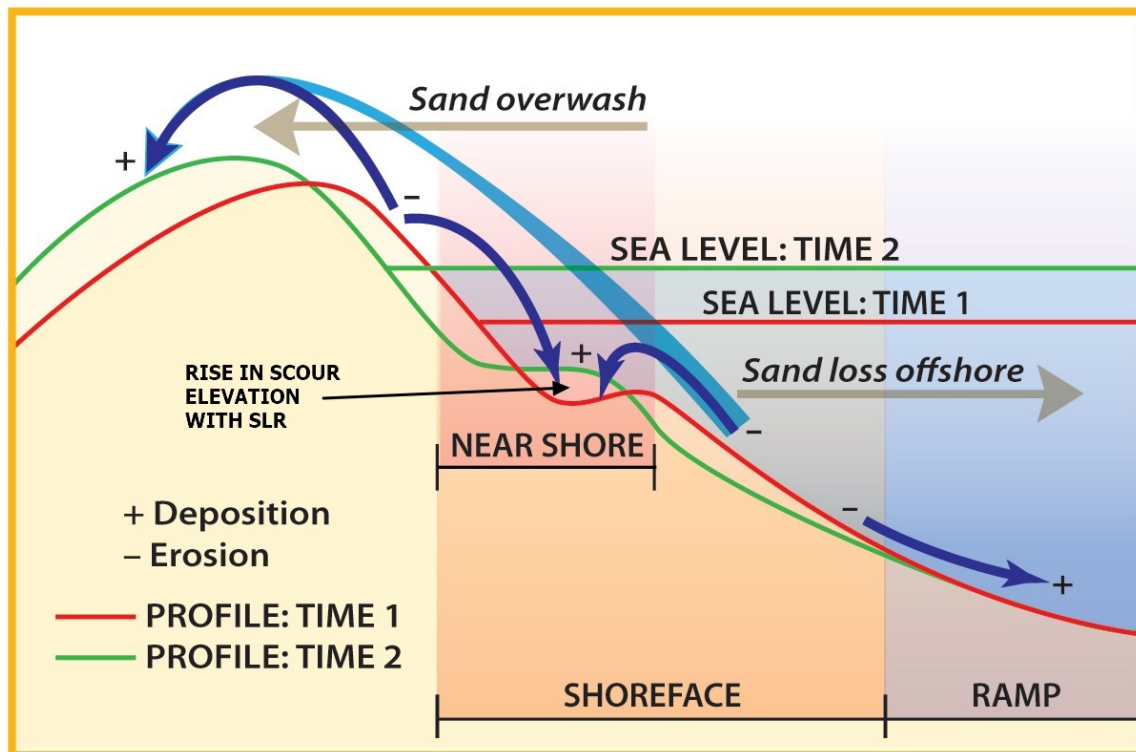


Figure 3. Equilibrium beach profile illustration

WAVE RUNUP AND OVERTOPPING ANALYSIS

As waves encounter the revetment/beach at the site, the waves can rush up, and sometimes over the revetment/beach and onto the property. The revetment may have, in the past, been subject to overtopping. However, if this occurs in the future, the site drainage is capable of conveying these waters back into the ocean or back to Solimar Beach Drive. Wave runup is defined as the vertical height above the still water level to which a wave will rise on a structure of infinite height. Overtopping is the flow rate of water over the top of a finite height structure (the revetment or the design beach profile), as a result of wave runup.

Wave runup and overtopping on the existing shore protection is calculated using the US Army Corps of Engineers Automated Coastal Engineering System, ACES. The methods to calculate runup and overtopping implemented within this ACES application are discussed in greater detail in the ACES Manual. Wave runup analysis assumes that whatever slope (natural shoreline slope or revetment slope) the wave is running up is higher than the actual wave runup elevation. When the slope height is lower than the wave runup elevation, the wave runup becomes wave overtopping. At the site, the top of the revetment is below the highest future design wave runup elevation. **Table 3** is the output from the ACES analysis for the revetment in place case. Both for the revetment and, if the revetment is removed cases, the site grade slopes back to Solimar Beach Drive. The site grade is below the wave runup and the design waves will overtop them. In the case where there is no revetment, the wave runup travels up the eroded natural rocky shoreline, to the top of the slope, and then across the site to Pacific Coast Highway (PCH).

ACES		Mode: Single Case		Functional Area: Wave - Structure Interaction		
Application: Wave Runup and Overtopping on Impermeable Structures						
Item		Unit	Value			
Incident Wave Height	Hi:	ft	7.800	Rough Slope Runup and Overtopping	3124 Solimar Beach Road	
Wave Period	T:	sec	15.000			
COTAN of Nearshore Slope	COT(ϕ):		50.000			
Water Depth at Structure Toe	ds:	ft	10.100			
COTAN of Structure Slope	COT(θ):		1.500			
Structure Height Above Toe	hs:	ft	13.000			
Rough Slope Coefficient	a:		0.775			
Rough Slope Coefficient	b:		0.361			
Wave Runup	R:	ft	12.479			6 FT SLR
Onshore Wind Velocity	U:	ft/sec	8.439			
Deepwater Wave Height	H0:	ft	5.271	Revetment		
Relative Height	ds/H0:		1.916			
Wave Steepness	H0/(gT ²):		0.000728			
Overtopping Coefficient	α :		0.070000			
Overtopping Coefficient	Qstar0:		0.060000			
Overtopping Rate	Q:	ft ³ /s-ft	8.098			

Table 3. ACES output with the revetment

When the beach erodes the beach material will transition to cobbles. The wave runup analysis for no revetment case will use a “rough slope” methodology to mimic the cobbles. **Table 4** contains the ACES output for the no revetment analysis. For the no seawall theoretical beach profiles, the theoretical natural beach berm elevation at the crest of the profile (~+15 feet NAVD88) was subtracted from the beach toe depth (~+3 feet NAVD88) to get 12 feet as the berm (structure) height above the toe for overtopping calculation.

ACES		Mode: Single Case		Functional Area: Wave - Structure Interaction	
Application: Wave Runup and Overtopping on Impermeable Structures					
Item		Unit	Value	Rough Slope Runup and Overtopping	
Incident Wave Height	Hi:	ft	7.800	3124 Solimar Beach Road 6 FT SLR Cobble Beach	
Wave Period	T:	sec	15.000		
COTAN of Nearshore Slope	COTAN(φ):		50.000		
Water Depth at Structure Toe	ds:	ft	10.100		
COTAN of Structure Slope	COTAN(θ):		10.000		
Structure Height Above Toe	hs:	ft	12.000		
Rough Slope Coefficient	a:		0.956		
Rough Slope Coefficient	b:		0.398		
Wave Runup	R:	ft	6.108		
Onshore Wind Velocity	U:	ft/sec	8.439		
Deepwater Wave Height	H0:	ft	5.271		
Relative Height	ds/H0:		1.916		
Wave Steepness	H0/(gT ²):		0.000728		
Overtopping Coefficient	α:		0.070000		
Overtopping Coefficient	Qstar0:		0.070000		
Overtopping Rate	Q:	ft ³ /s-ft	6.703		

Table 4. ACES output no revetment.

The runup analysis shows that the revetment at elevation +16 NAVD88 can be overtopped with SLR in the future. It also shows that future wave runup, including SLR, can overtop the theoretical beach profile berm crest at elevation +15 feet NAVD88 with no revetment on the site. The calculated revetment mean overtopping rate for the design condition is 8.1ft³/s-ft for 6 feet SLR. The overtopping rate for the no revetment condition with 6 feet SLR is 6.7ft³/s-ft . For the calculated overtopping rate, the height of water can be calculated using the following empirical formula provided by the USACOE (Protection Alternatives for Levees and Floodwalls in Southeast Louisiana, May 2006, equations 3.1) based upon the calculated overtopping rate Q for the SLR case

$$q = 0.5443\sqrt{g}h_1^{3/2} \qquad v_c = \sqrt{\frac{2}{3}gh_1}$$

For 8.1 ft³/s-ft, the height of the overtopping bore is about 2 feet. This bore will go over the top of the revetment and loose height as it flows back towards the proposed building. The wave overtopping bore will be reduced in height as it reaches and flows beneath the proposed structure. The revetment elevation is about +16 feet NAVD88, and with an overtopping bore of about 2 foot in height, the effective future design flood elevation in consideration of SLR is about +18 feet NAVD88 with the revetment in place and maintained.

For $6.7 \text{ ft}^3/\text{s-ft}$, the height of the overtopping bore above the beach berm is about 1.7 feet. This bore will go over the berm of the beach, which will be below the structure and lose height as it flows back towards and beneath the proposed building. The wave overtopping bore will be reduced in height as it passes beneath the proposed structure. The maximum site elevation, in consideration of SLR, at the proposed structure is about +15 feet NAVD88 and, with an overtopping bore of about 1.7 foot in height (due to distance from the revetment), the effective future design flood elevation in consideration of SLR at the proposed development is also about +17 feet NAVD88 with the revetment removed.

FEMA BASE FLOOD ELEVATION DISCUSSION

FEMA CCAMP study used a statistical “response base” method and the TAW empirical wave runup equations. The current FEMA flood zones for the site are as shown on Map 06111C0728F, effective date is 1/29/21. The offshore area in front of the site to just landward of the crest of the revetment is mapped in the FEMA VE Zone with a base flood elevation (BFE) of +28 feet NAVD88. From the landward limit of the VE 28 Zone revetment to about the middle of the existing residence (~50 feet distance) is mapped in a secondary VE Zone with a BFE of +18 feet NAVD88. From the landward limit of the secondary VE Zone to across Solimar Beach Drive is mapped in the FEMA X Zone. This is shown on the DBP.

It should be noted that these BFEs are not based upon flooding or flooding elevations that have happened at the site, but rather how FEMA modeled the wave runup process. The top of the revetment is at +16 feet NAVD88 and the FEMA BFE at that location is 12 feet higher at elevation +28 feet NAVD88. In the area where the BFE is +18 feet NAVD88 the site grade is about around elevation +13 feet. The FEMA BFE is 5 feet higher than the adjacent grade. There has not been any historical flooding of the site to these calculated elevations. The FEMA modeling appears to over predict the historical and potential flood elevations the site.

GSI DESIGN FLOOD ELEVATION DISCUSSION

GSI used a traditional deterministic method for analysis of the design flood elevation. The US Army Corps of Engineers ACES computer modeling was used to calculate the runup bore height under the design conditions. The design flood elevation is the calculated bore height above the berm crest elevation or site elevation. The ACES type analysis is an acceptable method according FEMA guidelines (Wave Runup and Overtopping, FEMA Coastal Flood Hazard Analysis and Mapping Guidelines Focus Report, February 2005). The purpose of the GSI analysis is to determine the design flood elevation in consideration of SLR. The proposed development is in the FEMA VE Zone and is required by local and state regulatory agencies to be constructed on piles in conformance with FEMA V/VE Flood Hazard Zone requirements. GSI will provide the wave runup elevations requested

by the reviewer on the DBP. The GSI wave runup elevation calculation assumes an infinite slope, which does not occur at this site. The proposed building is in the VE Zone so the other special flood zones calculated by GSI are moot.

GSI Revetment Case

This case is provided because it depicts real conditions that will occur over the life of the development. The calculated revetment bore overtopping height, with SLR, is 2.0 feet. Using the calculated bore height (h_1) and the velocity (v_c), then $h_1 v_c^2 = 86 \text{ ft}^3/\text{sec}^2$ which is less than $200 \text{ ft}^3/\text{sec}^2$ and places the site landward of the revetment in an AO zone by definition. However, the project is required to be designed as being in the VE Zone. The top of the revetment is at about +16 feet NAVD88. The design flood elevation behind the revetment would be the elevation of the revetment plus the height of the bore or about elevation +18 feet NAVD88. As the overtopping bore propagates across the site, the height of the bore is reduced as it travels at a rate depending upon the roughness of the flow surface. The GSI DFE area is depicted on the attached DBP. The wave runup elevation is 13.6 feet NAVD88 + 12.5 feet runup or about +26 feet NAVD88. This elevation assumes that the wave is running up on an infinite slope, which does not exist on the site.

GSI No Revetment

The calculated wave runup on a 1/10 sloping cobble beach overtops elevation + 15 feet NAVD88 with a bore height $h_1 = 1.7$ feet and a velocity $v_c = 6$ ft/sec. This water height and velocity ($h_1 v_c^2 = 62 \text{ ft}^3/\text{sec}^2 < 200 \text{ ft}^3/\text{sec}^2$) places this location in the AO Zone. In this case the upper limit of the water elevation would be the berm height +15 NAVD88 + 1.7 feet or ~+17 feet NAVD88. This would also be the calculated BFE beneath the structure landward to where the bore elevation approaches 0.0 feet. This is likely landward of the proposed building and would be considered to be the FEMA X Zone. This information has been shown on the DBP. The wave runup elevation on an infinite slope (which does not exist at the site) is 13.6 feet NAVD88 + 6.1 feet runup or ~+20 feet NAVD88.

The flood zone designation for the development is VE. A review of ASCE24-14 relative to conditions of the subject site indicates that the bottom of the lowest horizontal structural member should be BFE + 1' or the Design Flood Elevation (DFE), whichever is higher. The development is in the FEMA VE Zone with a BFE of +18 feet. The DFE for the site per ASCE24-14 would be the BFE + 1'. However, the County requires site specific analysis and determination of a future flood elevation or future DFE. Based upon the analysis and discussion above the calculated future DFE is lower than the current FEMA BFE. With this in mind, the most onerous conditions would be the current FEMA FIRM, which has the structure in the VE Zone with a base flood elevation of +18 feet NAVD88. **Per the County for the FEMA VE Zone the lowest horizontal structural member needs to be 1 foot above the BFE of +18 feet NAVD88 or +19 NAVD88.**

Tsunami

The State of California (2009) shows that the site is within a tsunami inundation zone (Ventura Quadrangle). The tsunami inundation map use is for evacuation planning only. The County of Ventura has developed a tsunami alert and evacuation plan. This plan recommends that coastal communities within the potential areas of inundation upgrade their tsunami education programs. The County has posted signs throughout the community showing tsunami evacuation routes, tsunami evacuation center locations, and the limits of the tsunami hazard zones. The limit of the tsunami inundation zone at the site is landward of the proposed residential structure.

COASTAL HAZARD DISCUSSION

Future Shoreline Erosion Hazard

It is highly speculative to assume that the existing permitted revetment could, or will be, removed at any time in the future in front of the subject property, or in its entirety, because it protects properties to either side of the subject site. Removal would jeopardize these properties. As stated in the CCC Sea-Level Rise Policy Guidance document (Appendix B, page 237), “predictions of future beach, bluff, and dune erosion are complicated by the uncertainty associated with future waves, storms and sediment supply. The CCC Sea Level Rise Policy Guidance also recognizes that the future erosion rate may be lower than current rates due to more erosion resistant material being exposed. The CCC staff typically uses the highest historic erosion rate as an estimate of the future erosion rate with sea level rise. As stated above, with the shore protection in place, the erosion rate for the next 75 years will be 0.0 ft/yr. In addition, the USGS historical shoreline movement analysis does not take into account that as the beach erodes, the littoral material changes. While the SLR document generally recommends use of the higher rate, it specifically acknowledges that based on site specific evidence, a lower rate may be used provided “future erosion will encounter more resistant material, in which case lower erosions rates may be used.”

This is exactly what will occur along this beach. Once the sand is gone, the “future erosion” will encounter cobbles and the erosion resistant claystone. Cobbles do not behave the same as sand when subjected to waves. Cobbles do move/transport, but at a rate that is much slower than sand. Cobble beaches tend to be steeper because the beach slope is a function of the littoral material grain size. Cobble transport is bed load transport, while sand transport is suspended load transport. Stated very simply, the transport rate of any beach material is inversely proportional to the weight. That is to say, the larger the sediment size, the heavier it is, and the slower it moves. The beach cobbles are about 6 inches (146 mm) or greater in size as compared to sand at about 0.1 mm in size. A conservative estimate of the erosion rate of the cobbles versus the sand is that the cobble erode at a rate of 1/3 or lower than the rate at which the sand erodes. The proposed design and use of the “no seawall” BFE allows for the beach to erode beneath

the structure. With the seawall in place, no erosion will occur. If the seawall is removed, the structure will not be impacted by shoreline erosion due to its elevation and provided that it is constructed on a pile foundation. GSI recommends that the habitable portions of the development be constructed on a pile foundation. Non habitable portions of the development such as the garage can be constructed with a slab on grade foundation per the project geotechnical engineer's recommendation.

Flooding Hazard

The proposed residential structure should not be subject to short-term flooding from wave runup attack if the recommendations herein are incorporated into the project design. With the no revetment in place, and the lowest horizontal structural member at or above elevation +19 feet NAVD88 (BFE 18 feet NAVD88 + 1 foot [County]), the residence is above any flooding elevation due to wave overtopping. The proposed project is reasonably safe from flooding because of the elevation above any potential ocean still water elevation.

Wave Attack & Wave Runup

With no seawall in place, waves will break on or near the piles and wave runup will reach beneath the development the future. Wave runup beneath the pile supported structure may strike the bottom of the structure or the back of the slab-on-grade garage wall. The proposed pile supported foundation and the garage wall will be subject to wave forces. The pile wave loads are taken from FEMA equation 8.5, provided below, using a depth limited design wave height of 7.8 feet (see wave runup analysis) at the structure and a 30-inch round pile. $F = 1/2(1.75)(64)(2.5)(7.8)(7.8) = \sim 8000$ lbs acting at the still water elevation of 13 feet NAVD88.



EQUATION 8.5. BREAKING WAVE LOAD ON VERTICAL PILES

$$F_{brkp} = \frac{1}{2} C_{db} \gamma_w D H_b^2 \quad (\text{Eq. 8.5})$$

where:

- F_{brkp} = drag force (lb) acting at the stillwater elevation
- C_{db} = breaking wave drag coefficient (recommended values are 2.25 for square and rectangular piles and 1.75 for round piles)
- γ_w = specific weight of water (62.4 lb/ft³ for fresh water and 64.0 lb/ft³ for saltwater)
- D = pile diameter (ft) for a round pile or 1.4 times the width of the pile or column for a square pile (ft)
- H_b = breaking wave height (0.78 d_s), in ft, where d_s = design stillwater flood depth (ft)

The relationship between the diameter of the pile and the wave force are linear and are provided in the equation. It is also assumed that the water will be on both sides of the pile, which will result in no net hydrostatic force on the pile.

Wave runup may strike the bottom of the foundation or other improvements (such as stairs and elevator enclosure) as the beach erodes beneath the building. The bottom of the foundation and other improvements will be located above the design still water elevation, but may be subject to wave runup bore forces or broken wave forces in the future with SLR. The wave runup and overtopping analysis calculated a wave bore height beneath the building of 2 feet. Using Equation VI-5-184 from the Coastal Engineering Manual the surge force per unit horizontal width of the improvement is ~1,200 lbs.

The design engineer for the foundation and other improvements will determine the proper design loading in consideration of the above information. FEMA National Flood Insurance Program (NFIP) Free-of-Obstruction requirements (NFIP Technical Bulletin 5/March 2020) should be followed. In addition, for the design and siting of the elevator improvement NFIP Technical Bulletin 4-93 should be followed. Typically, the seismic forces of the accelerated building mass on the piles are much greater than the potential breaking wave loads. The structural engineer will be provided these force calculations for his design.

In summary, the proposed development is reasonably safe from coastal hazards including shoreline erosion, wave runup, and flooding without the shore protection in place. Provided the recommendations (foundation type, elevation, and potential wave runup forces) in this report are incorporated into the project design.

CALIFORNIA COASTAL COMMISSION SLR POLICY GUIDANCE INFORMATION

Step 1. Establish the projected sea level rise range for the proposed project's planning horizon using the best available science, which is currently the 2012 NRC Report.

The "State of California Sea Level Rise Guidance 2018" by the California Natural Resources Agency provides the current SLR estimates accepted by the CCC within a probability framework. The 2018 report provides SLR estimates in the Santa Barbara area based upon various carbon emission scenarios known as a "representative concentration pathway" or RCP. For the "low emissions" scenario in the year 2096 with 5% probability the SLR estimate is 2.9 feet above the 1991-2009 baseline. For the "high emissions" scenario in the year 2096 with 0.5% probability, the SLR estimate is ~6 feet above the 1991-2009 baseline. The GSI analysis used the high emissions estimated SLR.

Step 2. Determine how physical impacts from sea level rise may constrain the project site, including erosion, structural and geologic stability, flooding, and inundation.

This report discusses the physical impacts from SLR and the corresponding project constraints.

Step 3. Determine how the project may impact coastal resources, considering the influence of future sea level rise upon the landscape as well as potential impacts of

sea level rise adaptation strategies that may be used over the lifetime of the project.

In the future, the revetment can be increased in height as an adaptation strategy to manage wave overtopping onto the property. It should be noted that the project will provide protection to the public street and railroad located behind it. I should also be noted that the project is design such that the revetment is not in place.

Step 4. Identify alternatives to avoid resource impacts and minimize risks throughout the expected life of the development.

The impact of SLR on the narrowing beach and lateral access cannot be mitigated at this site alone.

Step 5. Finalize project design and submit CDP application.

GSI is the coastal engineer for the project and not the project designer or the applicant.

CONCLUSIONS

The existing revetment is not necessary to protect the proposed development provided the recommendations in the report with regards to foundation type (pile foundation), lowest horizontal structural member (minimum elevation +19 feet NAVD88), and potential wave loading are incorporated into the design. It is GSI's professional opinion that the revetment should remain in place to insure the integrity of the adjacent properties, protect Solimar Beach Drive access, the existing infrastructure (water, sewer, natural gas, and electrical services), and the railroad. The revetment should be inspected when the beach is at the lowest level. The seawall should be maintained. Maintenance typically consists of repositioning stones that have rolled off of the structure. In as much as the revetment may be subject to overtopping during future extreme events, the site drainage paths should be maintained (clear) to convey wave overtopping waters.

The proposed development is entirely on private property and well above the mean high tide line so it will not impact lateral public access. If the seawall is revetment, the only portion of the development that may be subject to direct wave attack (other than the garage), is the vertical piles, which the residence will be supported upon. The adjacent road may be subject to significant and temporary flooding if the revetment is removed. The piles should extend well below the maximum beach scour depth. The only time that the piles will interact with the ocean is under conditions when the beach is eroded back underneath the residence (with no revetment in place).

REFERENCES

BEACON (Beach Erosion Authority for Control Operations and Nourishment) 1989, "Main Report, Coastal Sand Management Plan, Santa Barbara/Ventura County Coastline" prepared by Noble Consultants, Irvine CA.

Coastal Engineering Manual 2004,, US Army Engineer Waterways Experiment Station, Coastal Engineering Research Center, US Government Printing Office, Washington, DC.

Dean, Robert, 1991, "Equilibrium Beach Profiles: Characteristics and Applications," date Winter 1991, Journal of Coastal Research, 7-1 pages 53-94

FEMA, 2013, Guidelines and Specifications for Flood Hazard Mapping Partners.

FEMA, 2015, "California Coastal Analysis and Mapping Project (CCAMP) /Open Pacific Coast Study, Ventura County, California", prepared by BakerAECOM.

Moffatt & Nichol, and Revell Coastal, 2017, "Final Report, Technical Review of FEMA CCAMP for Ventura County," dated August

NOAA, 2017, Web Site, Maps <http://anchor.ncd.noaa.gov/states/ca.htm> Tidal Datums http://www.opsd.nos.noaa.gov/cgi-bin/websql/ftp/query_new.pl

USACE LAD, 1986, "Southern California Coastal Processes Data Summary" Ref# CCSTW 86-1.

USACOE 2013, "Incorporating Sea Level Change in Civil Works Programs," ER 1100-2-8162, dated 31 December.

USGS 2006, "National Assessment of Shoreline Change Part 3: Historical Shoreline Change and Associated Coastal Land Loss Along Sandy Shorelines of the California Coast", Open File Report 2006-1219

APPENDIX A

SURVEYOR'S STATEMENT

THIS MAP CORRECTLY REPRESENTS A TOPOGRAPHIC SURVEY MADE BY ME OR UNDER MY DIRECTION IN CONFORMANCE WITH LOCALLY ACCEPTED STANDARDS AND PRACTICES ON JANUARY 13, 2021

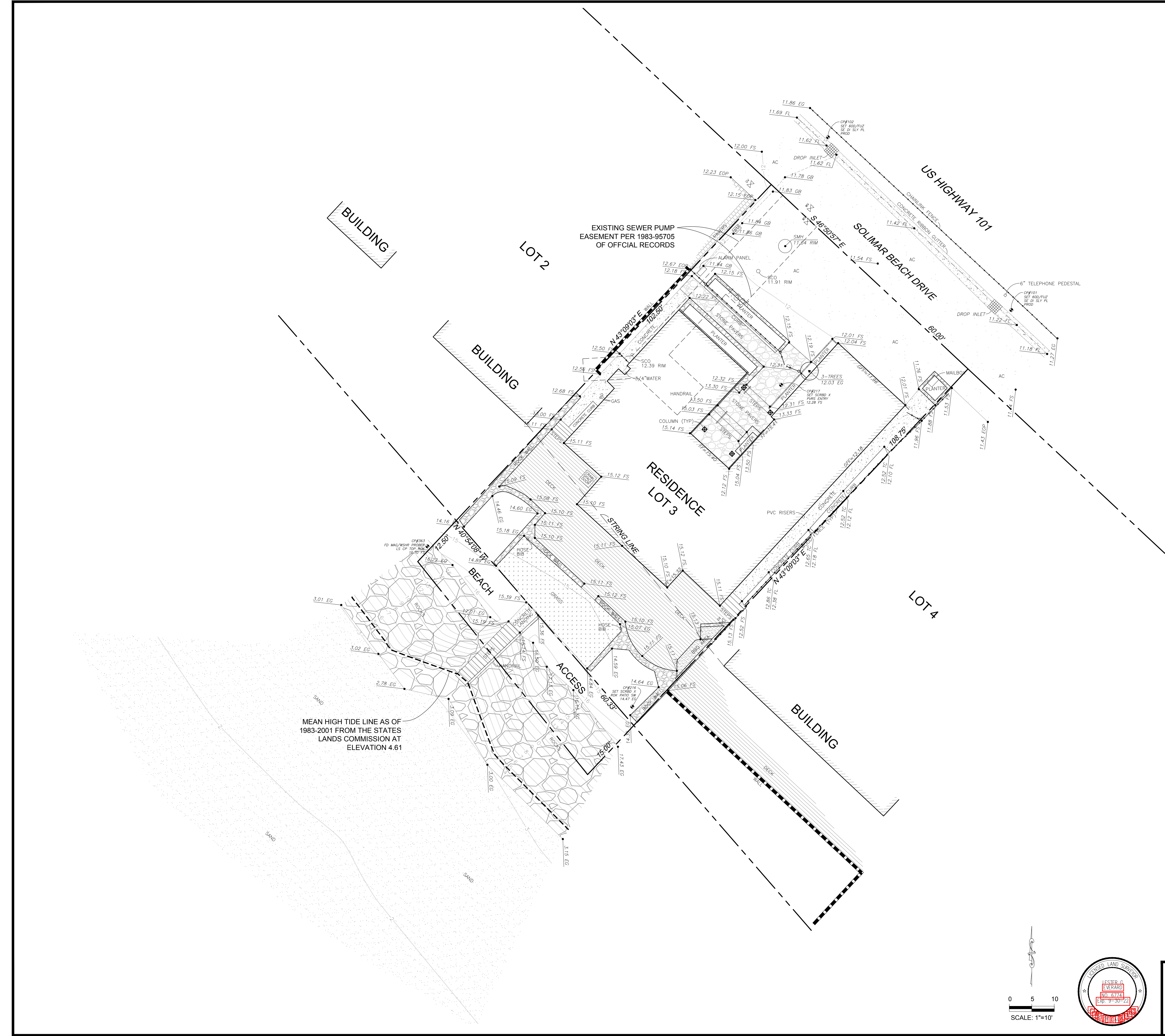
BENCHMARK

BM R 569 (1939)
ELEVATION = 4.878m (NAVD 88)

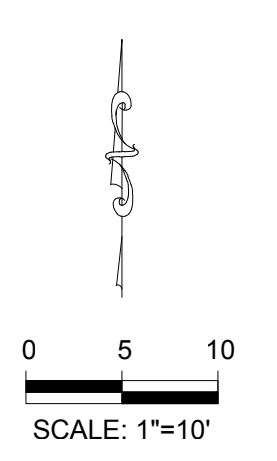
5.5 MILES NORTHWEST ALONG THE SOUTHERN PACIFIC RAILROAD FROM THE STATION AT VENTURA, 0.3 MILE NORTHWEST OF MILEPOLE 393, DIRECTLY ACROSS THE TRACK FROM HIGHWAY CULVERT D 221+55, IN THE TOP AND 0.7 FOOT NORTHWEST OF THE SOUTHEAST END OF THE NORTHEAST CONCRETE HEAD WALL OF 5 BY 10-FOOT CONCRETE BOX CULVERT 392.71 UNDER THE TRACK, 5.5 FEET NORTHEAST OF THE NORTHEAST RAIL OF THE MAIN TRACK, AND ABOUT 1 FOOT LOWER THAN THE TRACK

NOTES

1. NO ATTEMPT HAS BEEN MADE AS A PART OF THIS TOPOGRAPHIC SURVEY TO OBTAIN OR SHOW DATA CONCERNING EXISTENCE, SIZE, DEPTH, CONDITION, CAPACITY, OR LOCATION OF ANY UTILITY OR MUNICIPAL/PUBLIC SERVICE FACILITY, EXCEPT AS MAY BE SHOWN HEREON. FOR INFORMATION REGARDING THESE UTILITIES OR FACILITIES, CONTACT THE APPROPRIATE AGENCY.
2. EXCEPT AS SPECIFICALLY STATED OR SHOWN ON THIS PLAT, THIS TOPOGRAPHIC SURVEY DOES NOT PURPORT TO REFLECT ANY OF THE FOLLOWING WHICH MAY BE APPLICABLE TO THE SUBJECT REAL ESTATE: EASEMENTS, OTHER THAN POSSIBLE EASEMENTS THAT WERE VISIBLE AT THE TIME OF MAKING THIS SURVEY; BUILDING SETBACK LINES; RESTRICTIVE COVENANTS; ZONING OR OTHER LAND USE REGULATIONS, AND ANY OTHER LAND USE REGULATIONS; AND ANY OTHER FACTS THAT AN ACCURATE AND CURRENT TITLE SEARCH MAY DISCLOSE.



MEAN HIGH TIDE LINE AS OF 1983-2001 FROM THE STATES LANDS COMMISSION AT ELEVATION 4.61



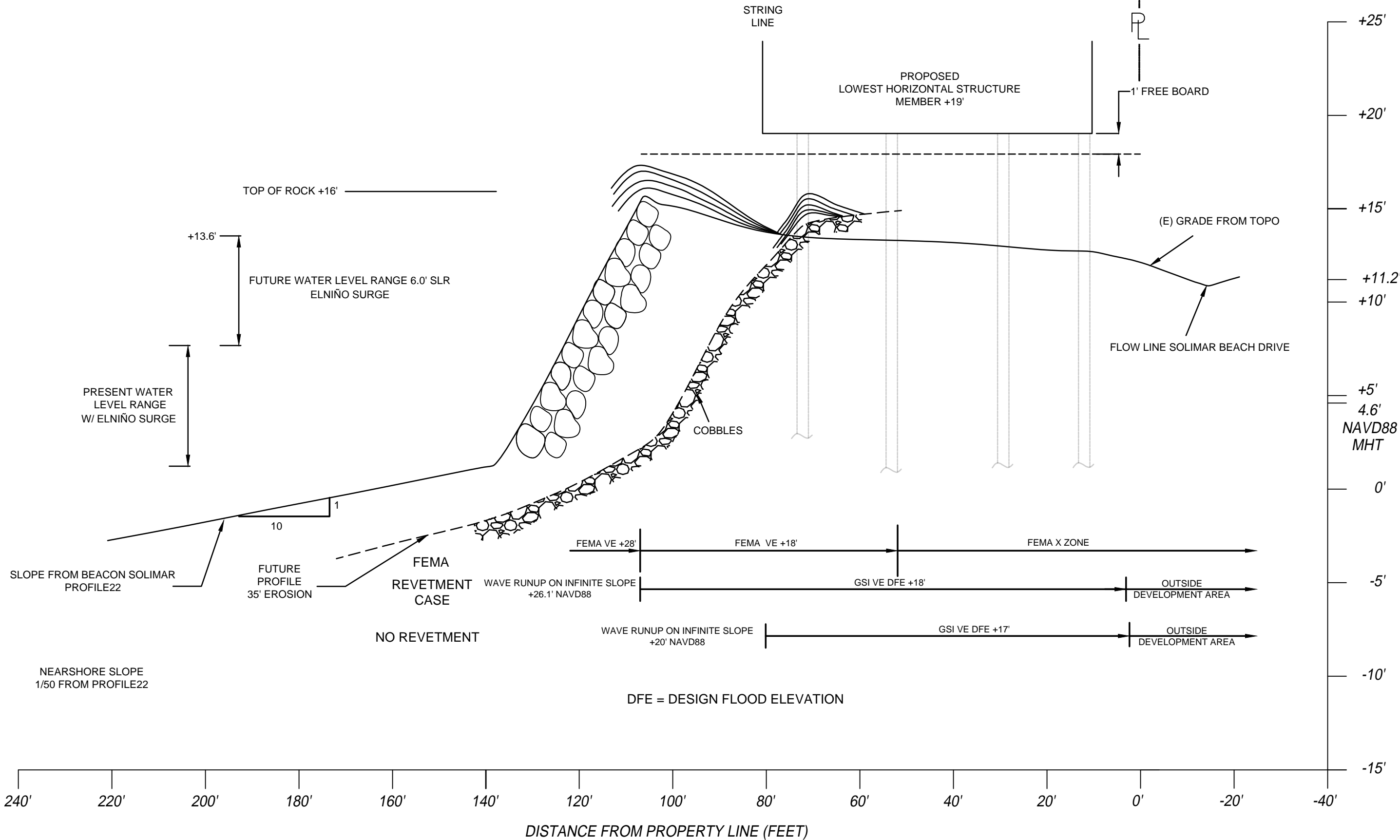
Prepared by:
AZIMUTH GROUP
5201 CLEMSON STREET
VENTURA, CA 93003 (805) 289-9407

TOPOGRAPHIC SURVEY
3124 SOLIMAR BEACH
VENTURA, CA

DWG DATE: 1-18-2021

APPENDIX B

DESIGN BEACH PROFILE 3124 SOLIMAR BEACH DRIVE VENTURA CA



REVISIONS	BY
08/19/21	
12/06/21	

DRAFTING BY:

GeoSoils, Inc.

Geotechnical • Geologic • Coastal • Environmental

5741 Palmer Way, Carlsbad, CA 92010
760-438-3155

TITLE: **3124 SOLIMAR BEACH DRIVE
DESIGN BEACH PROFILE**

CLIENT: 3124 SOLIMAR LLC,
3124 SOLIMAR BEACH DRIVE,
VENTURA, CA - 93002

W.O. SB070

CHECKED

DATE: 03/26/21

SCALE

JOB NO.

SHEET

S1

OF 1 SHEETS

SESPE

CONSULTING, INC.

A Trinity Consultants Company

374 Poli Street, Suite 200 • Ventura, CA 93001
Office (805) 275-1515 • Fax (805) 667-8104

April 29, 2021

Attention: Donald H. Jones c/o Martha Picciotti
3124 Solimar, LLC
10508 Wyton Drive
Los Angeles, California 90024

**Re: Noise Impact Assessment – Proposed Single-Family Residence
3124 Solimar Beach Drive – Ventura, California 93001**

Dear Mr. Jones:

This letter summarizes the Noise Impact Assessment (NIA) prepared for the proposed residential development located at 3124 Solimar Drive (Assessor's Parcel Number [APN] 060-0-340-035) in unincorporated Ventura County. 3124 Solimar LLC (the "Applicant") is proposing to demolish the existing residence at the Project site and construct a new two-story residence in its place (the "Project"). This proposed detached single-family residence is located in the Solimar Beach Colony, north of the City of Ventura (see Figure 1, Attachment 1). This NIA presents 24-hour ambient noise measurement collected at the proposed residence, prediction of the post-Project noise environment, and comparison of the noise environment to the applicable Ventura County comparability standards. For instances where post-Project noise levels exceed applicable County compatibility standards, feasible noise control measures are recommended. This NIA has been prepared in coordination with, and at the direction of, the Applicant.

PROJECT

The subject property is used as a single-family residence. As discussed above, the Applicant proposes to demolish the existing structure and build a new, two-story single-family residence in its place. Please see Figure 2 (Attachment 1), which shows the proposed design of the new residence.

The Ventura County Planning Department has requested that a NIA be prepared, as required by the *Ventura County 2040 General Plan* (Ventura County, 2020), to determine if existing nearby sources already result in excessive noise levels at the subject property (APN 060-0-340-035). The subject property experiences noise from three (3) existing sources (see Figure 1). The qualitative noise effects that these sources have on the subject property are described below:

- **California State Route 1** is located approximately 62-feet to the northeast of the property. It is an infrequently traveled roadway (commuter traffic takes Highway 101, which parallels State Route 1 in this area), and therefore generates relatively low noise levels at the property.
- **Railroad** line is located approximately 140-feet to the northeast of the property. The trains travelling along this section of the railroad causes infrequent, but high-intensity, noise events at the property. Note there are no railroad crossings and/or signals located within the nearby portion of the rail line.
- **US Highway 101** is located approximately 355-feet to the northeast of the property. Highway 101 is heavily travelled, and produces constant, low-intensity noise at the property.

VENTURA COUNTY NOISE COMPATIBILITY STANDARDS

The *Ventura County 2040 General Plan* (Ventura County, 2020) has the following applicable standards for noise sensitive uses, which includes residences, proposed to be located near highways and railroads:

Policy HAZ-9.2 – Noise Compatibility Standards: *The County shall review discretionary development for noise compatibility with surrounding uses. The County shall determine noise based on the following standards:*

1. *New noise sensitive uses proposed to be located near highways, truck routes, heavy industrial activities and other relatively continuous noise sources shall incorporate noise control measures so that indoor noise levels in habitable rooms do not exceed Community Noise Equivalent Level (CNEL) 45 and outdoor noise levels do not exceed CNEL 60 or Leq1H of 65 dB(A) during any hour.*
2. *New noise sensitive uses proposed to be located near railroads shall incorporate noise control measures so that indoor noise levels in habitable rooms do not exceed Community Noise Equivalent Level (CNEL) 45 and outdoor noise levels do not exceed L10 of 60 dB(A).*

Based on the Ventura County General Plan compatibility standards outlined above, Table 1 summarizes the applicable noise limits for the subject property, which is considered a noise sensitive use.

Table 1 – Sound Pressure Level Compatibility Standard

Receptor	Unit	Limit (dBA)
Indoor Noise Levels	CNEL	45
Outdoor Noise Levels	CNEL	60
	Leq1H	65
	L10	60

The abbreviations and noise metrics described in Table 1 are further defined below:

- **A-Weighted Sound Level (dBA):** Sound pressure level measured using the A-weighting network, a filter which discriminates against low and very high frequencies in a manner similar to the human hearing mechanism at moderate sound levels. The A-weighted sound level is generally used when discussing environmental noise impacts.
- **Community Noise Equivalent Level (CNEL):** The long-term 24-hour time average sound level, weighted as follows:
 - Daytime noise (7:00 a.m. to 7:00 p.m.) is not weighted;
 - Evening noise (7:00 p.m. and 10:00 p.m.) is weighted by +5 dBA; and
 - Nighttime noise (10:00 p.m. and 7:00 a.m.) is weighted by +10 dBA.
- **One Hour Equivalent Continuous Noise Level (Leq1H):** The average noise level over a 1-hour time period. In the case of the above County standard, the peak average hour over the entire day is used.
- **Sound Pressure Level (SPL):** The logarithmic measure of the power of a sound relative to a reference value, measured in decibels (dB). The sound pressure level is always associated with a specific location or distance from a sound source.
- **Ten Percent Exceedance Noise Level (L10):** The sound level that is exceeded 10 percent of the time within a given hour. The L10 value is often used to represent the noise levels generated by an intermittent source, such as a railroad.

NOISE MEASUREMENT RESULTS

Starting Tuesday, April 20, 2021 and ending Wednesday, April 21, 2021, a 24-hour noise measurement was obtained within the vicinity of the subject property. Figure 1 (Attachment 1) shows the monitoring location. The noise measurement was logged in 1-minute increments. A Type 2 Quest Soundpro SE/DL noise meter was calibrated prior to and following the measurement, and the measurement was collected in the vicinity of the subject property’s front yard, within line-of-site to the noise sources discussed above. The noise measurement summary and log is included as Attachment 2.

Table 2 summarizes the outdoor noise levels measured, as well as the estimated indoor noise level. Note that, based on the Environmental Protection Agency’s *Protective Noise Levels* document (EPA, 1974), included in Attachment 3, an outdoor to indoor attenuation of 20 dBA is assumed to estimate the interior noise levels experienced at the proposed residence. This takes into account the average noise reduction provided while windows are closed (25 dBA) and while windows are open (15 dBA). This is a conservatively low estimate of noise attenuation, as occupants of the proposed house are expected to generally keep windows closed, especially those facing sources of noise. Furthermore, the EPA study was conducted over 40 years ago (1974), and standard construction materials and practices have progressed considerably since then. The proposed residence will be constructed using more modern materials and practices, which will provide more noise attenuation than the materials assessed in 1974.

Table 2 – Monitored Noise Levels

Receptor	Unit	Measurement (dBA)
Indoor Noise Levels	CNEL	47.2
Outdoor Noise Levels	CNEL	67.2
	L _{eq} 1H	70.4
	L ₁₀	63.9

Table 3 presents the noise levels expected for the new structure (i.e., post-Project) and compares them to the appropriate limits, taking into account various reductions due to distance and intervening structures as described below. Using these assumptions, the estimated worst-case noise levels are determined at the residences inhabitable spaces nearest to the dominant noise sources (i.e., the highway and railroad), as explained below. Also, please see Figure 2 (Attachment 1) which shows the location of the indoor and outdoor spaces described below:

- **Indoor Noise Level:** Noise levels expected in the bedroom located above the garage is utilized to determine the significance of indoor noise levels (see Figure 2). This bedroom represents the proposed indoor inhabitable space that would be most affected by the nearby noise sources. Additionally, the noise measurement collected near the front of the existing home accurately represents the noise levels in this area because it was placed in a location about the same distance from the dominant noise sources. As discussed above, the outdoor to indoor attenuation is estimated to be 20 dBA.
- **Outdoor Noise Level:** The second-floor deck, located in the southwest (i.e., ocean side) corner of the residence, is the only inhabitable outdoor space (i.e., outdoor area where residences are expected to occupy for an extended period) that may be adversely impacted by the dominant noise sources (see Figure 2). The noise measurement does not accurately represent noise levels in this area because it (1) does not account for the increased noise attenuation provided by the shielding of the house structure, and (2) does not account for the increased distance from the noise sources (i.e., measurement was collected closer to

the noise sources, in the front of the house rather than the rear). This area will be shielded from the dominant noise sources by a combination of the building (the garage/bedrooms in front of the proposed residence) as well as the neighboring residences (see Figure 2), both of which are two stories and would remain post-Project. The proposed structures and neighboring residence walls are expected to break line-of-site between the occupants and some or all of the noise sources to the northeast.

The Federal Highway Administration’s *Noise Barrier Design Handbook* (see excerpt in Attachment 3) indicates that 5 dBA is the minimum attenuation expected when a barrier breaks line-of-site between the source and receptor. The back deck is also approximately 65-feet farther from the dominant noise sources than the measurement location. This is expected to conservatively provide approximately 5 dBA of additional noise attenuation. Together, the additional shielding and distance are assumed to result in a 10 dBA of attenuation for the outdoor noise levels experienced at the back deck. Note that this is a conservative estimate because the large structures that shield the noise sources will considerably outperform the bare minimum 5 dBA for just breaking line of site.

Table 3 – Expected Post-Project Noise Levels

Receptor	Unit	Production (dBA)	Limit (dBA)	Exceeds Limit?
Indoor Noise Levels	CNEL	47.2	45	Yes
Outdoor Noise Levels	CNEL	57.2	60	No
	L _{eq} 1H	60.4	65	No
	L ₁₀	53.9	60	No

As shown in Table 3 above, estimate CNEL noise levels within the indoor, second story bedroom exceed the applicable Ventura County compatibility standard by approximately 2.2 dBA’s. Please see recommended control measures below. It’s also important to note that these estimates are based on conservative assumptions, and the actual indoor and outdoor noise levels experienced by residence in these locations are expected to be lower than those presented in Table 3.

NOISE CONTROL MEASURES

As shown in Table 3 above, it is estimated that the indoor CNEL noise levels experienced in the bedroom located in the northwest corner of the proposed residence, which faces the existing noise sources, would exceed the applicable Ventura County General Plan compatibility standard by approximately 2.2 dBA’s. Therefore, to ensure the subject property experiences indoor noise levels that are below the applicable County compatibility standard, the following noise control measures is proposed:

Noise Control Measure NO-1: Double-paned or better windows shall be utilized throughout the residence.

Implementation of this recommended control measure is expected to provide a minimum of 5 dBA of additional noise attenuation beyond the 20 dBA utilized herein (see excerpt in Attachment 3). As discussed above, a baseline of 20 dBA outdoor to indoor attenuation is assumed based on the EPA’s 1974 study. Modern double-pane windows are expected to provide an additional 5 dBA of outdoor to indoor attenuation compared to the windows utilized in the 1974 study. Using this assumption, Table 4 presents the mitigated Project noise assuming that double-paned or better windows are installed throughout the house.

Table 3 – Expected Post-Project Noise Levels with Double-Paned Windows

Receptor	Unit	Production (dBA)	Limit (dBA)	Exceeds Limit?
Indoor Noise Levels	CNEL	42.2	45	No
Outdoor Noise Levels	CNEL	57.2	60	No
	L _{eq} 1H	60.4	65	No
	L ₁₀	53.9	60	No

CONCLUSION

This NIA finds that the subject property will be exposed to less than significant levels of noise by incorporated double-paned windows (or better) throughout the residence. Please call me or Graham Stephens at (805) 275-1515 if you have any questions or if you need additional information.

Respectfully submitted,

Scott Cohen, P.E., C.I.H.
Sespe Consulting, Inc.

ATTACHMENTS

1. Figures
 - Figure 1: Source/Receptor Location
 - Figure 2: Conceptual Floor Plan(s)
2. Noise Measurement Summary
3. Applicable Noise References
 - Excerpt from EPA’s *Protective Noise Levels*
 - Excerpt from FHWA’s *Noise Barrier Design Handbook*
 - Excerpt from San Diego County *General Plan*
4. Resume – Scott Cohen, P.E., C.I.H.

Attachment 1
Figures



Source: Google Earth 2021

Approximate Subject Property Boundary



SESPE
CONSULTING, INC.

FIGURE

1

SITE LOCATION MAP

Solimar Beach Colony
3124 Solimar Beach Colony
Ventura, California 93001

PROJECT #:	210509.0331	DATE:	4/26/21
SCALE:	As Shown	DRAWN BY:	GPS

PROJECT INFORMATION

PROJECT ADDRESS:
3124 SOLIMAR BEACH DRIVE
VENTURA, CA 93001

APN:
060-0-340-035

OWNER:
3124 SOLIMAR LLC
MANAGER DONALD H. JONES
10508 WYTON DRIVE
LOS ANGELES, CA 90024
(310) 780-8575 PHONE
dhjones@iaclaw.com E MAIL

ZONING:
R-B

DESCRIPTION:
NEW TWO STORY SINGLE FAMILY RESIDENCE
WITH ATTACHED TWO CAR GARAGE AND DECK.

CONSTRUCTION:
TYPE V NON-RATED

FIRE SPRINKLERS:
YES (UNDER SEPERATE PERMIT)

SOLAR:
YES (UNDER SEPERATE PERMIT)

LOT SIZE:
6355 S.F.

SQAURE FOOTAGE:
FIRST FLOOR HABITABLE 2588 S.F.
SECOND FLOOR HABITABLE 3179 S.F.
TOTAL HABITABLE 5767 S.F.
GARAGE 532 S.F.
SECOND FLOOR DECK 183 S.F.

LOT COVERAGE:
SECOND FLOOR HABITABLE 3179 S.F.
SECOND FLOOR DECK 183 S.F.
TOTAL S.F. 3362 S.F. OR 53%

MAXIMUM ALLOWABLE HEIGHT AND FINISHED FLOOR:
28 FEET ABOVE DATUM IS MAXIMUM ALLOWABLE HEIGHT
DATUM / FINISHED FLOOR IS 12 INCHES ABOVE BFE OF 18 FEET NAVD88
DATUM / FINISHED FLOOR IS 18 FEET + 12 INCHES OR 19.0 FEET NAVD88
STRUCTURE IS 26.5 FEET ABOVE DATUM OR 45.5 FEET NAVD88

SETBACKS:
FRONT 10 FEET
SIDES 3 FEET
REAR PER STRINGLINE

ARCHITECT AND CONTACT PERSON:
PICCIOTTI DESIGN
404 N. CATALINA STREET
VENTURA, CA 93001
(805) 641-3221 PHONE
mpdesign@charter.net E MAIL

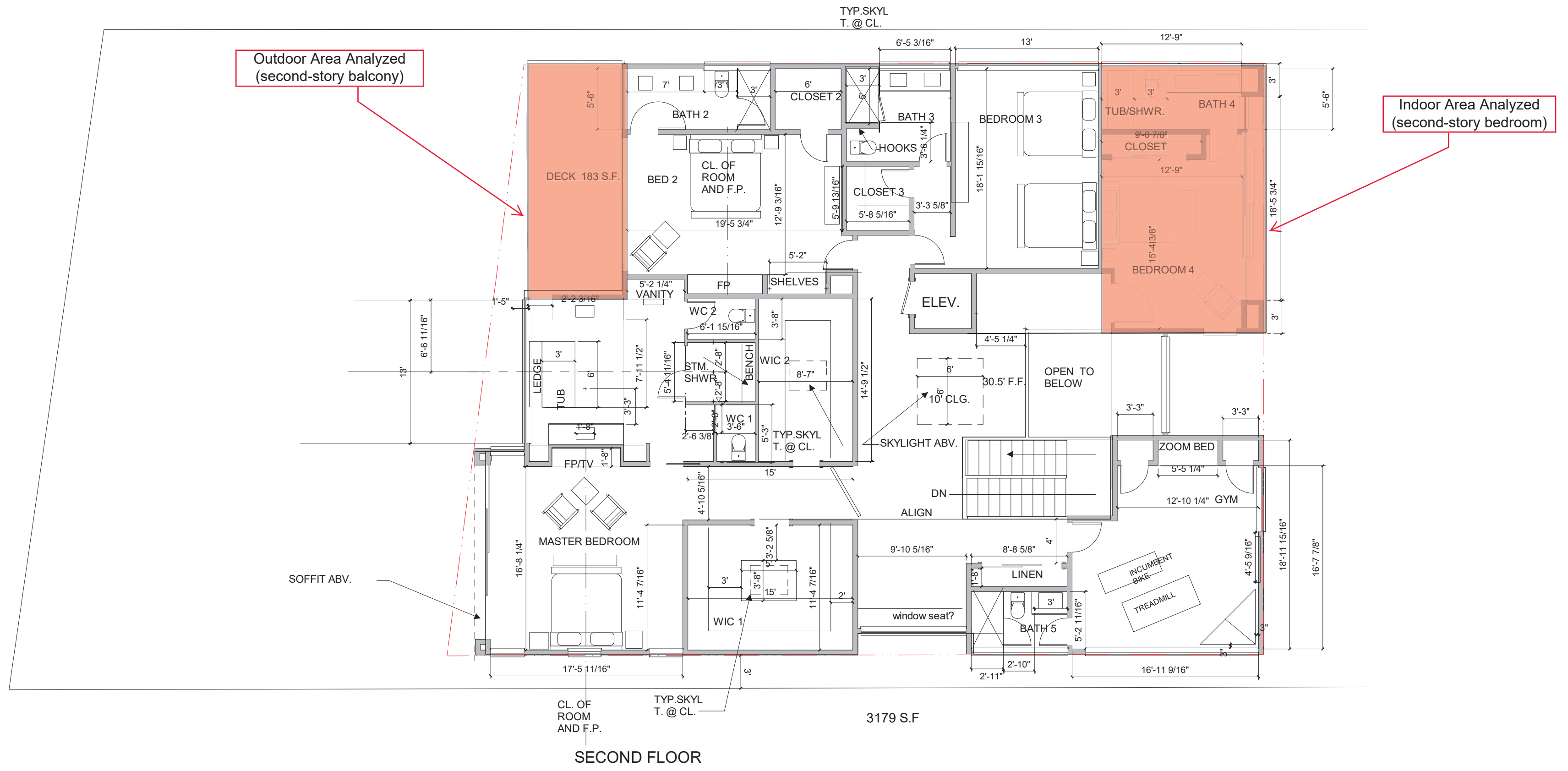
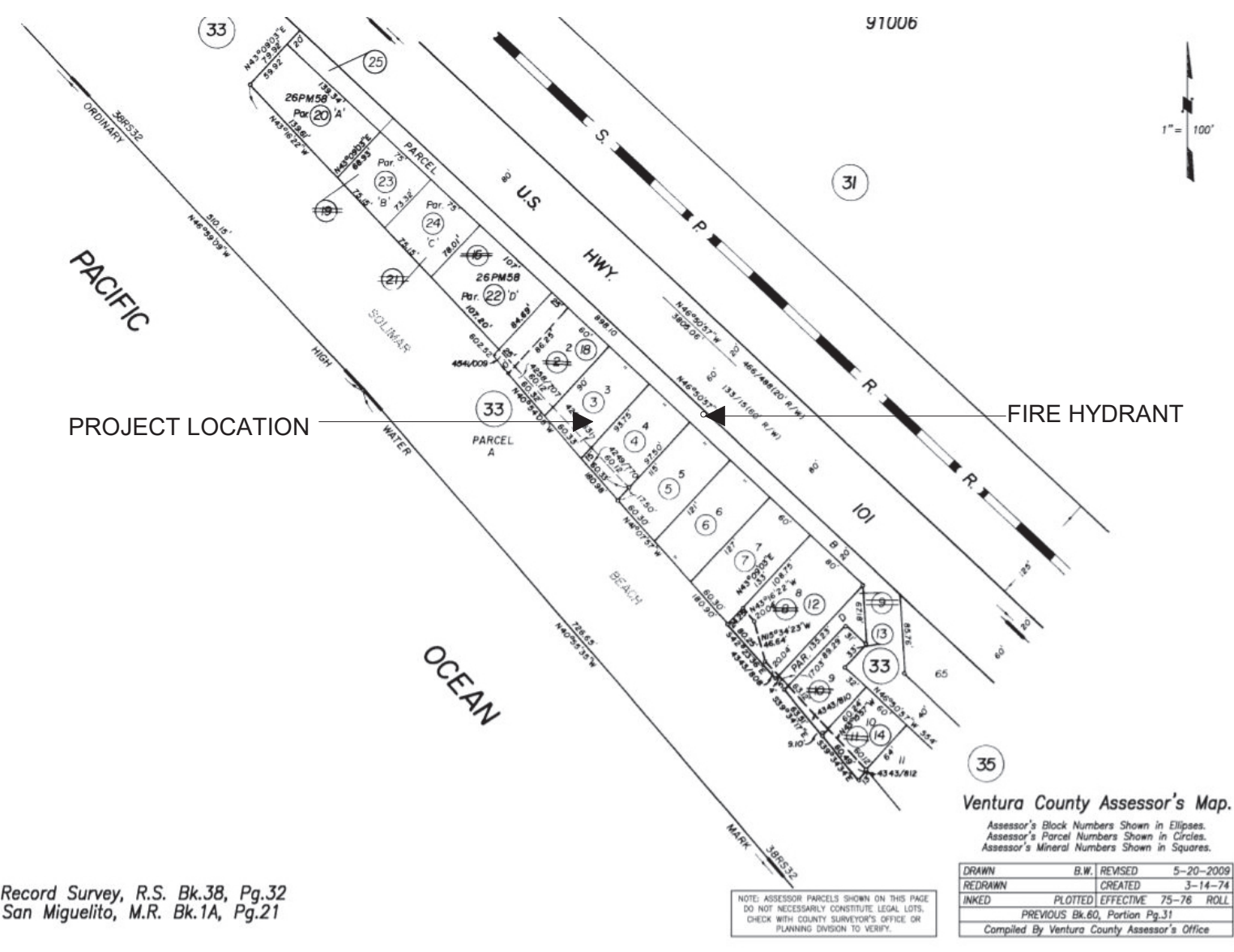
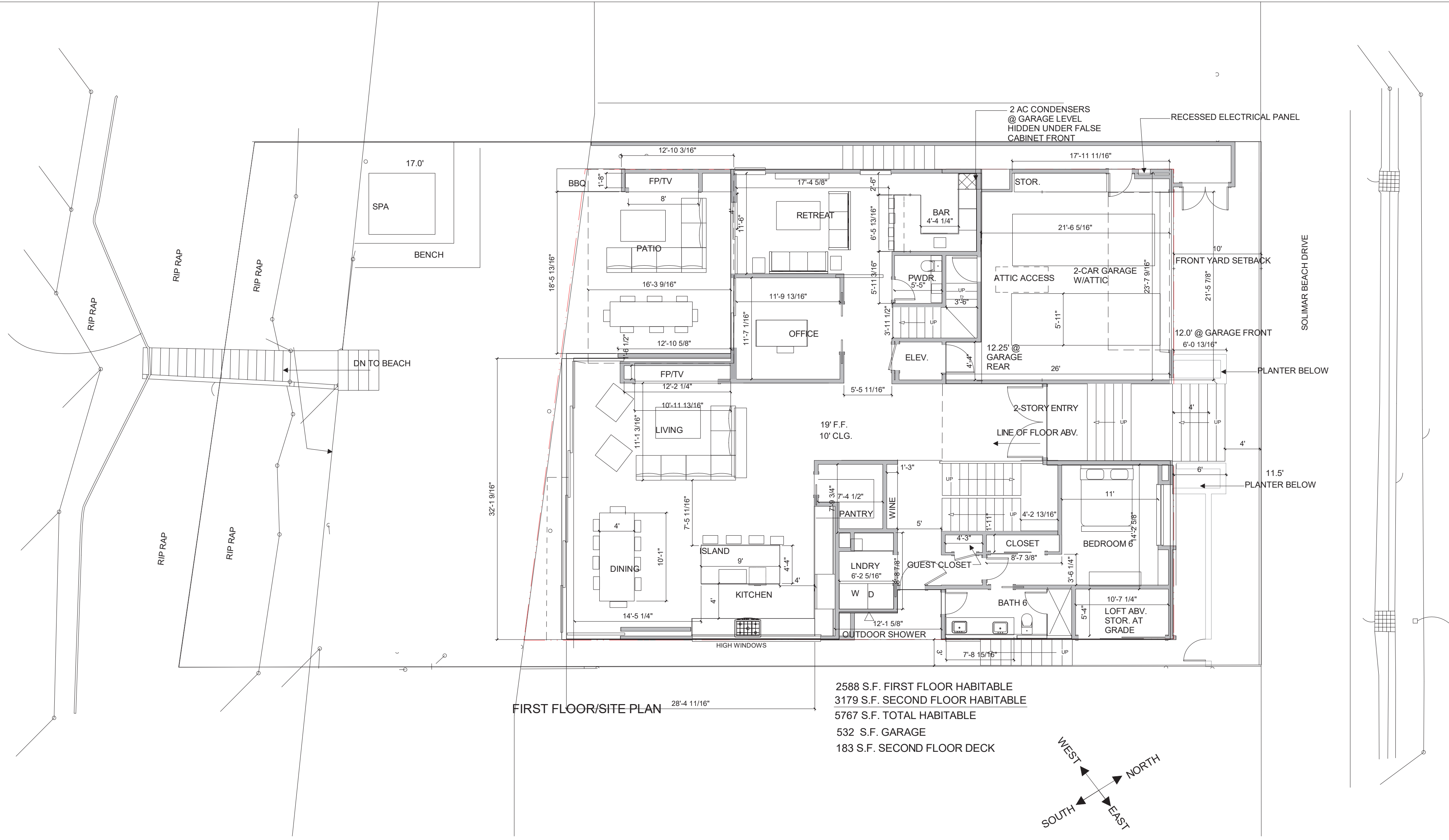
REVISIONS	BY

PICCIOTTI
MARTHA PICCIOTTI ARCHITECT
LICENSE # C18513
DESIGN
404 NORTH CATALINA STREET
VENTURA, CA 93001
TEL (805) 641 - 3221
MPDESIGN@CHARTER.NET

NEW RESIDENCE
for
SALLY AND DON JONES
3124 SOLIMAR BEACH
DRIVE
VENTURA CA

FLOOR PLANS
SITE PLAN

DRAWN BY
SCALE 1/8"=1'-0"
DATE 4-07-21
JOB
SHEET



Note: Existing noise sources (freeway, railroad, etc.) located to the northeast of the home.

Attachment 2
Noise Measurement Summary

Start Time 11:22:15 20-Apr-2021
 Run Length 24:00:00 5529600

Microphone Information		
Description	Units	Value
Sensitivity	dB	29
Polarization	Volts	0
Meter Range	dB	110
Max Level	dB	140
Meas. Floor	dB	-20

Configuration Information			
Description	Units	Meter 1	Meter 2
Integration Threshold	dB	OFF	OFF
Exchange Rate	dB	3	3
Criterion Level	dB	90	90
Upper Limit Level	dB	140	140
Projected Time	Hrs	24	24
Weighting		A	A
Time Response		SLOW	SLOW

Measurement	Units	Meter 1	Meter 2
		Broadband	Broadband
Lavg	dB	62.7	62.7
Lmax	dB	101.5	101.4
Lmin	dB	46.2	46.2
Lpk	dB	114.2	114.1
TWA	dB	67.5	67.5
PTWA	dB	67.5	67.5
DOSE	%	0.56	0.56
PDOSE	%	0.56	0.56
SEL	dB	112.1	112.1
EXP	p2s	64	64

Measurement	Units	Value
LDN	dB	66.6
CNEL	dB	67.1
TAKTMAX (5sec)	dB	N/A
LC-A	dB	N/A

		Meter 1			Meter 2		
		Count	Percent	Time	Count	Percent	Time
Overload	(OL)	0	0	00:00:00	0	0	00:00:00
Under-Range	(UR)	0	0	00:00:00	0	0	00:00:00
Upper Limit	(UL)	0	0	00:00:00	0	0	00:00:00

Exceedence Table

	0	1	2	3	4	5	6	7	8	9
0	101.5	69.4	67.9	67	66.3	65.7	65.3	64.9	64.5	64.2
10	63.9	63.6	63.3	63.1	62.8	62.6	62.4	62.2	62	61.8
20	61.6	61.5	61.3	61.1	61	60.8	60.7	60.5	60.4	60.3
30	60.1	60	59.9	59.7	59.6	59.5	59.4	59.3	59.2	59
40	58.9	58.8	58.7	58.6	58.5	58.4	58.3	58.2	58.1	58
50	57.9	57.8	57.6	57.5	57.4	57.3	57.2	57.1	57	56.9
60	56.8	56.7	56.5	56.4	56.3	56.2	56.1	56	55.9	55.8
70	55.7	55.6	55.5	55.4	55.3	55.1	55	54.9	54.8	54.6
80	54.5	54.4	54.2	54.1	53.9	53.8	53.6	53.5	53.3	53.2
90	53	52.8	52.7	52.5	52.2	52	51.7	51.4	51	50.4

Statistics Table

	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
46			0	0	0	0	0	0	0	0
47	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0.01	0.01	0.01
49	0.01	0.02	0.02	0.02	0.03	0.04	0.04	0.05	0.06	0.06
50	0.08	0.09	0.07	0.1	0.11	0.11	0.12	0.14	0.16	0.16
51	0.18	0.19	0.21	0.24	0.26	0.28	0.29	0.3	0.32	0.34
52	0.35	0.4	0.43	0.44	0.44	0.47	0.49	0.52	0.54	0.57

Study	Study Time	Session Time	OL Status	Lavg Meter1	Lpk Meter1	Lmax Meter1	Lmin Meter1	Lavg Meter2	Lpk Meter2	Lmax Meter2	Lmin Meter2
Study 1	0:01:00	0:01:00		60.8	86.1	68.5	53.9	60.8	86.1	68.4	53.9
	0:02:00	0:02:00		61.1	86.8	70.9	52.7	61.1	86.8	70.8	52.7
	0:03:00	0:03:00		63.4	93.3	73.7	54	63.4	93.3	73.7	54
	0:04:00	0:04:00		58.7	89.6	66.2	51.3	58.6	89.5	66.2	51.3
	0:05:00	0:05:00		61.2	84.9	70	50.9	61.2	84.9	70	50.9
	0:06:00	0:06:00		59.4	80.2	65.6	53.9	59.4	80.2	65.6	53.9
	0:07:00	0:07:00		61.8	81.7	68.1	54	61.8	81.6	68.1	54
	0:08:00	0:08:00		61	83.7	67.9	54.3	61	83.6	67.9	54.2
	0:09:00	0:09:00		60.9	84.6	71.2	52.1	60.9	84.5	71.2	52
	0:10:00	0:10:00		60.2	85.1	68.2	52	60.2	85.1	68.2	52
	0:11:00	0:11:00		64.1	89.7	76.4	53.3	64.1	89.7	76.4	53.3
	0:12:00	0:12:00		61.9	84.5	72.1	52.7	61.9	84.5	72.1	52.7
	0:13:00	0:13:00		62.7	90.1	74.5	54.2	62.7	90.1	74.5	54.2
	0:14:00	0:14:00		61.1	80.7	67.7	52.8	61.1	80.7	67.7	52.8
	0:15:00	0:15:00		60.3	81.9	68.9	52.2	60.3	81.9	68.8	52.2
	0:16:00	0:16:00		63.9	91	73.8	50.9	63.9	91	73.7	50.9
	0:17:00	0:17:00		61.6	81.7	66.6	53.3	61.6	81.7	66.5	53.3
	0:18:00	0:18:00		59.8	80	68	52.9	59.7	80	67.9	52.9
	0:19:00	0:19:00		60.8	81	66.2	53.8	60.8	81	66.2	53.7
	0:20:00	0:20:00		61.6	78.8	65.7	56	61.6	78.8	65.7	55.9
	0:21:00	0:21:00		63.3	82.5	70.6	52.9	63.3	82.5	70.6	52.9
	0:22:00	0:22:00		59.5	80.2	66.4	53.2	59.5	80.2	66.3	53.1
	0:23:00	0:23:00		63.4	87.6	73.4	53.9	63.4	87.6	73.4	53.9
	0:24:00	0:24:00		61.9	82.3	69.5	53.4	61.8	82.3	69.5	53.4
	0:25:00	0:25:00		63.8	85.9	73	53.7	63.8	85.9	73	53.6
	0:26:00	0:26:00		61.6	80.3	65.1	54.6	61.6	80.3	65.1	54.6
	0:27:00	0:27:00		60.1	78.7	65.4	53.2	60	78.7	65.4	53.2
	0:28:00	0:28:00		62.7	89.5	74.2	52.7	62.7	89.5	74.2	52.7
	0:29:00	0:29:00		65.4	86.9	74	53.5	65.4	86.9	74	53.5
	0:30:00	0:30:00		60.5	84.1	68.4	54.4	60.4	84.1	68.3	54.3
	0:31:00	0:31:00		59.9	80.7	67.4	54.1	59.8	80.7	67.3	54.1
	0:32:00	0:32:00		60.3	84.3	69	53.4	60.3	84.3	69	53.3
	0:33:00	0:33:00		60.5	86.3	68.7	52.8	60.5	86.3	68.6	52.7
	0:34:00	0:34:00		57.6	74.7	62	53.4	57.5	74.6	62	53.4
	0:35:00	0:35:00		58	80.5	66.3	53.7	58	80.5	66.2	53.7
	0:36:00	0:36:00		63	83.8	69.2	56.6	62.9	83.7	69.1	56.6
	0:37:00	0:37:00		60.2	79.6	67.5	51.2	60.1	79.6	67.5	51.2
	0:38:00	0:38:00		58.8	81.5	68.4	50.7	58.8	81.5	68.4	50.6
	0:39:00	0:39:00		59.3	82.2	68	52.2	59.3	82.2	68	52.1
	0:40:00	0:40:00		62.6	82	69.6	56.3	62.6	82	69.6	56.3
	0:41:00	0:41:00		61.4	83.2	69.7	53.6	61.4	83.2	69.6	53.6
	0:42:00	0:42:00		59.7	84.3	68.5	52.5	59.7	84.2	68.5	52.5
	0:43:00	0:43:00		60.4	82.5	68.4	54.8	60.3	82.5	68.4	54.7
	0:44:00	0:44:00		61.2	82.3	68.8	53.4	61.1	82.3	68.8	53.4
	0:45:00	0:45:00		62.9	83.7	69.8	55	62.9	83.6	69.8	55
	0:46:00	0:46:00		62.6	84.4	71.4	52.5	62.6	84.4	71.3	52.5
	0:47:00	0:47:00		62.2	85.4	68.5	56.1	62.1	85.3	68.4	56.1
	0:48:00	0:48:00		61.5	81.1	67.7	55.4	61.5	81.1	67.6	55.4
	0:49:00	0:49:00		61.9	82.4	69.2	54.9	61.8	82.3	69.1	54.9
	0:50:00	0:50:00		63.4	87.1	73.2	56.5	63.4	87	73.2	56.4
	0:51:00	0:51:00		57.3	73.8	61.4	55	57.3	73.8	61.4	55
	0:52:00	0:52:00		63.3	87	73.6	55.3	63.3	86.9	73.6	55.3
	0:53:00	0:53:00		60.5	78.5	65.9	56.5	60.4	78.4	65.9	56.5
	0:54:00	0:54:00		62.4	81.7	68	55.3	62.4	81.7	68	55.3
	0:55:00	0:55:00		59.5	77.9	65.2	54.6	59.4	77.9	65.2	54.6
	0:56:00	0:56:00		61.3	81.7	68.6	56.7	61.2	81.7	68.6	56.7
	0:57:00	0:57:00		60.2	78.2	65.5	55	60.2	78.2	65.4	55
	0:58:00	0:58:00		60.1	84.1	70.9	52.7	60.1	84.1	70.9	52.7
	0:59:00	0:59:00		61	81.1	68.3	54.6	61	81.1	68.3	54.6
	1:00:00	1:00:00		60.3	79.9	67	54.8	60.2	79.9	67	54.7
	1:01:00	1:01:00		58.8	78.9	65.7	53.7	58.7	78.9	65.6	53.7
	1:02:00	1:02:00		62.4	80.7	67.1	54.1	62.4	80.7	67.1	54
	1:03:00	1:03:00		62.1	85.7	72.8	53.6	62.1	85.6	72.8	53.5
	1:04:00	1:04:00		58.2	81.2	65.1	51.6	58.1	81.2	65.1	51.6
	1:05:00	1:05:00		59.1	78.7	65.5	54.7	59.1	78.6	65.4	54.7
	1:06:00	1:06:00		61.2	79.6	66.7	53.5	61.2	79.6	66.6	53.5
	1:07:00	1:07:00		63.4	87.8	73.2	55.5	63.4	87.7	73.1	55.4
	1:08:00	1:08:00		58.3	80.1	64	54.7	58.2	80.1	64	54.7

Average L_{eq} (1 Hour)
62.7

Peak L_{eq} (1 Hour)
70.4

L_{dn}
66.6

CNEL
67.2

L₁₀
63.9

1:09:00	1:09:00	63.7	84.5	73.2	57	63.7	84.5	73.2	57
1:10:00	1:10:00	62.9	80.7	68.2	56.9	62.8	80.6	68.1	56.9
1:11:00	1:11:00	63.9	86.9	72.6	57	63.8	86.9	72.6	57
1:12:00	1:12:00	62.8	87	72.8	54.2	62.8	86.9	72.8	54.1
1:13:00	1:13:00	58.1	77	65.1	54	58.1	77	65.1	54
1:14:00	1:14:00	59.6	78.3	65	53.3	59.6	78.3	65	53.3
1:15:00	1:15:00	58.5	77	64.4	54.9	58.4	77	64.4	54.9
1:16:00	1:16:00	61.3	81.2	66.1	52.2	61.2	81.1	66.1	52.2
1:17:00	1:17:00	61.8	82.6	68.5	55.6	61.8	82.6	68.5	55.6
1:18:00	1:18:00	64.4	84.4	71.9	57	64.4	84.4	71.9	57
1:19:00	1:19:00	72	95.6	82.1	55	72	95.6	82.1	55
1:20:00	1:20:00	58.7	80.8	67.4	52.8	58.6	80.7	67.4	52.7
1:21:00	1:21:00	59.7	78.5	67.5	53	59.7	78.5	67.5	53
1:22:00	1:22:00	60.7	80.5	68.1	53.1	60.7	80.4	68	53.1
1:23:00	1:23:00	63.4	85.1	72.2	50.8	63.3	85	72.1	50.8
1:24:00	1:24:00	62.1	82	69.4	52.9	62.1	82	69.3	52.9
1:25:00	1:25:00	61.6	82	67.8	56.1	61.6	82	67.8	56.1
1:26:00	1:26:00	59.5	81	65.3	52.1	59.5	80.9	65.3	52.1
1:27:00	1:27:00	60.6	82.4	68.7	51.6	60.6	82.4	68.7	51.5
1:28:00	1:28:00	56.9	74.3	59.9	53.1	56.9	74.3	59.8	53.1
1:29:00	1:29:00	62.6	85.1	71.5	53	62.6	85	71.5	53
1:30:00	1:30:00	58.9	77.9	63.9	53.8	58.8	77.9	63.8	53.8
1:31:00	1:31:00	59.4	78.1	65.2	54.2	59.3	78.1	65.2	54.1
1:32:00	1:32:00	61.8	84.2	69.9	53.2	61.8	84.2	69.9	53.2
1:33:00	1:33:00	62.4	84.3	71	55.3	62.4	84.3	71	55.2
1:34:00	1:34:00	58.3	75.3	62.8	51.8	58.3	75.3	62.8	51.8
1:35:00	1:35:00	62.6	85.9	71.6	54.3	62.6	85.9	71.6	54.3
1:36:00	1:36:00	62.4	86.4	72.8	53.1	62.4	86.4	72.7	53.1
1:37:00	1:37:00	57.6	78.9	65	51.4	57.6	78.8	65	51.3
1:38:00	1:38:00	61.5	84.6	69.2	54	61.5	84.6	69.1	54
1:39:00	1:39:00	61.5	80.6	67.8	54.2	61.5	80.6	67.8	54.2
1:40:00	1:40:00	60.2	80.3	66.7	52.2	60.2	80.3	66.7	52.2
1:41:00	1:41:00	60.3	84.7	68.6	51.6	60.2	84.6	68.6	51.5
1:42:00	1:42:00	64.7	87.6	71.5	55.5	64.7	87.5	71.5	55.5
1:43:00	1:43:00	60.2	80	66	55.5	60.1	80	66	55.5
1:44:00	1:44:00	58.3	79.3	64.4	53.7	58.2	79.3	64.4	53.7
1:45:00	1:45:00	61.3	82.8	67.4	53.3	61.3	82.8	67.4	53.3
1:46:00	1:46:00	70.5	99.5	84	51.5	70.4	99.5	83.9	51.5
1:47:00	1:47:00	58.3	79.9	65.9	51.1	58.2	79.9	65.9	51.1
1:48:00	1:48:00	59.3	80.4	67.2	52.7	59.3	80.3	67.2	52.7
1:49:00	1:49:00	63.1	87.5	71.7	53.6	63.1	87.5	71.7	53.6
1:50:00	1:50:00	64.2	84	70	53.4	64.2	84	70	53.4
1:51:00	1:51:00	58.4	78.6	65.7	53.3	58.4	78.6	65.7	53.3
1:52:00	1:52:00	62.3	85.5	72.8	52.7	62.3	85.5	72.7	52.7
1:53:00	1:53:00	63	89.8	72.4	52.3	63	89.8	72.4	52.3
1:54:00	1:54:00	58.8	82.1	66.4	52.8	58.7	82	66.4	52.8
1:55:00	1:55:00	60.3	82	68.2	51.9	60.2	81.9	68.2	51.8
1:56:00	1:56:00	62.1	81.1	68.4	51.9	62.1	81	68.4	51.8
1:57:00	1:57:00	62.4	86.6	72.5	53.1	62.3	86.6	72.5	53
1:58:00	1:58:00	60.2	80.2	71	53.3	60.2	80.2	71	53.3
1:59:00	1:59:00	66	93.7	79.6	55.6	66	93.6	79.5	55.6
2:00:00	2:00:00	60.7	79.7	74.9	51.1	60.7	79.7	74.8	51
2:01:00	2:01:00	60.9	84	68.1	51	60.9	84	68.1	51
2:02:00	2:02:00	61.1	82.3	69.3	53.7	61.1	82.2	69.3	53.7
2:03:00	2:03:00	61.7	82	68.4	53.4	61.7	82	68.4	53.4
2:04:00	2:04:00	61.4	81.1	67.6	53.3	61.4	81	67.6	53.3
2:05:00	2:05:00	58.5	78.4	65.2	51.7	58.5	78.3	65.2	51.6
2:06:00	2:06:00	61.8	86.2	71.8	52.6	61.8	86.2	71.8	52.6
2:07:00	2:07:00	62.2	86.6	70	55.8	62.2	86.5	70	55.8
2:08:00	2:08:00	61.7	83.8	69.7	56.4	61.7	83.8	69.7	56.4
2:09:00	2:09:00	60.6	82.2	68.2	54.7	60.6	82.1	68.2	54.7
2:10:00	2:10:00	60.6	81.2	67.7	53.9	60.6	81.2	67.6	53.9
2:11:00	2:11:00	65.3	88	74.2	54.4	65.2	88	74.2	54.4
2:12:00	2:12:00	58.7	83.3	66.2	54.2	58.7	83.3	66.2	54.2
2:13:00	2:13:00	59.7	81.2	67.4	53	59.7	81.2	67.4	52.9
2:14:00	2:14:00	60.1	79.1	66.2	52.8	60.1	79	66.2	52.8
2:15:00	2:15:00	60.5	83.9	68.6	50.7	60.5	83.9	68.6	50.7
2:16:00	2:16:00	58.6	82.3	66.8	52.1	58.6	82.3	66.7	52.1
2:17:00	2:17:00	62.4	85.1	69.4	55.2	62.4	85.1	69.4	55.2
2:18:00	2:18:00	59.9	81.1	68.7	51.3	59.8	81.1	68.7	51.3
2:19:00	2:19:00	59.5	80.9	67.1	52.4	59.5	80.9	67	52.4

2:20:00	2:20:00	60.9	81.5	66.7	53.6	60.8	81.4	66.7	53.6
2:21:00	2:21:00	62.3	80.9	67.8	53.9	62.3	80.9	67.8	53.9
2:22:00	2:22:00	59.9	79.6	66.6	55.2	59.9	79.6	66.6	55.2
2:23:00	2:23:00	62.7	86.1	71.4	53.8	62.6	86.1	71.4	53.8
2:24:00	2:24:00	57.5	77.2	64.2	52	57.4	77.1	64.2	52
2:25:00	2:25:00	59.8	82.9	66.5	52.7	59.8	82.9	66.5	52.7
2:26:00	2:26:00	60.6	82.9	69.6	54	60.6	82.9	69.6	54
2:27:00	2:27:00	62	83.3	69	53.5	62	83.3	69	53.5
2:28:00	2:28:00	61.1	82.9	70	54.9	61.1	82.9	70	54.9
2:29:00	2:29:00	59	80.9	68	51.8	59	80.9	68	51.8
2:30:00	2:30:00	61	82.7	69.3	52.4	61	82.7	69.3	52.3
2:31:00	2:31:00	60.5	84.4	70.8	52.1	60.5	84.4	70.8	52
2:32:00	2:32:00	58.1	79.9	66.4	51.5	58.1	79.9	66.4	51.5
2:33:00	2:33:00	59.1	79	66.8	53.9	59.1	79	66.7	53.9
2:34:00	2:34:00	59.2	81.1	66.9	52.9	59.1	81.1	66.9	52.8
2:35:00	2:35:00	60.4	81.8	67.1	56	60.4	81.8	67.1	56
2:36:00	2:36:00	57.3	80	66.5	51.6	57.3	80	66.4	51.5
2:37:00	2:37:00	61.3	82.8	69.2	53.9	61.3	82.8	69.2	53.9
2:38:00	2:38:00	61.1	89.9	73.9	50.7	61.1	89.8	73.9	50.7
2:39:00	2:39:00	61.7	86.8	70.8	51.9	61.7	86.8	70.8	51.9
2:40:00	2:40:00	61	82	68.2	55.4	60.9	82	68.1	55.4
2:41:00	2:41:00	58.2	79.3	66	53.4	58.2	79.3	66	53.4
2:42:00	2:42:00	64.3	86.4	73.2	54.9	64.2	86.4	73.2	54.9
2:43:00	2:43:00	67.8	90.1	76.2	54.2	67.8	90.1	76.1	54.2
2:44:00	2:44:00	61.7	82.8	69.8	54.6	61.7	82.7	69.8	54.6
2:45:00	2:45:00	59.2	76.8	69.1	53.1	59.1	76.8	69.1	53
2:46:00	2:46:00	63.6	85.4	72.4	54.1	63.5	85.4	72.4	54
2:47:00	2:47:00	60.4	81.1	67.7	50.1	60.4	81.1	67.7	50.1
2:48:00	2:48:00	59.5	81	66.2	50.8	59.5	81	66.2	50.8
2:49:00	2:49:00	60.8	82.9	70.2	53.2	60.7	82.9	70.2	53.1
2:50:00	2:50:00	64.3	89.1	74.6	55.5	64.3	89.1	74.6	55.4
2:51:00	2:51:00	58.6	79	65.6	51.2	58.6	79	65.5	51.1
2:52:00	2:52:00	62.1	83.3	69.1	52.6	62.1	83.3	69.1	52.6
2:53:00	2:53:00	60.4	79.1	65.5	53	60.3	79.1	65.5	52.9
2:54:00	2:54:00	60.8	83.2	68.6	54	60.8	83.2	68.6	53.9
2:55:00	2:55:00	61.5	84.1	69.3	54.2	61.5	84.1	69.3	54.2
2:56:00	2:56:00	61.7	84	69.5	55.8	61.7	83.9	69.5	55.8
2:57:00	2:57:00	61.4	81.3	68.8	53.4	61.4	81.3	68.8	53.4
2:58:00	2:58:00	60.1	80	66.4	52.3	60	80	66.3	52.3
2:59:00	2:59:00	59.3	80.8	65.8	52.7	59.2	80.8	65.8	52.7
3:00:00	3:00:00	60.3	82.2	67.9	51.3	60.2	82.2	67.8	51.3
3:01:00	3:01:00	61.3	81.8	68.7	50	61.3	81.8	68.7	50
3:02:00	3:02:00	59.6	80.1	65.2	52.2	59.6	80.1	65.2	52.2
3:03:00	3:03:00	57.9	77.5	64	53.1	57.9	77.5	64	53.1
3:04:00	3:04:00	60.4	82.3	67.5	52.9	60.4	82.3	67.5	52.9
3:05:00	3:05:00	57.3	79.6	66.1	50.9	57.3	79.6	66.1	50.9
3:06:00	3:06:00	57.9	78.2	65.8	52.7	57.8	78.2	65.8	52.7
3:07:00	3:07:00	57.9	79.5	65.5	52.4	57.9	79.5	65.4	52.4
3:08:00	3:08:00	59.9	80.6	67.4	53.1	59.9	80.6	67.4	53.1
3:09:00	3:09:00	58.5	77.8	64.1	53.3	58.5	77.8	64.1	53.2
3:10:00	3:10:00	61.9	81.8	67.4	53.8	61.9	81.8	67.4	53.8
3:11:00	3:11:00	58.5	79.1	65.7	52.3	58.5	79.1	65.7	52.2
3:12:00	3:12:00	59.1	79.3	65.5	52.3	59	79.3	65.5	52.3
3:13:00	3:13:00	59.1	80.9	67.4	51.7	59.1	80.8	67.4	51.6
3:14:00	3:14:00	59.2	79.5	66.2	53.1	59.2	79.5	66.2	53.1
3:15:00	3:15:00	60	81.5	66.3	54.8	60	81.4	66.3	54.8
3:16:00	3:16:00	59.5	84.1	68.8	52.6	59.5	84.1	68.8	52.6
3:17:00	3:17:00	62	82	68.6	55.7	62	82	68.5	55.6
3:18:00	3:18:00	59.6	79.2	66.1	53.1	59.6	79.2	66.1	53.1
3:19:00	3:19:00	58.6	81.4	66.8	52.6	58.5	81.4	66.8	52.6
3:20:00	3:20:00	58.2	80.4	67.1	54.8	58.2	80.3	67.1	54.8
3:21:00	3:21:00	60.9	78.4	66.3	52	60.9	78.3	66.2	52
3:22:00	3:22:00	60.9	80.5	67.2	50.2	60.9	80.5	67.2	50.2
3:23:00	3:23:00	60.2	82.3	68.9	52.2	60.2	82.3	68.9	52.2
3:24:00	3:24:00	60.9	78.1	65.2	53.6	60.9	78.1	65.2	53.6
3:25:00	3:25:00	60.4	83.4	70.2	53.7	60.3	83.4	70.2	53.6
3:26:00	3:26:00	58.7	78.4	65.2	53.8	58.7	78.4	65.2	53.8
3:27:00	3:27:00	60.9	83.1	69.8	53	60.9	83.1	69.8	53
3:28:00	3:28:00	63.5	87	71.5	53.1	63.5	87	71.4	53
3:29:00	3:29:00	61.4	80.9	67.3	53.5	61.4	80.9	67.3	53.5
3:30:00	3:30:00	61.1	80.8	67.2	55.3	61.1	80.8	67.1	55.2
3:31:00	3:31:00	61.5	81.3	68.7	53	61.5	81.3	68.7	53
3:32:00	3:32:00	63.2	85.1	69.7	55.4	63.2	85.1	69.7	55.4
3:33:00	3:33:00	63	89	71.7	52.5	63	88.9	71.7	52.5
3:34:00	3:34:00	62.2	88.6	71.8	52.2	62.1	88.6	71.7	52.2
3:35:00	3:35:00	59.7	79.6	65.7	52.8	59.6	79.5	65.7	52.8
3:36:00	3:36:00	56.3	76.9	63	52.5	56.3	76.9	62.9	52.5
3:37:00	3:37:00	57.5	77	62.7	53	57.5	77	62.7	52.9

3:38:00	3:38:00	61.9	88.3	74.2	52.5	61.9	88.2	74.1	52.4
3:39:00	3:39:00	59.4	79.3	66.1	50.2	59.4	79.2	66	50.2
3:40:00	3:40:00	61	83.1	69.5	50.6	61	83.1	69.5	50.5
3:41:00	3:41:00	62.1	82.4	70.4	52.8	62.1	82.3	70.4	52.8
3:42:00	3:42:00	62.7	84.6	72.6	52.2	62.6	84.6	72.6	52.2
3:43:00	3:43:00	59.5	80.9	66.8	52.9	59.5	80.9	66.8	52.9
3:44:00	3:44:00	63.7	89.4	75.3	53.9	63.7	89.3	75.2	53.8
3:45:00	3:45:00	60.4	82.2	69	52.3	60.4	82.2	68.9	52.3
3:46:00	3:46:00	60.8	85.1	69.1	53.8	60.8	85.1	69.1	53.8
3:47:00	3:47:00	63.3	88.4	74.4	51.8	63.2	88.3	74.4	51.7
3:48:00	3:48:00	58.7	80.1	64.2	53.6	58.7	80.1	64.2	53.6
3:49:00	3:49:00	62.5	86.3	71.4	54.7	62.5	86.2	71.4	54.7
3:50:00	3:50:00	59.2	79.9	64.7	51.1	59.2	79.9	64.6	51.1
3:51:00	3:51:00	58.7	78.4	65.5	52.8	58.7	78.4	65.5	52.8
3:52:00	3:52:00	63.2	85.2	69	55.1	63.2	85.2	69	55.1
3:53:00	3:53:00	57.3	78.9	64.4	52.3	57.3	78.8	64.4	52.3
3:54:00	3:54:00	62.8	86	73.1	52.3	62.8	86	73.1	52.3
3:55:00	3:55:00	60.7	82.8	69.1	52.7	60.6	82.7	69	52.6
3:56:00	3:56:00	62.1	85.9	71.6	53.9	62.1	85.8	71.6	53.8
3:57:00	3:57:00	59.3	81.6	64.9	53.6	59.3	81.5	64.8	53.6
3:58:00	3:58:00	58.5	80.1	66	52.3	58.5	80.1	66	52.3
3:59:00	3:59:00	62.1	83.3	66.8	53.8	62	83.2	66.8	53.7
4:00:00	4:00:00	67.4	90.7	76.9	53	67.4	90.6	76.9	53
4:01:00	4:01:00	58.7	78.2	63.8	53.6	58.7	78.2	63.8	53.6
4:02:00	4:02:00	61.7	82.9	68.4	56	61.7	82.9	68.4	56
4:03:00	4:03:00	58.9	78.5	65.4	54.2	58.9	78.5	65.4	54.2
4:04:00	4:04:00	61.9	82	68.8	55.1	61.9	82	68.8	55.1
4:05:00	4:05:00	64.1	85.2	71.6	52.3	64.1	85.2	71.5	52.3
4:06:00	4:06:00	61.4	82.2	68.2	54.3	61.3	82.2	68.2	54.3
4:07:00	4:07:00	59.9	81.9	67.9	53.4	59.9	81.9	67.9	53.4
4:08:00	4:08:00	59.4	80.9	67.2	53.5	59.4	80.9	67.2	53.4
4:09:00	4:09:00	59.9	83.6	65	55.1	59.9	83.6	64.9	55.1
4:10:00	4:10:00	56.3	82.2	68.1	51	56.3	82.2	68.1	51
4:11:00	4:11:00	61.5	80.6	68.2	54.6	61.5	80.6	68.1	54.5
4:12:00	4:12:00	59.6	81.3	67.3	54.5	59.6	81.3	67.2	54.4
4:13:00	4:13:00	61.8	83.1	68.9	54.2	61.8	83.1	68.8	54.2
4:14:00	4:14:00	59.9	82.6	67.7	53.5	59.9	82.5	67.7	53.4
4:15:00	4:15:00	60.8	84.7	70.8	52.5	60.8	84.7	70.8	52.5
4:16:00	4:16:00	62.3	81.5	66.8	55.7	62.2	81.4	66.7	55.7
4:17:00	4:17:00	62	82.3	68.5	54.8	62	82.2	68.5	54.8
4:18:00	4:18:00	64.1	86.7	72.1	56.2	64.1	86.7	72.1	56.2
4:19:00	4:19:00	61.2	81.7	68.3	54.7	61.2	81.6	68.3	54.7
4:20:00	4:20:00	63.1	85.2	71.8	52.2	63.1	85.2	71.8	52.1
4:21:00	4:21:00	60.2	79.5	65.9	52.6	60.1	79.5	65.8	52.5
4:22:00	4:22:00	61.1	81.9	67.2	54.4	61.1	81.9	67.2	54.3
4:23:00	4:23:00	63.6	94.4	76.9	55.5	63.6	94.4	76.9	55.5
4:24:00	4:24:00	62.2	83.9	76.5	53.6	62.2	83.9	76.4	53.5
4:25:00	4:25:00	64.6	85.7	72.3	54.5	64.6	85.6	72.3	54.5
4:26:00	4:26:00	59	82	68.3	54.2	59	82	68.3	54.2
4:27:00	4:27:00	64.8	90.4	75.7	52.2	64.8	90.4	75.7	52.1
4:28:00	4:28:00	61.5	82.1	68	54.7	61.5	82.1	68	54.7
4:29:00	4:29:00	60.8	83.2	68.2	54.8	60.8	83.1	68.2	54.7
4:30:00	4:30:00	62.3	84.3	70.4	51.8	62.3	84.3	70.4	51.7
4:31:00	4:31:00	62.2	82.4	70.9	52.6	62.2	82.4	70.9	52.6
4:32:00	4:32:00	65.2	90.4	73.7	54.9	65.2	90.3	73.6	54.9
4:33:00	4:33:00	60.9	80.7	66.7	55.4	60.8	80.7	66.7	55.4
4:34:00	4:34:00	60.5	82.3	68.2	52.9	60.4	82.3	68.2	52.8
4:35:00	4:35:00	59.3	84.4	66.1	55.2	59.3	84.4	66.1	55.2
4:36:00	4:36:00	63.6	83.5	70.1	54.2	63.6	83.5	70.1	54.2
4:37:00	4:37:00	61.1	82.3	69	54.8	61.1	82.3	69	54.8
4:38:00	4:38:00	59.6	79.6	67.4	53.2	59.6	79.6	67.4	53.2
4:39:00	4:39:00	61.1	80.1	66.4	55.5	61	80.1	66.4	55.5
4:40:00	4:40:00	63.8	89.7	69.2	57.6	63.8	89.7	69.1	57.6
4:41:00	4:41:00	61.6	82.1	68.8	55.2	61.6	82.1	68.8	55.2
4:42:00	4:42:00	63.1	81.3	69.2	55.6	63.1	81.3	69.1	55.6
4:43:00	4:43:00	62.9	82.4	70.4	53.4	62.9	82.4	70.4	53.4
4:44:00	4:44:00	57	78.7	65	54.3	56.9	78.7	65	54.3
4:45:00	4:45:00	60.3	86.1	68	54.9	60.3	86	68	54.9
4:46:00	4:46:00	62.4	85.2	69.8	56.5	62.4	85.2	69.8	56.4
4:47:00	4:47:00	58.6	79.7	65.4	52.5	58.5	79.7	65.4	52.5
4:48:00	4:48:00	62.4	88.1	71.4	55.9	62.4	88.1	71.4	55.9
4:49:00	4:49:00	62.6	86.4	72	53.3	62.5	86.4	72	53.3
4:50:00	4:50:00	62.2	83.5	69.2	52	62.2	83.5	69.2	52
4:51:00	4:51:00	64.7	84	70	55.3	64.7	84	70	55.2
4:52:00	4:52:00	64.3	86.2	73.5	57.8	64.3	86.2	73.5	57.8
4:53:00	4:53:00	62.9	80.9	68.7	56.3	62.9	80.9	68.7	56.3
4:54:00	4:54:00	64.1	87.5	74.5	55.9	64.1	87.5	74.4	55.9
4:55:00	4:55:00	60.2	80.1	66.3	52.5	60.1	80.1	66.3	52.5

4:56:00	4:56:00	62.6	84.6	69.8	54.8	62.5	84.6	69.8	54.8
4:57:00	4:57:00	59.7	77.6	65	54.3	59.7	77.6	65	54.3
4:58:00	4:58:00	62	80.4	67.4	54.9	62	80.4	67.4	54.9
4:59:00	4:59:00	59.3	79.8	66.6	55	59.3	79.8	66.6	54.9
5:00:00	5:00:00	63.3	83.4	68.6	54.6	63.3	83.4	68.6	54.6
5:01:00	5:01:00	59.6	80.5	66.1	53.3	59.5	80.5	66.1	53.3
5:02:00	5:02:00	56.9	79.8	64.7	52.9	56.9	79.8	64.7	52.9
5:03:00	5:03:00	61.3	83.9	68.2	53.6	61.3	83.9	68.2	53.6
5:04:00	5:04:00	62.7	88	73.2	54.1	62.7	88	73.2	54
5:05:00	5:05:00	63	84.6	69.3	55.5	63	84.5	69.3	55.5
5:06:00	5:06:00	62.2	84.4	70.9	55.3	62.2	84.4	70.8	55.3
5:07:00	5:07:00	61.3	82.7	69.2	54.3	61.2	82.7	69.1	54.3
5:08:00	5:08:00	62.5	84.7	70.2	54.1	62.4	84.7	70.2	54.1
5:09:00	5:09:00	62.4	85.9	71	53.5	62.4	85.8	70.9	53.5
5:10:00	5:10:00	65.6	92.9	74.1	54.5	65.5	92.8	74.1	54.4
5:11:00	5:11:00	62	86.5	70.2	54.6	62	86.5	70.2	54.6
5:12:00	5:12:00	63.6	84.5	70.8	54.5	63.6	84.5	70.7	54.5
5:13:00	5:13:00	60.8	82	68.2	54.6	60.8	81.9	68.2	54.6
5:14:00	5:14:00	62.3	85	70.2	56	62.3	85	70.2	56
5:15:00	5:15:00	62.6	87.2	69.3	52.8	62.6	87.2	69.2	52.7
5:16:00	5:16:00	59.2	79.8	66	54	59.2	79.8	66	54
5:17:00	5:17:00	61.2	81.5	66.8	56.4	61.1	81.5	66.8	56.4
5:18:00	5:18:00	62.4	83.4	70	57.2	62.4	83.3	69.9	57.2
5:19:00	5:19:00	61	82	68	53.5	61	82	68	53.5
5:20:00	5:20:00	64	86.6	72.3	54.5	64	86.6	72.2	54.5
5:21:00	5:21:00	58.2	77.6	64.6	53.7	58.2	77.6	64.6	53.7
5:22:00	5:22:00	60.2	82.4	67.5	52.3	60.2	82.4	67.5	52.3
5:23:00	5:23:00	63.6	85.6	73.2	53	63.6	85.5	73.1	53
5:24:00	5:24:00	63.4	83.7	70.9	56	63.4	83.7	70.9	56
5:25:00	5:25:00	62.7	83.3	68.5	53.7	62.7	83.3	68.5	53.7
5:26:00	5:26:00	60.8	80.4	66.4	56.2	60.8	80.4	66.4	56.1
5:27:00	5:27:00	62	81.6	68	55.2	62	81.6	68	55.1
5:28:00	5:28:00	61.9	83	70.3	54.9	61.9	83	70.3	54.8
5:29:00	5:29:00	62.8	84.3	70.2	54.2	62.7	84.3	70.2	54.2
5:30:00	5:30:00	61	82.1	67.1	56.1	61	82.1	67.1	56
5:31:00	5:31:00	58.5	79.7	66	54.2	58.4	79.7	66	54.1
5:32:00	5:32:00	62.7	83.3	69.5	55.5	62.6	83.3	69.5	55.5
5:33:00	5:33:00	60.5	79.1	66.3	53	60.5	79	66.3	52.9
5:34:00	5:34:00	62.6	86.8	73.8	53.3	62.6	86.8	73.8	53.3
5:35:00	5:35:00	61.5	81.9	68.7	56	61.4	81.8	68.6	56
5:36:00	5:36:00	65.3	88.9	74.5	56.3	65.3	88.9	74.4	56.3
5:37:00	5:37:00	61.3	83.4	69.4	56.1	61.2	83.4	69.4	56.1
5:38:00	5:38:00	62.1	80.6	67.6	57.6	62.1	80.6	67.6	57.6
5:39:00	5:39:00	61.5	82.1	68.5	54.3	61.5	82.1	68.5	54.3
5:40:00	5:40:00	60.3	86.7	69.6	50.4	60.3	86.7	69.5	50.4
5:41:00	5:41:00	87.2	114.2	101.5	55.8	87.2	114.1	101.4	55.8
5:42:00	5:42:00	63.3	83.2	69.3	55.7	63.3	83.2	69.2	55.6
5:43:00	5:43:00	59.2	80.8	67	53.2	59.2	80.8	67	53.1
5:44:00	5:44:00	61.2	81.4	67.2	55	61.2	81.3	67.2	55
5:45:00	5:45:00	61.2	84.4	70.8	54.2	61.2	84.4	70.8	54.2
5:46:00	5:46:00	60.2	83	66.8	53.5	60.1	83	66.8	53.5
5:47:00	5:47:00	60.1	81.8	67.5	52.7	60	81.7	67.5	52.7
5:48:00	5:48:00	59.9	81.4	65.7	54.5	59.9	81.4	65.7	54.5
5:49:00	5:49:00	61.4	82.9	68.4	55.6	61.4	82.8	68.4	55.5
5:50:00	5:50:00	61	82	68.1	52.3	61	82	68.1	52.3
5:51:00	5:51:00	67.7	94	80.4	56.5	67.7	93.9	80.4	56.5
5:52:00	5:52:00	72.7	93.4	80.8	58.9	72.7	93.3	80.7	58.9
5:53:00	5:53:00	59.8	80.1	66.1	53.9	59.8	80.1	66.1	53.9
5:54:00	5:54:00	62.3	82.8	67.9	54	62.3	82.8	67.9	54
5:55:00	5:55:00	63	83.9	69.8	55	62.9	83.9	69.8	55
5:56:00	5:56:00	64.4	87.7	74.7	55.1	64.4	87.7	74.6	55.1
5:57:00	5:57:00	61.8	82.8	69.8	54.8	61.8	82.8	69.8	54.8
5:58:00	5:58:00	63.4	84.6	70.9	56.4	63.4	84.5	70.8	56.3
5:59:00	5:59:00	59.9	82.1	67.3	54.7	59.9	82.1	67.3	54.7
6:00:00	6:00:00	65.8	88.5	74.3	54.5	65.8	88.5	74.2	54.4
6:01:00	6:01:00	63.7	90.4	76	54.6	63.7	90.4	76	54.6
6:02:00	6:02:00	62.8	83.6	72.3	54.5	62.8	83.6	72.3	54.5
6:03:00	6:03:00	66	86.2	72.9	55.1	66	86.2	72.9	55.1
6:04:00	6:04:00	62.8	81.4	67.2	56.9	62.8	81.4	67.1	56.9
6:05:00	6:05:00	60.6	81.3	67.2	52.3	60.6	81.3	67.2	52.3
6:06:00	6:06:00	60.4	81	67.6	54.7	60.3	81	67.6	54.6
6:07:00	6:07:00	61.8	81	68.4	55.6	61.8	80.9	68.3	55.6
6:08:00	6:08:00	61.8	90.2	70.9	53.1	61.8	90.2	70.9	53
6:09:00	6:09:00	59	82.2	67.2	53.8	59	82.1	67.2	53.8
6:10:00	6:10:00	62.6	82.7	68.1	56.8	62.6	82.7	68.1	56.8
6:11:00	6:11:00	61.2	81.8	68.7	55.2	61.2	81.8	68.6	55.2
6:12:00	6:12:00	60	79	66.5	54.3	60	79	66.5	54.2
6:13:00	6:13:00	62	86.6	68.9	53.4	62	86.6	68.8	53.4

6:14:00	6:14:00	63.3	83.5	71.1	58	63.3	83.5	71.1	58
6:15:00	6:15:00	58.6	76.7	63.6	53.4	58.5	76.7	63.6	53.4
6:16:00	6:16:00	63.2	85.4	70.8	51.9	63.2	85.3	70.8	51.9
6:17:00	6:17:00	60.5	80.2	66.5	54.2	60.5	80.1	66.5	54.2
6:18:00	6:18:00	61.4	81.9	68.8	51.4	61.4	81.9	68.8	51.3
6:19:00	6:19:00	62.1	81.6	69.2	55.8	62.1	81.6	69.2	55.8
6:20:00	6:20:00	62.1	80.3	68.6	53.9	62.1	80.3	68.6	53.9
6:21:00	6:21:00	61.8	86.8	68.7	54.7	61.8	86.7	68.7	54.7
6:22:00	6:22:00	60.4	80.7	67.7	54.6	60.4	80.7	67.6	54.6
6:23:00	6:23:00	61.8	85.8	68.2	54.8	61.7	85.7	68.2	54.8
6:24:00	6:24:00	60.3	80.2	67.3	55.2	60.3	80.2	67.2	55.2
6:25:00	6:25:00	63.8	84.9	70.2	55.7	63.8	84.9	70.2	55.7
6:26:00	6:26:00	59.9	85.4	68.2	53	59.8	85.3	68.1	53
6:27:00	6:27:00	62.4	86.2	71.5	55.8	62.4	86.2	71.5	55.8
6:28:00	6:28:00	62.4	82.8	68.7	56.3	62.3	82.8	68.7	56.3
6:29:00	6:29:00	64.8	91	76.2	54.3	64.8	91	76.2	54.2
6:30:00	6:30:00	63.3	84.8	69.9	57.7	63.3	84.8	69.9	57.7
6:31:00	6:31:00	65	85	71.3	55.4	65	84.9	71.3	55.3
6:32:00	6:32:00	62.5	82.3	68.9	55.9	62.5	82.3	68.9	55.8
6:33:00	6:33:00	62	82.6	69	52.7	62	82.6	68.9	52.7
6:34:00	6:34:00	60.2	80.7	67	54.6	60.1	80.7	67	54.6
6:35:00	6:35:00	63.5	83.2	69.7	57.7	63.5	83.2	69.6	57.6
6:36:00	6:36:00	59.7	80.3	66.2	54	59.7	80.3	66.2	54
6:37:00	6:37:00	61	77.5	65.1	56.4	61	77.5	65.1	56.3
6:38:00	6:38:00	60.8	82.7	69.1	55.1	60.7	82.7	69	55.1
6:39:00	6:39:00	62.6	84.4	70.7	56.3	62.5	84.4	70.7	56.2
6:40:00	6:40:00	62.5	84.3	70.7	55	62.5	84.2	70.7	55
6:41:00	6:41:00	64.7	91.1	77	55.8	64.7	91.1	76.9	55.8
6:42:00	6:42:00	61.5	82.5	68.8	56.7	61.5	82.5	68.8	56.7
6:43:00	6:43:00	65.6	91.8	78	55.1	65.6	91.8	78	55.1
6:44:00	6:44:00	65.4	86.6	77.4	56.2	65.4	86.5	77.4	56.2
6:45:00	6:45:00	61.1	80.8	65.9	55.3	61	80.8	65.9	55.2
6:46:00	6:46:00	64.1	85	71	57.4	64.1	85	71	57.3
6:47:00	6:47:00	61.1	82	68.8	54.1	61	82	68.8	54.1
6:48:00	6:48:00	60.1	82.2	68.2	53.3	60.1	82.2	68.2	53.3
6:49:00	6:49:00	60.6	82	68	54.6	60.5	81.9	68	54.6
6:50:00	6:50:00	61.7	81.5	68	57	61.6	81.5	68	57
6:51:00	6:51:00	59.8	82.5	68.9	54.6	59.7	82.5	68.8	54.5
6:52:00	6:52:00	59.9	77.4	64.9	55.3	59.8	77.4	64.9	55.3
6:53:00	6:53:00	59.5	86.4	69.8	52.3	59.4	86.4	69.7	52.3
6:54:00	6:54:00	61.3	84.9	70.1	53.4	61.3	84.8	70	53.4
6:55:00	6:55:00	59.3	78.6	65	54.7	59.3	78.6	65	54.6
6:56:00	6:56:00	60.6	81.9	68.5	54	60.6	81.9	68.5	54
6:57:00	6:57:00	59.7	82.8	68.5	51.8	59.6	82.8	68.5	51.8
6:58:00	6:58:00	61.1	80.1	66.4	56.9	61.1	80.1	66.4	56.9
6:59:00	6:59:00	60.8	79.4	66	56.2	60.8	79.4	66	56.1
7:00:00	7:00:00	62.9	83.9	70.6	57	62.9	83.9	70.6	57
7:01:00	7:01:00	60.8	81.3	64.8	57.7	60.8	81.3	64.8	57.6
7:02:00	7:02:00	62.9	87.7	73	53.6	62.9	87.7	73	53.6
7:03:00	7:03:00	61.7	81.8	68.1	55.2	61.7	81.8	68	55.1
7:04:00	7:04:00	62	80.5	67.7	56.8	62	80.5	67.7	56.8
7:05:00	7:05:00	64.4	84.8	72.5	55.7	64.3	84.8	72.4	55.6
7:06:00	7:06:00	70.5	94.1	79.9	54.7	70.5	94.1	79.9	54.7
7:07:00	7:07:00	60.9	81.1	68.3	53.6	60.9	81.1	68.3	53.6
7:08:00	7:08:00	61.7	89.6	69.1	55.4	61.6	89.6	69	55.4
7:09:00	7:09:00	59.8	76.2	63.4	54.7	59.7	76.2	63.3	54.7
7:10:00	7:10:00	61.7	83.3	69.8	54.8	61.7	83.3	69.8	54.8
7:11:00	7:11:00	58.9	75.7	62.6	55.8	58.8	75.7	62.5	55.8
7:12:00	7:12:00	62.5	84.3	70.5	54.6	62.4	84.3	70.5	54.6
7:13:00	7:13:00	61.2	80.5	66.6	56.2	61.2	80.5	66.6	56.1
7:14:00	7:14:00	60.1	79.8	65.7	54.4	60.1	79.7	65.7	54.4
7:15:00	7:15:00	63.1	84.5	70.2	55.6	63.1	84.5	70.2	55.6
7:16:00	7:16:00	60.1	80.7	66.7	54.2	60	80.7	66.7	54.2
7:17:00	7:17:00	63	88	73.5	54.5	63	87.9	73.5	54.5
7:18:00	7:18:00	58.7	81.8	67.2	51.3	58.6	81.8	67.2	51.2
7:19:00	7:19:00	61.5	84.6	70.7	55.3	61.5	84.6	70.7	55.3
7:20:00	7:20:00	59.9	80.8	68	55.1	59.9	80.8	68	55.1
7:21:00	7:21:00	58.9	79.8	67.2	51.5	58.9	79.8	67.2	51.5
7:22:00	7:22:00	61.1	82.4	69.7	53.4	61.1	82.3	69.6	53.4
7:23:00	7:23:00	61.3	85.7	70.6	54.4	61.3	85.7	70.5	54.4
7:24:00	7:24:00	59.1	80	65.6	53.2	59	80	65.5	53.1
7:25:00	7:25:00	64.1	91.2	77.2	51.7	64.1	91.2	77.1	51.7
7:26:00	7:26:00	60.9	85	70.8	52.3	60.9	85	70.8	52.3
7:27:00	7:27:00	60.3	79.9	67.1	53.8	60.3	79.9	67	53.8
7:28:00	7:28:00	63.6	85.8	72.4	56.9	63.6	85.8	72.4	56.9
7:29:00	7:29:00	60.7	80.6	67.5	52.1	60.7	80.6	67.5	52.1
7:30:00	7:30:00	60	81.9	65.2	53.4	60	81.8	65.2	53.4
7:31:00	7:31:00	60	77.8	64.4	55.2	60	77.8	64.3	55.2

7:32:00	7:32:00	61.3	81.5	69	54.9	61.3	81.4	69	54.8
7:33:00	7:33:00	60.6	81.1	66.2	53.9	60.6	81	66.2	53.9
7:34:00	7:34:00	64.5	88.8	75.6	54.9	64.5	88.8	75.5	54.9
7:35:00	7:35:00	60.9	83.2	70.4	53.6	60.9	83.1	70.4	53.6
7:36:00	7:36:00	58.3	78.2	64.4	52.5	58.3	78.2	64.4	52.4
7:37:00	7:37:00	61.3	82.3	68.7	54.5	61.3	82.3	68.7	54.5
7:38:00	7:38:00	69.2	96.2	81.8	55.6	69.1	96.2	81.8	55.6
7:39:00	7:39:00	61.2	83.8	67.1	54.6	61.2	83.8	67	54.6
7:40:00	7:40:00	60.1	80.8	66.7	55.3	60.1	80.7	66.7	55.3
7:41:00	7:41:00	59.8	80.7	66.7	54.1	59.7	80.6	66.7	54
7:42:00	7:42:00	59.4	80.2	67.2	55.7	59.4	80.1	67.1	55.7
7:43:00	7:43:00	60.2	81.3	68.8	52.4	60.1	81.3	68.7	52.4
7:44:00	7:44:00	60.8	80.6	68.4	55.2	60.8	80.5	68.3	55.2
7:45:00	7:45:00	65.3	90	76.1	52.1	65.3	90	76	52.1
7:46:00	7:46:00	60.6	83.4	70.1	53.1	60.6	83.3	70	53.1
7:47:00	7:47:00	59.2	78.5	65.6	52.3	59.1	78.5	65.6	52.3
7:48:00	7:48:00	63.2	86.5	72.9	52.3	63.1	86.4	72.9	52.3
7:49:00	7:49:00	54.8	72.5	59.1	51.3	54.8	72.5	59.1	51.3
7:50:00	7:50:00	59.9	81.4	67.9	53.4	59.9	81.3	67.8	53.4
7:51:00	7:51:00	60.3	83.2	68	54.2	60.3	83.2	68	54.2
7:52:00	7:52:00	61.7	86.7	70.8	53.1	61.7	86.7	70.8	53.1
7:53:00	7:53:00	62.8	83	70.1	52.9	62.7	82.9	70.1	52.9
7:54:00	7:54:00	60.2	81.1	67.5	54	60.2	81	67.5	54
7:55:00	7:55:00	62.1	82	67.4	55.1	62.1	82	67.3	55.1
7:56:00	7:56:00	58.2	81.9	67.8	53.7	58.2	81.9	67.8	53.6
7:57:00	7:57:00	61.9	82.1	69	56.4	61.8	82.1	69	56.4
7:58:00	7:58:00	60.5	82.1	67.9	55.7	60.5	82	67.9	55.6
7:59:00	7:59:00	63.4	84	70.2	53.9	63.4	84	70.2	53.9
8:00:00	8:00:00	60.9	78.3	69.6	53.1	60.9	78.3	69.6	53.1
8:01:00	8:01:00	58.8	77.9	65.4	53.4	58.8	77.9	65.4	53.4
8:02:00	8:02:00	62.8	80.9	67.1	57.6	62.8	80.9	67	57.6
8:03:00	8:03:00	61.2	79.6	65.6	56	61.2	79.6	65.5	55.9
8:04:00	8:04:00	59.3	77.9	64.4	55.2	59.2	77.9	64.4	55.2
8:05:00	8:05:00	61.2	81.8	68.7	53.8	61.2	81.8	68.7	53.8
8:06:00	8:06:00	59.5	81.2	67.9	54.9	59.5	81.2	67.9	54.9
8:07:00	8:07:00	59.2	80.7	67.2	55	59.1	80.6	67.1	54.9
8:08:00	8:08:00	63.2	84.3	69.2	55.8	63.2	84.3	69.2	55.7
8:09:00	8:09:00	62.3	90.3	75.2	53.5	62.3	90.3	75.2	53.4
8:10:00	8:10:00	70.2	94.4	80.4	53.3	70.2	94.4	80.4	53.3
8:11:00	8:11:00	59.3	78.1	64.8	52.7	59.3	78	64.8	52.7
8:12:00	8:12:00	59.6	80.1	67.3	53.4	59.6	80.1	67.3	53.4
8:13:00	8:13:00	60.9	84.1	69.3	53.2	60.9	84.1	69.3	53.2
8:14:00	8:14:00	62	83.9	69.4	55.7	61.9	83.8	69.4	55.6
8:15:00	8:15:00	62.2	82.3	68.8	54.6	62.2	82.3	68.8	54.6
8:16:00	8:16:00	58.8	77.8	67.9	53.1	58.8	77.7	67.9	53.1
8:17:00	8:17:00	59.7	86.3	71	53	59.6	86.3	71	53
8:18:00	8:18:00	61.6	82.6	68.9	55.3	61.5	82.6	68.9	55.2
8:19:00	8:19:00	63.2	85.5	71.8	56	63.2	85.5	71.8	55.9
8:20:00	8:20:00	60.6	81.9	67.9	53.8	60.6	81.9	67.9	53.8
8:21:00	8:21:00	59.4	83.8	68.5	54	59.4	83.7	68.5	54
8:22:00	8:22:00	56.7	73	60.9	53	56.6	73	60.8	53
8:23:00	8:23:00	57.5	79.7	65.9	51.5	57.5	79.7	65.9	51.5
8:24:00	8:24:00	60.6	81	67.2	53.7	60.5	80.9	67.1	53.7
8:25:00	8:25:00	59.4	79.7	65.5	52.3	59.4	79.7	65.5	52.3
8:26:00	8:26:00	60.3	80.6	66.5	54.4	60.3	80.6	66.5	54.4
8:27:00	8:27:00	61.6	83	68.6	54.8	61.6	83	68.6	54.7
8:28:00	8:28:00	62.5	83.3	70.2	54.1	62.5	83.3	70.2	54.1
8:29:00	8:29:00	60	85.5	68.6	53.8	60	85.4	68.6	53.8
8:30:00	8:30:00	59.6	78.2	64.9	55	59.6	78.2	64.9	55
8:31:00	8:31:00	59.1	77.9	64	54.7	59.1	77.8	64	54.7
8:32:00	8:32:00	62.1	82.8	67.8	58	62.1	82.8	67.7	57.9
8:33:00	8:33:00	59.8	81.5	66	55.3	59.8	81.5	66	55.2
8:34:00	8:34:00	62.3	85.1	69.8	57.5	62.3	85.1	69.8	57.5
8:35:00	8:35:00	60.2	76.1	64.3	57.6	60.2	76.1	64.2	57.5
8:36:00	8:36:00	61.7	81.9	69.5	54.9	61.7	81.8	69.5	54.9
8:37:00	8:37:00	57.7	79	64.8	54.6	57.7	79	64.7	54.6
8:38:00	8:38:00	61.1	80.5	67.3	55.6	61.1	80.5	67.3	55.5
8:39:00	8:39:00	60.8	82.6	68.8	54.4	60.7	82.6	68.8	54.3
8:40:00	8:40:00	58.9	76.7	63.4	54.9	58.8	76.7	63.4	54.9
8:41:00	8:41:00	61.7	82.7	69	54.2	61.7	82.7	69	54.2
8:42:00	8:42:00	61.1	79.3	66.4	55.3	61.1	79.3	66.4	55.3
8:43:00	8:43:00	60	82.8	69.1	54	59.9	82.7	69.1	54
8:44:00	8:44:00	60.8	82.2	68	54	60.7	82.2	68	54
8:45:00	8:45:00	59	82.8	68.9	53.5	59	82.8	68.9	53.5
8:46:00	8:46:00	61.9	82.7	68	58.1	61.9	82.7	68	58.1
8:47:00	8:47:00	61.9	84.4	70.1	57.3	61.9	84.4	70.1	57.3
8:48:00	8:48:00	60.1	78.2	64.5	55.6	60	78.2	64.5	55.5
8:49:00	8:49:00	64.4	91.6	76.2	56.3	64.4	91.6	76.1	56.3

8:50:00	8:50:00	60.1	80.9	67.9	55.7	60.1	80.8	67.8	55.7
8:51:00	8:51:00	59	79.6	66.5	54.5	59	79.5	66.5	54.5
8:52:00	8:52:00	60.2	84.8	69.4	55.4	60.2	84.8	69.4	55.4
8:53:00	8:53:00	57.3	80.7	65.4	53.7	57.3	80.7	65.4	53.7
8:54:00	8:54:00	61.9	84.9	69.1	57.2	61.9	84.9	69.1	57.1
8:55:00	8:55:00	57.9	79.9	65.8	53	57.9	79.9	65.8	53
8:56:00	8:56:00	58.1	80.7	65.7	53	58	80.6	65.7	53
8:57:00	8:57:00	57.6	77.2	64	51.9	57.5	77.1	64	51.8
8:58:00	8:58:00	57.8	77.9	63.7	53.4	57.7	77.9	63.7	53.4
8:59:00	8:59:00	58.7	75.3	61.9	55.8	58.7	75.3	61.9	55.8
9:00:00	9:00:00	60.2	78.8	65.5	54.2	60.1	78.8	65.4	54.1
9:01:00	9:01:00	57.8	76	63.4	53.7	57.7	76	63.4	53.7
9:02:00	9:02:00	56.8	76.6	63.9	51.6	56.8	76.6	63.8	51.6
9:03:00	9:03:00	57.2	80.6	66.9	51.7	57.2	80.6	66.9	51.6
9:04:00	9:04:00	58.6	78.7	64.3	52.6	58.6	78.7	64.3	52.6
9:05:00	9:05:00	58.5	75.3	63.2	53.4	58.5	75.3	63.2	53.4
9:06:00	9:06:00	59	82	67.7	53.5	59	81.9	67.7	53.5
9:07:00	9:07:00	58.1	81	67.6	52.7	58.1	81	67.6	52.7
9:08:00	9:08:00	58.9	77.8	63.5	53.7	58.9	77.8	63.5	53.7
9:09:00	9:09:00	61.1	81.9	68	55.1	61.1	81.9	68	55.1
9:10:00	9:10:00	60.5	79.3	66.7	55.5	60.5	79.3	66.7	55.5
9:11:00	9:11:00	58.5	78.6	65.8	53.4	58.5	78.6	65.8	53.4
9:12:00	9:12:00	59	75.3	63.8	54.6	59	75.3	63.8	54.6
9:13:00	9:13:00	58.9	75.8	62.5	55.4	58.8	75.8	62.5	55.4
9:14:00	9:14:00	62.7	81.3	67.2	56.1	62.7	81.3	67.2	56.1
9:15:00	9:15:00	56.6	75.4	61.8	53.4	56.6	75.4	61.8	53.4
9:16:00	9:16:00	58	79.9	65.7	54	57.9	79.9	65.7	54
9:17:00	9:17:00	63.7	89.7	75.5	51.7	63.6	89.7	75.5	51.7
9:18:00	9:18:00	58.5	75.6	62.5	53.9	58.5	75.6	62.4	53.8
9:19:00	9:19:00	57.9	74.8	62.8	53.4	57.9	74.8	62.8	53.4
9:20:00	9:20:00	59.9	82.2	66.6	55.1	59.9	82.2	66.6	55.1
9:21:00	9:21:00	62.7	88.6	73	56.6	62.7	88.6	73	56.6
9:22:00	9:22:00	58.6	74.9	62.6	54.8	58.6	74.9	62.6	54.7
9:23:00	9:23:00	61.1	77.7	65.2	55.6	61.1	77.7	65.2	55.6
9:24:00	9:24:00	61.1	77.6	64.6	57.9	61.1	77.6	64.6	57.9
9:25:00	9:25:00	59.8	80.6	67	57.2	59.8	80.6	67	57.2
9:26:00	9:26:00	61.5	79.7	67	56.2	61.5	79.7	66.9	56.1
9:27:00	9:27:00	60.7	80.4	67.8	56	60.7	80.3	67.8	56
9:28:00	9:28:00	58.4	80.7	67.1	54.7	58.3	80.6	67.1	54.7
9:29:00	9:29:00	60.5	81.7	68.2	54.1	60.4	81.7	68.2	54.1
9:30:00	9:30:00	58.4	77.1	64	52.3	58.3	77.1	64	52.3
9:31:00	9:31:00	57.8	73.9	61.3	53.7	57.8	73.9	61.3	53.6
9:32:00	9:32:00	60.8	78.9	66.1	55.1	60.8	78.9	66	55
9:33:00	9:33:00	58.1	79.4	65.5	52.9	58.1	79.4	65.4	52.8
9:34:00	9:34:00	61.6	81.2	66.8	56.7	61.6	81.2	66.8	56.7
9:35:00	9:35:00	60.8	86	67.6	55.3	60.8	86	67.6	55.3
9:36:00	9:36:00	61.9	81.2	68.8	58.3	61.9	81.2	68.8	58.3
9:37:00	9:37:00	65.2	93	78	55.4	65.2	93	78	55.4
9:38:00	9:38:00	60.1	78.4	65.6	56.3	60.1	78.4	65.6	56.3
9:39:00	9:39:00	61.4	81	67.2	57.8	61.4	80.9	67.2	57.8
9:40:00	9:40:00	59.8	83.3	68.8	53	59.8	83.3	68.7	53
9:41:00	9:41:00	61.8	80.5	66.9	59	61.7	80.5	66.9	59
9:42:00	9:42:00	61.1	83	69.3	55.9	61.1	83	69.3	55.9
9:43:00	9:43:00	62.7	86	71.5	55.6	62.6	86	71.5	55.6
9:44:00	9:44:00	62.3	86.2	72.9	54.2	62.2	86.2	72.9	54.1
9:45:00	9:45:00	63.7	89	74.9	53.4	63.7	88.9	74.8	53.4
9:46:00	9:46:00	57.3	73.3	62	52.5	57.3	73.3	62	52.4
9:47:00	9:47:00	61.2	80.3	66.4	51.8	61.2	80.3	66.4	51.8
9:48:00	9:48:00	61.9	81.9	68.6	56.9	61.9	81.9	68.5	56.8
9:49:00	9:49:00	58.5	75.8	61	55.3	58.4	75.8	61	55.3
9:50:00	9:50:00	62.5	84.5	70.3	58.8	62.4	84.5	70.3	58.8
9:51:00	9:51:00	61	79.2	65.8	57.3	61	79.2	65.7	57.2
9:52:00	9:52:00	62.2	82	67.7	50.7	62.1	82	67.7	50.7
9:53:00	9:53:00	58.5	79.5	65.4	54	58.5	79.4	65.4	54
9:54:00	9:54:00	60.8	79.3	66.5	55.1	60.8	79.3	66.5	55.1
9:55:00	9:55:00	58	80	65.2	53.7	58	80	65.2	53.6
9:56:00	9:56:00	62.4	84.9	70.6	55.9	62.4	84.8	70.5	55.9
9:57:00	9:57:00	55.9	72.7	57.7	53.4	55.8	72.7	57.7	53.4
9:58:00	9:58:00	59.5	78	65.8	53.5	59.5	78	65.8	53.5
9:59:00	9:59:00	61.5	83.5	70.7	52.7	61.5	83.5	70.7	52.7
10:00:00	10:00:00	60.9	80.8	68.1	56.3	60.8	80.8	68.1	56.2
10:01:00	10:01:00	59.6	75.8	62.7	56.5	59.5	75.8	62.6	56.5
10:02:00	10:02:00	58.6	78.8	63.1	54.5	58.6	78.8	63	54.4
10:03:00	10:03:00	57.3	73.3	59.8	53.6	57.3	73.3	59.8	53.6
10:04:00	10:04:00	56.5	72.2	60.1	53.3	56.5	72.1	60.1	53.3
10:05:00	10:05:00	59.7	79.1	65.1	54.3	59.7	79.1	65.1	54.3
10:06:00	10:06:00	58.2	76	63.9	54.3	58.1	76	63.9	54.3
10:07:00	10:07:00	58.1	79.6	66	54.2	58.1	79.5	66	54.2

10:08:00	10:08:00	57.7	75.7	63.8	54.9	57.6	75.6	63.8	54.9
10:09:00	10:09:00	60.8	82	67.4	55.3	60.8	82	67.4	55.2
10:10:00	10:10:00	58.1	74.9	62.8	54.1	58	74.9	62.8	54
10:11:00	10:11:00	56.3	71.7	57.9	53.3	56.2	71.7	57.9	53.3
10:12:00	10:12:00	59.9	74.6	62.5	56.7	59.9	74.5	62.5	56.6
10:13:00	10:13:00	57.6	76.5	63	54.3	57.6	76.4	63	54.3
10:14:00	10:14:00	60.3	79.2	67.6	54.6	60.3	79.2	67.5	54.6
10:15:00	10:15:00	83.4	112.5	98.6	56.6	83.3	112.5	98.6	56.6
10:16:00	10:16:00	59.1	83.7	68.9	52.9	59.1	83.7	68.9	52.9
10:17:00	10:17:00	57.1	73.4	61.5	52.3	57.1	73.4	61.5	52.2
10:18:00	10:18:00	58.2	75.5	63.1	52	58.1	75.5	63.1	52
10:19:00	10:19:00	61.4	85.9	71.2	55.3	61.4	85.9	71.2	55.3
10:20:00	10:20:00	59.6	78.7	66.3	53.9	59.6	78.6	66.3	53.9
10:21:00	10:21:00	60.9	76.7	64	58.3	60.9	76.7	64	58.2
10:22:00	10:22:00	58.5	75.7	63.1	55	58.5	75.7	63.1	55
10:23:00	10:23:00	60.9	81.4	66.4	56.9	60.9	81.3	66.4	56.8
10:24:00	10:24:00	59.6	82.4	67.5	56.5	59.6	82.3	67.5	56.5
10:25:00	10:25:00	57.1	73.6	60.3	52.1	57.1	73.5	60.2	52.1
10:26:00	10:26:00	57.6	75.8	63.1	53.8	57.6	75.8	63.1	53.8
10:27:00	10:27:00	59.3	75.4	61.5	55.7	59.3	75.4	61.5	55.7
10:28:00	10:28:00	61.5	78.7	65.2	55.5	61.5	78.6	65.2	55.5
10:29:00	10:29:00	63.1	83.1	68.4	52.8	63.1	83.1	68.4	52.8
10:30:00	10:30:00	57.5	79.1	64.6	52	57.5	79.1	64.6	51.9
10:31:00	10:31:00	61.8	83.8	69.7	55.6	61.8	83.8	69.7	55.5
10:32:00	10:32:00	62.5	85.8	70.9	56.8	62.5	85.8	70.9	56.7
10:33:00	10:33:00	59.7	83.1	68.8	54.8	59.7	83.1	68.8	54.8
10:34:00	10:34:00	59.9	80.3	67.2	56	59.9	80.3	67.2	56
10:35:00	10:35:00	59.2	75.5	62.5	56.1	59.2	75.5	62.5	56
10:36:00	10:36:00	56.6	72.9	59.3	53.3	56.6	72.8	59.3	53.2
10:37:00	10:37:00	57.8	75.6	62	54.4	57.8	75.6	62	54.4
10:38:00	10:38:00	60.9	77.7	64.9	54.6	60.9	77.6	64.8	54.6
10:39:00	10:39:00	57.5	74.4	60.8	53.5	57.5	74.4	60.8	53.5
10:40:00	10:40:00	58.2	76.1	63.7	51.9	58.2	76.1	63.6	51.9
10:41:00	10:41:00	56.7	77.1	64.7	50.9	56.7	77.1	64.7	50.9
10:42:00	10:42:00	63.6	82.9	69.9	58.4	63.6	82.9	69.9	58.3
10:43:00	10:43:00	61.9	84.8	70.4	55.9	61.9	84.7	70.4	55.8
10:44:00	10:44:00	57.8	76.5	63.8	52.2	57.8	76.4	63.8	52.2
10:45:00	10:45:00	61.1	80	66.8	54.8	61.1	80	66.8	54.7
10:46:00	10:46:00	59.1	77.4	63.9	54.9	59.1	77.3	63.9	54.9
10:47:00	10:47:00	61.1	77.8	64.7	56.7	61.1	77.8	64.7	56.7
10:48:00	10:48:00	61.9	79	66.1	56.8	61.9	79	66.1	56.7
10:49:00	10:49:00	62.8	85.4	71.2	56.7	62.7	85.4	71.2	56.6
10:50:00	10:50:00	64.1	82.1	69.8	58.5	64	82.1	69.8	58.5
10:51:00	10:51:00	60.5	80.8	68.1	51.7	60.5	80.8	68.1	51.7
10:52:00	10:52:00	57.8	76.2	62.5	53.7	57.8	76.2	62.5	53.7
10:53:00	10:53:00	55.6	74.6	62.2	50	55.6	74.6	62.2	50
10:54:00	10:54:00	58.6	75.8	61.3	53.6	58.5	75.7	61.3	53.6
10:55:00	10:55:00	58.7	75.5	62.3	53.7	58.6	75.5	62.3	53.7
10:56:00	10:56:00	61.3	86.7	72.4	53.3	61.3	86.6	72.4	53.2
10:57:00	10:57:00	61.4	78	65.9	55.5	61.3	78	65.9	55.5
10:58:00	10:58:00	60.1	78	64.1	56.7	60.1	77.9	64.1	56.7
10:59:00	10:59:00	59.7	75.5	62	57.1	59.7	75.4	62	57.1
11:00:00	11:00:00	61.1	84.2	71	54.7	61.1	84.2	71	54.7
11:01:00	11:01:00	60.7	83.6	68.6	52.9	60.7	83.6	68.6	52.9
11:02:00	11:02:00	57.8	74.2	61.3	52.2	57.8	74.2	61.3	52.1
11:03:00	11:03:00	60.9	79.2	65	56.8	60.9	79.2	64.9	56.8
11:04:00	11:04:00	62.4	83.8	70.8	57.9	62.4	83.7	70.8	57.9
11:05:00	11:05:00	61	78.7	67.3	53.1	61	78.6	67.3	53
11:06:00	11:06:00	63.1	82.2	68.3	53.3	63.1	82.1	68.3	53.3
11:07:00	11:07:00	62.6	86.1	71.9	57.8	62.6	86	71.9	57.8
11:08:00	11:08:00	58.4	76.7	64	53.7	58.4	76.7	64	53.7
11:09:00	11:09:00	62.8	89.1	74.5	51.2	62.8	89	74.5	51.1
11:10:00	11:10:00	59.2	77	64.9	53.1	59.2	76.9	64.9	53.1
11:11:00	11:11:00	61.5	85.1	71.5	52.3	61.5	85.1	71.5	52.2
11:12:00	11:12:00	63.1	82.9	69.4	56.8	63	82.9	69.3	56.8
11:13:00	11:13:00	66.8	97.9	73.7	55.9	66.8	97.9	73.7	55.9
11:14:00	11:14:00	61.9	102.1	76.5	51.6	61.8	102.1	76.5	51.6
11:15:00	11:15:00	62	77.3	65.1	57.8	62	77.2	65.1	57.8
11:16:00	11:16:00	60	78.6	65	54.2	60	78.6	64.9	54.2
11:17:00	11:17:00	61.2	83	70.3	50.9	61.2	83	70.3	50.9
11:18:00	11:18:00	54.4	72.7	58.5	49.9	54.4	72.7	58.5	49.9
11:19:00	11:19:00	59	76.9	64.8	53.9	59	76.9	64.7	53.9
11:20:00	11:20:00	58.6	78.5	65	51.5	58.6	78.5	65	51.5
11:21:00	11:21:00	61.3	78.8	66.2	56.8	61.3	78.8	66.2	56.7
11:22:00	11:22:00	55.8	75.1	62.6	50.6	55.8	75	62.6	50.6
11:23:00	11:23:00	57	75	62.5	52.1	57	75	62.5	52.1
11:24:00	11:24:00	61.4	84.1	72.1	52.9	61.4	84	72.1	52.9
11:25:00	11:25:00	59.2	78.4	63.9	53.2	59.1	78.4	63.8	53.2

11:26:00	11:26:00	57.6	77.1	62.8	52.1	57.6	77	62.8	52.1
11:27:00	11:27:00	60.9	83.3	69.7	55.1	60.9	83.3	69.7	55.1
11:28:00	11:28:00	56.4	73.2	60.6	53.1	56.4	73.2	60.5	53.1
11:29:00	11:29:00	59	76.5	62.5	55.3	59	76.5	62.4	55.3
11:30:00	11:30:00	61.6	82	69	53	61.6	82	68.9	53
11:31:00	11:31:00	58.5	77.8	65	52.2	58.4	77.8	65	52.2
11:32:00	11:32:00	56.7	74.7	60.8	50.6	56.6	74.7	60.8	50.6
11:33:00	11:33:00	60.1	85.1	71.2	54.4	60.1	85.1	71.2	54.4
11:34:00	11:34:00	58	83	68.5	50.2	58	83	68.5	50.2
11:35:00	11:35:00	62.5	83.3	69.9	52.7	62.5	83.2	69.9	52.7
11:36:00	11:36:00	57.8	74.2	61.7	54.8	57.8	74.2	61.6	54.8
11:37:00	11:37:00	60.7	78.9	65.8	53.5	60.7	78.8	65.8	53.4
11:38:00	11:38:00	57.2	77.3	63.8	52.6	57.2	77.2	63.8	52.6
11:39:00	11:39:00	58.8	75.7	63.5	52.3	58.7	75.6	63.4	52.3
11:40:00	11:40:00	54.7	71.9	59.1	50.8	54.7	71.9	59.1	50.7
11:41:00	11:41:00	59.4	77.4	64.7	53.3	59.4	77.4	64.7	53.3
11:42:00	11:42:00	56.4	76.2	63.4	51.2	56.4	76.2	63.3	51.1
11:43:00	11:43:00	58.1	77.3	64.3	51.5	58.1	77.2	64.3	51.5
11:44:00	11:44:00	56.5	74.2	64.3	53.1	56.5	74.2	64.3	53.1
11:45:00	11:45:00	57.3	75.5	62.7	52.1	57.3	75.5	62.7	52
11:46:00	11:46:00	56.9	73.1	59.9	54.1	56.9	73.1	59.8	54
11:47:00	11:47:00	55.3	73.5	59.9	52	55.3	73.4	59.8	52
11:48:00	11:48:00	57	71.8	58.8	53.8	57	71.7	58.7	53.7
11:49:00	11:49:00	59	74.7	63.2	53.6	58.9	74.7	63.1	53.5
11:50:00	11:50:00	58.8	80.6	67.4	52.6	58.8	80.6	67.4	52.6
11:51:00	11:51:00	60.4	82.5	69.6	54.1	60.4	82.5	69.6	54.1
11:52:00	11:52:00	58	79.3	69.4	51.9	57.9	79.3	69.4	51.9
11:53:00	11:53:00	59.4	75.7	62.9	56.2	59.4	75.7	62.8	56.2
11:54:00	11:54:00	59.5	77	64.8	51.4	59.5	77	64.7	51.4
11:55:00	11:55:00	55.7	76.5	64.2	49.7	55.7	76.5	64.1	49.7
11:56:00	11:56:00	55.8	76.6	64.4	49.3	55.8	76.6	64.4	49.3
11:57:00	11:57:00	57.6	77.8	63.7	50.6	57.6	77.7	63.7	50.6
11:58:00	11:58:00	55	71.5	59.3	50	55	71.5	59.3	50
11:59:00	11:59:00	58.3	76	61.9	52.9	58.3	76	61.9	52.9
12:00:00	12:00:00	61.1	78.7	66.4	53.6	61	78.7	66.4	53.6
12:01:00	12:01:00	56.8	76	62.4	49.5	56.8	75.9	62.4	49.5
12:02:00	12:02:00	58.3	74.6	62.6	51.2	58.3	74.6	62.6	51.1
12:03:00	12:03:00	54	72.6	56.6	51.5	54	72.6	56.5	51.5
12:04:00	12:04:00	59.4	76.1	63.3	54.1	59.4	76.1	63.3	54.1
12:05:00	12:05:00	58.8	76.2	64	51.1	58.8	76.2	63.9	51.1
12:06:00	12:06:00	58.8	78.8	65.8	52.3	58.7	78.8	65.7	52.3
12:07:00	12:07:00	59.7	86.8	71	52	59.7	86.8	71	51.9
12:08:00	12:08:00	59.5	77.7	63.3	51.9	59.5	77.7	63.3	51.9
12:09:00	12:09:00	53.3	70	55.1	50.5	53.3	69.9	55.1	50.5
12:10:00	12:10:00	59.1	80.6	68.5	51.9	59.1	80.6	68.5	51.9
12:11:00	12:11:00	63.5	86.5	73.7	52.5	63.5	86.5	73.7	52.5
12:12:00	12:12:00	59.7	77.6	65	54.2	59.7	77.5	65	54.2
12:13:00	12:13:00	58.7	78.8	65.7	50.2	58.7	78.8	65.6	50.1
12:14:00	12:14:00	56.9	77.5	63.8	50.7	56.9	77.5	63.8	50.7
12:15:00	12:15:00	57.7	76.1	62.8	50.8	57.7	76.1	62.7	50.7
12:16:00	12:16:00	58.9	78.4	65.1	53.6	58.9	78.4	65.1	53.6
12:17:00	12:17:00	58.9	78.6	66.1	55	58.8	78.5	66	55
12:18:00	12:18:00	59.5	76.4	63.4	55.7	59.4	76.3	63.3	55.7
12:19:00	12:19:00	55.1	73.9	59.2	51.2	55.1	73.9	59.1	51.2
12:20:00	12:20:00	54.9	72.3	59.2	51.6	54.9	72.3	59.1	51.5
12:21:00	12:21:00	56.8	80.2	65	53	56.8	80.2	65	53
12:22:00	12:22:00	55.2	70.8	57.7	51.6	55.1	70.7	57.7	51.6
12:23:00	12:23:00	60.5	79.2	66.1	55.2	60.5	79.2	66	55.2
12:24:00	12:24:00	59.2	84.7	70.2	52.3	59.2	84.7	70.2	52.3
12:25:00	12:25:00	58.5	75.4	63.9	52.4	58.5	75.3	63.8	52.3
12:26:00	12:26:00	55.7	70.4	58.7	53	55.7	70.4	58.7	53
12:27:00	12:27:00	57.6	83	68.8	51.8	57.6	83	68.8	51.8
12:28:00	12:28:00	54	70.2	63.5	48.4	54	70.1	63.5	48.3
12:29:00	12:29:00	56.8	77.2	64.6	48.3	56.7	77.2	64.6	48.3
12:30:00	12:30:00	57.6	79.8	66.4	52.5	57.6	79.8	66.4	52.5
12:31:00	12:31:00	60.6	87.2	72.5	51.8	60.6	87.2	72.5	51.8
12:32:00	12:32:00	57.7	77	64.9	52.1	57.7	77	64.9	52.1
12:33:00	12:33:00	56.4	76.1	62.6	51.7	56.3	76.1	62.6	51.7
12:34:00	12:34:00	54.9	71.9	59.2	51.1	54.9	71.9	59.2	51
12:35:00	12:35:00	57.8	85.2	66.9	51.3	57.8	85.2	66.8	51.2
12:36:00	12:36:00	56.2	73.2	59.6	53	56.2	73.1	59.6	52.9
12:37:00	12:37:00	54.9	70.3	57.3	51.1	54.9	70.3	57.3	51.1
12:38:00	12:38:00	53.9	69.8	56.6	49.3	53.9	69.8	56.6	49.3
12:39:00	12:39:00	57.8	73.6	61.1	52.5	57.8	73.6	61.1	52.5
12:40:00	12:40:00	55.7	75	61.1	50.9	55.7	75	61	50.8
12:41:00	12:41:00	55.4	78.4	63.4	50.2	55.4	78.4	63.4	50.1
12:42:00	12:42:00	59	78.3	65.1	52.9	59	78.3	65.1	52.9
12:43:00	12:43:00	54.9	71.7	57	52.3	54.8	71.7	57	52.3

12:44:00	12:44:00	55.4	76.9	58.7	51.8	55.3	76.9	58.7	51.8
12:45:00	12:45:00	60.5	79.1	66.5	52.7	60.5	79.1	66.4	52.7
12:46:00	12:46:00	55.9	75.8	62.5	50.9	55.9	75.8	62.4	50.9
12:47:00	12:47:00	52.9	70.9	57.1	48.3	52.9	70.9	57	48.3
12:48:00	12:48:00	58.3	82.6	69.7	51.1	58.3	82.6	69.7	51.1
12:49:00	12:49:00	57.2	75.5	62.5	52.3	57.2	75.5	62.5	52.3
12:50:00	12:50:00	58.8	80	66.7	52.4	58.8	80	66.7	52.4
12:51:00	12:51:00	58.5	77.7	65.3	53	58.5	77.7	65.3	52.9
12:52:00	12:52:00	57.5	75	63.2	54.5	57.4	74.9	63.2	54.4
12:53:00	12:53:00	57.7	74.1	61.7	53.6	57.6	74.1	61.6	53.5
12:54:00	12:54:00	57.2	79.5	62.7	51.1	57.2	79.5	62.7	51.1
12:55:00	12:55:00	61.8	84	69.4	57.5	61.8	84	69.4	57.5
12:56:00	12:56:00	59.8	76	63	57.7	59.8	75.9	63	57.7
12:57:00	12:57:00	60.7	78.4	64.4	57.2	60.7	78.3	64.4	57.2
12:58:00	12:58:00	60.3	80.1	66.2	57.1	60.3	80.1	66.1	57.1
12:59:00	12:59:00	58.4	77.1	60.4	53.6	58.4	77.1	60.4	53.6
13:00:00	13:00:00	57.7	75.8	63.4	53	57.7	75.8	63.4	53
13:01:00	13:01:00	56.5	75.2	62.1	48.6	56.5	75.2	62.1	48.6
13:02:00	13:02:00	56.4	76.1	63.1	47.1	56.4	76.1	63	47.1
13:03:00	13:03:00	53.7	71.5	58.4	49.8	53.7	71.5	58.4	49.8
13:04:00	13:04:00	58.8	80.5	67.1	53	58.8	80.5	67.1	53
13:05:00	13:05:00	56.2	73	60.7	51.6	56.1	72.9	60.7	51.5
13:06:00	13:06:00	54.5	71.2	57.4	49.9	54.4	71.2	57.4	49.9
13:07:00	13:07:00	58.4	78.4	67.1	47.8	58.4	78.4	67.1	47.8
13:08:00	13:08:00	56.3	77.4	62.7	52	56.3	77.4	62.7	52
13:09:00	13:09:00	55.3	75.7	63	52.1	55.3	75.6	63	52.1
13:10:00	13:10:00	60.8	80.1	67.1	54.1	60.8	80.1	67	54.1
13:11:00	13:11:00	59.9	80.5	67.4	54.7	59.9	80.5	67.4	54.7
13:12:00	13:12:00	55.7	73.6	61.6	51.8	55.7	73.6	61.6	51.8
13:13:00	13:13:00	56.1	73.8	60.5	52.2	56.1	73.8	60.5	52.2
13:14:00	13:14:00	54.5	71.2	56.4	50.6	54.5	71.1	56.4	50.6
13:15:00	13:15:00	55.8	76.4	62.1	51.5	55.8	76.4	62.1	51.4
13:16:00	13:16:00	54.5	75.4	62.6	49.3	54.5	75.3	62.6	49.3
13:17:00	13:17:00	59.1	76.3	63.5	54	59.1	76.3	63.5	54
13:18:00	13:18:00	58.6	75.8	62.7	53.5	58.6	75.7	62.7	53.4
13:19:00	13:19:00	56.4	74.8	61.8	51.5	56.3	74.8	61.8	51.5
13:20:00	13:20:00	56.7	75.4	62.9	51.2	56.6	75.4	62.9	51.2
13:21:00	13:21:00	60.7	79.4	65.5	51.8	60.7	79.4	65.5	51.8
13:22:00	13:22:00	57.6	75	62.8	52.2	57.6	75	62.8	52.2
13:23:00	13:23:00	54.9	73.1	59.4	51	54.9	73.1	59.4	50.9
13:24:00	13:24:00	60.4	79.9	66	53.4	60.4	79.9	65.9	53.4
13:25:00	13:25:00	59.5	77.6	65.3	54.2	59.5	77.5	65.3	54.1
13:26:00	13:26:00	57.8	76.4	63.5	51.6	57.7	76.4	63.5	51.6
13:27:00	13:27:00	56.3	75.3	62.7	51.3	56.3	75.3	62.7	51.3
13:28:00	13:28:00	58.4	76.6	63.8	51.4	58.4	76.6	63.8	51.3
13:29:00	13:29:00	52.8	67.7	54.7	50.4	52.8	67.7	54.7	50.3
13:30:00	13:30:00	56.1	74.5	62.4	51.8	56.1	74.5	62.4	51.7
13:31:00	13:31:00	53.5	69.5	57.2	51.5	53.5	69.5	57.2	51.4
13:32:00	13:32:00	51.8	68	54.8	48.5	51.8	68	54.7	48.5
13:33:00	13:33:00	57.3	75.4	63	51.4	57.3	75.4	63	51.4
13:34:00	13:34:00	53.3	68.2	55.7	51.1	53.3	68.1	55.7	51
13:35:00	13:35:00	57.7	82.3	69.2	51	57.7	82.3	69.2	50.9
13:36:00	13:36:00	54.5	69.8	65.6	49.6	54.5	69.7	65.5	49.6
13:37:00	13:37:00	55.3	78.9	65.1	50.2	55.3	78.9	65	50.1
13:38:00	13:38:00	53.4	68.9	55.9	50.2	53.3	68.9	55.9	50.2
13:39:00	13:39:00	51.8	66.6	53.7	49.5	51.8	66.5	53.7	49.5
13:40:00	13:40:00	57.8	75.9	62.8	52.7	57.8	75.9	62.8	52.7
13:41:00	13:41:00	53.1	70.3	56.9	50.7	53.1	70.3	56.9	50.7
13:42:00	13:42:00	58.5	79.4	67	50.8	58.5	79.4	67	50.8
13:43:00	13:43:00	58.7	77.7	65.4	49.4	58.6	77.7	65.4	49.4
13:44:00	13:44:00	58.1	77.9	65.7	50.2	58	77.8	65.7	50.1
13:45:00	13:45:00	52.8	70	56.1	50.1	52.8	70	56	50.1
13:46:00	13:46:00	56.4	73.1	59	50.7	56.4	73.1	59	50.7
13:47:00	13:47:00	51.7	66.7	54.6	49.1	51.6	66.6	54.5	49.1
13:48:00	13:48:00	53.8	70.3	57.1	49.2	53.7	70.3	57.1	49.2
13:49:00	13:49:00	53.9	71	57.1	49.5	53.9	71	57	49.5
13:50:00	13:50:00	56.9	80.5	66.5	49	56.9	80.5	66.5	49
13:51:00	13:51:00	56.3	82.2	67.5	51.2	56.3	82.1	67.5	51.2
13:52:00	13:52:00	59.7	77.4	65.5	52.7	59.6	77.4	65.5	52.7
13:53:00	13:53:00	58.3	77.7	64.8	52.2	58.3	77.6	64.8	52.2
13:54:00	13:54:00	54.4	69.8	57.8	51.9	54.3	69.8	57.8	51.9
13:55:00	13:55:00	51.9	68.2	55.4	49.5	51.8	68.2	55.4	49.5
13:56:00	13:56:00	56.8	76.4	63.6	50.8	56.8	76.4	63.5	50.8
13:57:00	13:57:00	52.7	69.8	57.9	49.8	52.7	69.7	57.9	49.8
13:58:00	13:58:00	51	68.8	53	48.7	51	68.8	53	48.7
13:59:00	13:59:00	53.2	69.9	56.8	50	53.2	69.9	56.8	50
14:00:00	14:00:00	56	73.2	60.7	49.8	56	73.2	60.6	49.7
14:01:00	14:01:00	57.7	78.3	65.8	50	57.7	78.3	65.8	50

14:02:00	14:02:00	54.2	71.9	59.1	51.2	54.2	71.8	59.1	51.1
14:03:00	14:03:00	57.5	75.8	62.5	53.4	57.5	75.8	62.5	53.4
14:04:00	14:04:00	52.9	69.6	56.8	49.9	52.9	69.6	56.8	49.9
14:05:00	14:05:00	52.6	72.3	55.3	49.3	52.6	72.2	55.2	49.3
14:06:00	14:06:00	53.6	76.7	58.8	49.5	53.5	76.7	58.8	49.5
14:07:00	14:07:00	58.5	75.9	64.3	51.4	58.4	75.9	64.2	51.4
14:08:00	14:08:00	51.6	68.7	54	47.4	51.6	68.6	53.9	47.4
14:09:00	14:09:00	55.8	75.2	62.1	47.7	55.8	75.1	62.1	47.7
14:10:00	14:10:00	56.8	74.9	63.6	50.6	56.8	74.9	63.5	50.6
14:11:00	14:11:00	54.2	70	58.6	51.5	54.1	69.9	58.6	51.5
14:12:00	14:12:00	54.5	71	57	50.7	54.5	71	57	50.7
14:13:00	14:13:00	53.1	71.5	56.1	50.2	53.1	71.4	56.1	50.1
14:14:00	14:14:00	54.3	71.1	57.8	49.9	54.3	71.1	57.7	49.9
14:15:00	14:15:00	58.3	76.3	63.4	49.8	58.3	76.3	63.4	49.7
14:16:00	14:16:00	53.7	72.3	57.9	49.2	53.6	72.3	57.9	49.2
14:17:00	14:17:00	51.6	67.4	54.3	49	51.6	67.4	54.3	49
14:18:00	14:18:00	52.1	68	54.1	49.4	52.1	68	54	49.3
14:19:00	14:19:00	52.4	68.1	55.7	50.1	52.4	68.1	55.6	50.1
14:20:00	14:20:00	53.5	68.7	55.9	50	53.5	68.7	55.9	50
14:21:00	14:21:00	52.4	69.8	55.1	48.8	52.4	69.8	55.1	48.8
14:22:00	14:22:00	55.1	73.8	61	49.4	55.1	73.7	61	49.4
14:23:00	14:23:00	59.8	78.4	66.2	53.4	59.8	78.4	66.2	53.3
14:24:00	14:24:00	52.9	70.6	57.4	50.7	52.8	70.5	57.4	50.7
14:25:00	14:25:00	57.4	76.3	63.2	53.2	57.4	76.3	63.1	53.1
14:26:00	14:26:00	53.7	80	59.7	50.6	53.7	79.9	59.7	50.6
14:27:00	14:27:00	62.2	90.6	75.5	50	62.2	90.6	75.5	50
14:28:00	14:28:00	56.2	75.9	63.5	49.4	56.2	75.8	63.5	49.4
14:29:00	14:29:00	53.3	69.5	56.5	49.5	53.3	69.5	56.5	49.4
14:30:00	14:30:00	56.3	73.3	60.8	49.7	56.3	73.3	60.8	49.7
14:31:00	14:31:00	61.4	82.2	69.2	54.1	61.4	82.2	69.2	54
14:32:00	14:32:00	54.9	73.4	60.9	49.6	54.9	73.3	60.9	49.6
14:33:00	14:33:00	56.4	75.7	62.1	49.4	56.4	75.7	62.1	49.4
14:34:00	14:34:00	58.3	81.5	67.7	51.4	58.3	81.5	67.6	51.4
14:35:00	14:35:00	57.6	73.7	61.9	51.2	57.5	73.7	61.8	51.2
14:36:00	14:36:00	53.7	72.8	60	49.4	53.7	72.8	60	49.4
14:37:00	14:37:00	54.4	73.5	60.9	50.4	54.4	73.5	60.8	50.3
14:38:00	14:38:00	54.4	73.7	57.8	51.7	54.4	73.7	57.8	51.6
14:39:00	14:39:00	54.5	70	57.3	51.4	54.4	70	57.3	51.4
14:40:00	14:40:00	55.7	73.8	61.2	50.5	55.7	73.8	61.2	50.5
14:41:00	14:41:00	53	69.2	55.2	50.1	52.9	69.2	55.2	50.1
14:42:00	14:42:00	54.5	72.5	59.5	51.1	54.5	72.5	59.4	51.1
14:43:00	14:43:00	56	73.6	61.2	50.7	56	73.6	61.2	50.7
14:44:00	14:44:00	56.5	75.3	61.9	52.1	56.5	75.3	61.8	52.1
14:45:00	14:45:00	58.3	76.5	63.6	50.2	58.3	76.5	63.6	50.2
14:46:00	14:46:00	58.4	75.8	63.7	51.6	58.3	75.8	63.7	51.6
14:47:00	14:47:00	54	72.4	59.1	51.3	54	72.3	59.1	51.3
14:48:00	14:48:00	57	75.7	61.7	52.1	56.9	75.7	61.7	52
14:49:00	14:49:00	57.2	77.4	64.1	51.2	57.1	77.4	64.1	51.2
14:50:00	14:50:00	57.2	76.9	63.7	50.9	57.2	76.8	63.7	50.9
14:51:00	14:51:00	55	72.5	59.4	51.4	55	72.5	59.4	51.4
14:52:00	14:52:00	56	76	62.5	50.8	56	75.9	62.5	50.8
14:53:00	14:53:00	52.8	71.8	56.9	49.7	52.8	71.7	56.9	49.7
14:54:00	14:54:00	56.3	81.8	67.1	48.9	56.3	81.7	67	48.9
14:55:00	14:55:00	57.6	75.3	63.1	51.5	57.6	75.3	63.1	51.5
14:56:00	14:56:00	56.2	75.5	63.1	49.5	56.2	75.5	63.1	49.5
14:57:00	14:57:00	54.6	72.3	60	50.3	54.6	72.3	60	50.2
14:58:00	14:58:00	56.2	75.5	61.5	49.4	56.1	75.5	61.5	49.4
14:59:00	14:59:00	56.1	73.7	61.5	49.8	56.1	73.7	61.5	49.7
15:00:00	15:00:00	55.7	73.4	59.5	51.2	55.7	73.4	59.5	51.2
15:01:00	15:01:00	52.7	70.5	55.5	49.5	52.7	70.4	55.5	49.5
15:02:00	15:02:00	53.3	71.8	58.6	49.6	53.3	71.8	58.6	49.6
15:03:00	15:03:00	52.1	68.7	55.3	48.6	52	68.6	55.2	48.6
15:04:00	15:04:00	54.7	72.8	60.2	47.7	54.6	72.8	60.1	47.7
15:05:00	15:05:00	58.5	78.2	68.4	48.7	58.5	78.2	68.4	48.7
15:06:00	15:06:00	54.9	74.5	61.6	48.4	54.9	74.5	61.5	48.4
15:07:00	15:07:00	57.8	75.3	62.4	54	57.8	75.3	62.4	54
15:08:00	15:08:00	56.9	76.4	63.9	50.8	56.9	76.4	63.9	50.8
15:09:00	15:09:00	51.2	66.3	53.1	49.3	51.2	66.3	53.1	49.3
15:10:00	15:10:00	53.5	71	57.9	49.1	53.5	71	57.9	49
15:11:00	15:11:00	55.1	71.1	57.5	51.6	55.1	71.1	57.5	51.6
15:12:00	15:12:00	51.6	71.6	55.1	49	51.6	71.6	55.1	49
15:13:00	15:13:00	58.2	75.4	62.2	50.9	58.2	75.4	62.2	50.8
15:14:00	15:14:00	56	74.5	62.8	50.5	55.9	74.5	62.8	50.5
15:15:00	15:15:00	56.4	73.7	61.6	52.5	56.4	73.7	61.5	52.4
15:16:00	15:16:00	58.5	76	64	51.9	58.5	75.9	64	51.9
15:17:00	15:17:00	56	77.3	63.6	51.8	56	77.3	63.6	51.8
15:18:00	15:18:00	56	71.6	59.1	52.5	56	71.6	59.1	52.5
15:19:00	15:19:00	56.5	75.9	61.9	50	56.5	75.9	61.9	50

15:20:00	15:20:00	56.5	73.8	60.7	51.2	56.4	73.7	60.7	51.2
15:21:00	15:21:00	53.4	69.8	56.7	49.3	53.4	69.8	56.7	49.3
15:22:00	15:22:00	57.7	76.1	62.6	52.1	57.7	76.1	62.6	52
15:23:00	15:23:00	57.5	75.5	63.6	51.9	57.4	75.5	63.6	51.8
15:24:00	15:24:00	52.8	68.4	55.8	49.6	52.8	68.4	55.8	49.6
15:25:00	15:25:00	56.2	74.1	61.8	51.4	56.1	74.1	61.8	51.3
15:26:00	15:26:00	54.5	71	58.4	51.5	54.5	70.9	58.4	51.4
15:27:00	15:27:00	52.7	69.1	56	48.8	52.7	69.1	56	48.8
15:28:00	15:28:00	51.8	69.3	55.9	49	51.8	69.2	55.9	49
15:29:00	15:29:00	52.5	68.8	55.2	48.3	52.4	68.8	55.2	48.3
15:30:00	15:30:00	56.2	76.6	67.1	50.3	56.1	76.6	67.1	50.3
15:31:00	15:31:00	51.8	68.4	54.5	48.7	51.8	68.4	54.5	48.7
15:32:00	15:32:00	56.8	75	62.7	50	56.8	75	62.6	50
15:33:00	15:33:00	55	72.5	60.1	49.7	55	72.4	60	49.7
15:34:00	15:34:00	53.8	75	61.5	48.5	53.8	75	61.5	48.5
15:35:00	15:35:00	56	74.3	62.3	50.8	56	74.3	62.2	50.8
15:36:00	15:36:00	58.3	75.5	62.5	52.4	58.2	75.5	62.5	52.4
15:37:00	15:37:00	51.5	68.6	53.3	48.9	51.5	68.6	53.3	48.9
15:38:00	15:38:00	53.2	71.8	55.5	49.5	53.2	71.8	55.5	49.5
15:39:00	15:39:00	52.8	70.1	55.2	50.1	52.8	70.1	55.1	50.1
15:40:00	15:40:00	54.1	70.1	57.5	51.3	54.1	70.1	57.5	51.2
15:41:00	15:41:00	55	73.9	61.6	50.1	55	73.8	61.5	50.1
15:42:00	15:42:00	54.2	69.9	57	50.9	54.2	69.9	57	50.9
15:43:00	15:43:00	53	73.3	55.1	49.8	52.9	73.3	55.1	49.8
15:44:00	15:44:00	56.7	73	60.8	50.1	56.7	72.9	60.8	50.1
15:45:00	15:45:00	56.6	73.1	60.8	51.1	56.5	73.1	60.7	51.1
15:46:00	15:46:00	52.8	69.2	56.4	50.7	52.8	69.1	56.4	50.7
15:47:00	15:47:00	54.1	70.8	57.6	51	54.1	70.8	57.6	51
15:48:00	15:48:00	57.9	76.4	63.1	49.9	57.9	76.4	63.1	49.9
15:49:00	15:49:00	59.1	76.7	64.7	52.7	59.1	76.6	64.7	52.7
15:50:00	15:50:00	57.1	75.5	62.7	50	57	75.4	62.6	49.9
15:51:00	15:51:00	55.7	74.7	62	52	55.7	74.7	62	51.9
15:52:00	15:52:00	56.8	75.4	62.4	49.9	56.7	75.3	62.3	49.9
15:53:00	15:53:00	55.9	75.2	61.7	50.7	55.9	75.2	61.7	50.6
15:54:00	15:54:00	53.1	68.4	56.3	50.3	53.1	68.4	56.3	50.3
15:55:00	15:55:00	55	75.2	61.2	50.4	55	75.2	61.2	50.4
15:56:00	15:56:00	54.7	73	61.3	49.4	54.7	73	61.2	49.4
15:57:00	15:57:00	62.5	88.2	75.1	49.9	62.5	88.1	75.1	49.9
15:58:00	15:58:00	55.6	74.6	61.6	48.6	55.5	74.5	61.6	48.6
15:59:00	15:59:00	52.9	74	56.5	50.5	52.9	73.9	56.5	50.5
16:00:00	16:00:00	55.2	74.5	60.8	50	55.1	74.4	60.7	49.9
16:01:00	16:01:00	52.7	67.7	54.7	47.3	52.7	67.7	54.7	47.2
16:02:00	16:02:00	53.6	70.5	57.5	50.7	53.6	70.4	57.5	50.7
16:03:00	16:03:00	58.6	79.5	65.4	50.9	58.6	79.5	65.4	50.8
16:04:00	16:04:00	52.7	69.6	55.4	49.6	52.7	69.5	55.4	49.6
16:05:00	16:05:00	52	68.2	54.7	48.7	52	68.1	54.6	48.7
16:06:00	16:06:00	53.9	68.8	56.1	50.1	53.8	68.8	56.1	50.1
16:07:00	16:07:00	55.7	73.3	60.7	50	55.7	73.3	60.7	50
16:08:00	16:08:00	55.6	72.5	60.8	51.9	55.6	72.5	60.8	51.9
16:09:00	16:09:00	60.1	83.5	69.9	54	60.1	83.4	69.9	54
16:10:00	16:10:00	57.1	76.6	63.8	50.4	57.1	76.6	63.8	50.4
16:11:00	16:11:00	53.1	70.1	57.7	49.9	53.1	70.1	57.7	49.8
16:12:00	16:12:00	61.9	84.9	70.6	52.8	61.9	84.9	70.6	52.8
16:13:00	16:13:00	55.5	74.3	65.1	49.5	55.5	74.3	65.1	49.5
16:14:00	16:14:00	53	69.7	57.8	50.1	52.9	69.7	57.7	50.1
16:15:00	16:15:00	58.4	77.8	63.1	51.7	58.4	77.7	63.1	51.7
16:16:00	16:16:00	56	73	60.2	47.7	56	73	60.1	47.7
16:17:00	16:17:00	52.8	68.1	56	50.4	52.8	68.1	56	50.4
16:18:00	16:18:00	56.7	73.1	60.1	51.7	56.7	73.1	60.1	51.7
16:19:00	16:19:00	55.6	71.4	59.6	51.2	55.5	71.4	59.6	51.2
16:20:00	16:20:00	56.6	75.5	65.3	51.9	56.5	75.4	65.3	51.9
16:21:00	16:21:00	57.3	74.1	61.4	51.6	57.3	74	61.4	51.6
16:22:00	16:22:00	57.1	75.5	63.3	51.8	57	75.5	63.3	51.7
16:23:00	16:23:00	52.3	68.4	54.8	49.1	52.3	68.4	54.8	49.1
16:24:00	16:24:00	57.7	73.8	61.7	52.8	57.7	73.8	61.7	52.8
16:25:00	16:25:00	58.3	75.6	63.6	51.6	58.3	75.6	63.5	51.6
16:26:00	16:26:00	56	72.3	60.1	51.2	55.9	72.3	60.1	51.2
16:27:00	16:27:00	55.9	73.8	60.9	49.7	55.8	73.8	60.8	49.7
16:28:00	16:28:00	52.2	68.6	56.4	46.8	52.1	68.6	56.4	46.8
16:29:00	16:29:00	53	67.9	55.1	48.2	52.9	67.9	55	48.2
16:30:00	16:30:00	57.3	73.2	61.2	52.4	57.3	73.2	61.2	52.4
16:31:00	16:31:00	58.9	77.3	65	53.1	58.9	77.2	65	53.1
16:32:00	16:32:00	57.4	78.1	65.8	51.7	57.3	78.1	65.7	51.7
16:33:00	16:33:00	55.6	74	61.6	49.2	55.6	74	61.6	49.1
16:34:00	16:34:00	54.9	71.4	58.4	50.7	54.8	71.4	58.4	50.6
16:35:00	16:35:00	52.3	68.5	56.5	48.3	52.3	68.5	56.4	48.3
16:36:00	16:36:00	55.6	77.5	63.6	51.3	55.6	77.5	63.6	51.3
16:37:00	16:37:00	64.4	88.7	75.3	55.5	64.4	88.6	75.3	55.5

16:38:00	16:38:00	60.2	78.4	66	52.4	60.2	78.4	65.9	52.4
16:39:00	16:39:00	56.6	73.6	59.9	52.5	56.5	73.5	59.9	52.5
16:40:00	16:40:00	54.1	70.5	57.4	49.9	54.1	70.5	57.3	49.9
16:41:00	16:41:00	55.4	71	58.1	51.4	55.4	71	58.1	51.4
16:42:00	16:42:00	59.5	78.6	66.3	50.7	59.4	78.5	66.3	50.6
16:43:00	16:43:00	57.7	76.8	65.4	49.1	57.7	76.8	65.4	49.1
16:44:00	16:44:00	57	75.2	60.6	51.7	57	75.2	60.6	51.6
16:45:00	16:45:00	57.9	77	63.6	53.1	57.9	76.9	63.6	53.1
16:46:00	16:46:00	55.1	72.4	60.1	51.8	55.1	72.4	60	51.8
16:47:00	16:47:00	53.2	67.8	55.6	50.2	53.1	67.8	55.6	50.2
16:48:00	16:48:00	53.2	70.3	57.8	48.7	53.2	70.3	57.8	48.7
16:49:00	16:49:00	57.5	73	60.7	53.7	57.5	72.9	60.6	53.6
16:50:00	16:50:00	55.9	75.1	62.1	50.4	55.9	75	62	50.4
16:51:00	16:51:00	57.5	75.3	61.9	50	57.5	75.2	61.9	50
16:52:00	16:52:00	54.4	71	56.9	50.8	54.4	70.9	56.9	50.8
16:53:00	16:53:00	56.6	81.5	66.2	51.2	56.6	81.5	66.1	51.2
16:54:00	16:54:00	55.3	74.5	61.7	47.5	55.3	74.5	61.6	47.5
16:55:00	16:55:00	52.6	73.7	58.6	46.2	52.6	73.7	58.6	46.2
16:56:00	16:56:00	55.1	72.4	60.6	50.4	55.1	72.4	60.6	50.4
16:57:00	16:57:00	56.7	73.2	60.2	52	56.7	73.2	60.1	52
16:58:00	16:58:00	55.9	76.7	64.4	48.6	55.9	76.7	64.3	48.6
16:59:00	16:59:00	59.3	75.7	64	53.4	59.3	75.6	64	53.4
17:00:00	17:00:00	60.6	79	65.9	51.3	60.6	78.9	65.9	51.2
17:01:00	17:01:00	58.4	75.9	63.5	54.8	58.3	75.8	63.5	54.8
17:02:00	17:02:00	59.6	77.8	65.7	52.7	59.6	77.8	65.7	52.6
17:03:00	17:03:00	55.3	71.1	58.1	51.5	55.3	71.1	58.1	51.4
17:04:00	17:04:00	61.7	81.3	68.8	54.2	61.6	81.3	68.8	54.2
17:05:00	17:05:00	58.3	74.8	65.1	53.9	58.3	74.7	65.1	53.9
17:06:00	17:06:00	55.5	72.4	60.7	50.6	55.5	72.3	60.7	50.5
17:07:00	17:07:00	56.9	75.8	63.8	51.6	56.9	75.7	63.8	51.6
17:08:00	17:08:00	59.1	77.2	63.6	52.4	59.1	77.1	63.6	52.3
17:09:00	17:09:00	61.6	77	64.7	58.7	61.6	76.9	64.7	58.7
17:10:00	17:10:00	60.7	78.8	65.4	55.6	60.7	78.8	65.4	55.6
17:11:00	17:11:00	61.1	84.3	71.6	52.6	61.1	84.3	71.6	52.6
17:12:00	17:12:00	59	78.2	66	52.5	59	78.1	65.9	52.5
17:13:00	17:13:00	58.6	78.8	63.8	53.7	58.6	78.7	63.8	53.6
17:14:00	17:14:00	56	72.5	60.5	51.9	55.9	72.5	60.5	51.9
17:15:00	17:15:00	60.1	82.1	68.5	52	60.1	82.1	68.4	52
17:16:00	17:16:00	57.1	72.9	61.5	53.8	57	72.8	61.5	53.8
17:17:00	17:17:00	57.5	75.1	61.2	47.3	57.5	75.1	61.2	47.2
17:18:00	17:18:00	56.8	73.9	60.5	52.8	56.7	73.9	60.5	52.8
17:19:00	17:19:00	60.2	78.5	65.8	53.4	60.2	78.5	65.8	53.4
17:20:00	17:20:00	59.8	79.3	65.6	51.9	59.7	79.3	65.6	51.9
17:21:00	17:21:00	57.1	75.7	63	49	57.1	75.7	62.9	48.9
17:22:00	17:22:00	55.1	71.1	57.9	52.6	55.1	71.1	57.8	52.5
17:23:00	17:23:00	56.1	73.8	60.9	51.8	56	73.8	60.9	51.8
17:24:00	17:24:00	54.2	70.7	57.9	50.8	54.2	70.7	57.9	50.8
17:25:00	17:25:00	56.9	75.4	62.8	52	56.9	75.4	62.8	52
17:26:00	17:26:00	58.9	78.7	66.8	52.2	58.9	78.7	66.8	52.1
17:27:00	17:27:00	57	76.5	63.8	51.2	57	76.5	63.8	51.2
17:28:00	17:28:00	57.5	74.6	61.9	50.9	57.4	74.6	61.9	50.9
17:29:00	17:29:00	56.9	75.9	63.2	52.7	56.9	75.9	63.2	52.7
17:30:00	17:30:00	54.6	71.9	58.4	51.1	54.6	71.9	58.4	51
17:31:00	17:31:00	58.2	84.1	70.3	51	58.1	84.1	70.3	51
17:32:00	17:32:00	56.2	73.8	62	50	56.2	73.8	62	49.9
17:33:00	17:33:00	55	70.2	57.6	52.1	55	70.2	57.6	52.1
17:34:00	17:34:00	56.3	74.4	62.4	49.9	56.2	74.3	62.3	49.9
17:35:00	17:35:00	52.7	69.8	56.2	49.4	52.7	69.8	56.2	49.3
17:36:00	17:36:00	55.1	71.8	59.6	51	55.1	71.8	59.5	51
17:37:00	17:37:00	55.1	74.4	58.9	51.4	55.1	74.4	58.9	51.4
17:38:00	17:38:00	56	75.3	62	49.9	56	75.2	61.9	49.9
17:39:00	17:39:00	56.5	76.5	63.8	50.1	56.5	76.5	63.8	50.1
17:40:00	17:40:00	54.5	69.8	56.8	51.7	54.5	69.8	56.8	51.7
17:41:00	17:41:00	58.5	80.3	67.6	50.5	58.5	80.3	67.6	50.4
17:42:00	17:42:00	56.9	76.8	63.9	49.6	56.9	76.8	63.9	49.6
17:43:00	17:43:00	63.2	90.9	76.2	49.9	63.2	90.8	76.2	49.9
17:44:00	17:44:00	55.5	76.4	61.7	50.7	55.4	76.4	61.7	50.7
17:45:00	17:45:00	56.9	79.1	66.2	51.2	56.9	79.1	66.1	51.2
17:46:00	17:46:00	54	69.4	56.4	50.9	54	69.4	56.4	50.9
17:47:00	17:47:00	59.5	80.3	65.5	53.1	59.4	80.3	65.5	53.1
17:48:00	17:48:00	56.4	79.1	65.8	51.4	56.4	79.1	65.7	51.4
17:49:00	17:49:00	53.5	68.4	57.1	49.3	53.5	68.4	57.1	49.2
17:50:00	17:50:00	53.5	71.8	55.9	50.4	53.5	71.8	55.9	50.3
17:51:00	17:51:00	55.9	72.5	59.6	50.4	55.8	72.5	59.6	50.4
17:52:00	17:52:00	57.4	75.7	62.7	52.5	57.4	75.6	62.7	52.4
17:53:00	17:53:00	58.2	76	62.4	51.4	58.2	76	62.3	51.4
17:54:00	17:54:00	59.1	77.2	64.8	50.3	59.1	77.2	64.8	50.3
17:55:00	17:55:00	56.6	78.2	65.9	50.9	56.6	78.2	65.8	50.8

17:56:00	17:56:00	55.6	73.6	62.2	50.7	55.6	73.6	62.2	50.7
17:57:00	17:57:00	56.4	74.1	60.8	52.6	56.3	74.1	60.8	52.6
17:58:00	17:58:00	57.5	81.8	68.4	52.2	57.5	81.8	68.4	52.2
17:59:00	17:59:00	56.4	74.1	67.6	52.8	56.4	74.1	67.5	52.8
18:00:00	18:00:00	58	74.8	62.5	52.4	58	74.8	62.5	52.4
18:01:00	18:01:00	59.1	76.6	63.6	53.8	59.1	76.6	63.6	53.8
18:02:00	18:02:00	58.2	76.2	63.8	53.4	58.2	76.1	63.7	53.4
18:03:00	18:03:00	60.7	84.9	71.1	51.3	60.6	84.8	71.1	51.3
18:04:00	18:04:00	55.4	72.7	61.2	51.8	55.4	72.7	61.2	51.8
18:05:00	18:05:00	54.7	71.5	59.1	49.2	54.6	71.5	59	49.1
18:06:00	18:06:00	53.8	71.4	59.4	51.3	53.8	71.4	59.4	51.3
18:07:00	18:07:00	55.6	73.8	61.3	51.1	55.6	73.7	61.2	51.1
18:08:00	18:08:00	56.5	73.5	61	52.5	56.5	73.5	61	52.5
18:09:00	18:09:00	60.5	79.2	68.1	54.4	60.4	79.2	68	54.4
18:10:00	18:10:00	60.6	85.5	70	53.3	60.5	85.5	70	53.3
18:11:00	18:11:00	59.7	82.5	69.5	53.4	59.7	82.5	69.5	53.3
18:12:00	18:12:00	55.9	74.2	61.8	51.1	55.9	74.1	61.8	51.1
18:13:00	18:13:00	59.3	75.5	62.4	56.4	59.3	75.5	62.3	56.4
18:14:00	18:14:00	58.1	76.3	61.6	53.3	58.1	76.3	61.6	53.3
18:15:00	18:15:00	55.7	71	58.3	53.5	55.6	70.9	58.3	53.5
18:16:00	18:16:00	59.4	76.4	63.2	54.8	59.3	76.4	63.2	54.8
18:17:00	18:17:00	57.4	74.1	59.3	54.6	57.4	74.1	59.3	54.5
18:18:00	18:18:00	65	89.3	76.1	57.1	65	89.2	76.1	57.1
18:19:00	18:19:00	63.7	84.2	70.7	58.5	63.7	84.1	70.7	58.4
18:20:00	18:20:00	60.5	81.5	67.5	56.7	60.4	81.5	67.4	56.6
18:21:00	18:21:00	59.2	76.3	63.5	53.5	59.1	76.3	63.5	53.5
18:22:00	18:22:00	59.5	78.8	65.7	53	59.5	78.8	65.7	53
18:23:00	18:23:00	67.6	93.4	80.1	56.1	67.6	93.4	80.1	56.1
18:24:00	18:24:00	64.4	87.9	74.5	57	64.4	87.8	74.4	57
18:25:00	18:25:00	59.9	78.1	62.5	56	59.9	78.1	62.5	56
18:26:00	18:26:00	61.4	80	65.8	56.6	61.3	80	65.8	56.5
18:27:00	18:27:00	67.1	94.2	78.5	57.2	67.1	94.2	78.5	57.1
18:28:00	18:28:00	63.8	84.1	70.4	56.7	63.8	84	70.4	56.7
18:29:00	18:29:00	62.8	83.6	69.7	57.4	62.8	83.6	69.7	57.4
18:30:00	18:30:00	63.3	87.3	71.1	57.9	63.2	87.2	71.1	57.8
18:31:00	18:31:00	59	76.4	62.9	55.4	59	76.4	62.9	55.4
18:32:00	18:32:00	62.5	84.5	70.2	57.3	62.5	84.4	70.1	57.3
18:33:00	18:33:00	61.9	84.4	70.4	56.3	61.9	84.4	70.4	56.3
18:34:00	18:34:00	57.3	75.1	59.8	53.9	57.3	75	59.8	53.8
18:35:00	18:35:00	64.7	85.4	72.8	55.2	64.7	85.3	72.8	55.2
18:36:00	18:36:00	63	85.1	71.6	58.3	63	85	71.6	58.3
18:37:00	18:37:00	60.9	78	65.4	54.7	60.9	78	65.4	54.7
18:38:00	18:38:00	63.7	84.8	71.3	55.8	63.7	84.8	71.3	55.8
18:39:00	18:39:00	61.3	78.9	68.6	56.9	61.3	78.9	68.6	56.9
18:40:00	18:40:00	62.4	81.5	68.4	58.2	62.4	81.5	68.3	58.2
18:41:00	18:41:00	62.2	84.2	70.7	58.1	62.2	84.2	70.7	58.1
18:42:00	18:42:00	60.7	77.5	67.7	56.6	60.7	77.5	67.6	56.5
18:43:00	18:43:00	61.3	81.9	68.6	56.6	61.2	81.9	68.5	56.6
18:44:00	18:44:00	60.8	79.3	68.8	56.3	60.8	79.3	68.8	56.3
18:45:00	18:45:00	61.1	78.2	68.6	55.5	61.1	78.2	68.6	55.5
18:46:00	18:46:00	60.1	78.9	64.7	55.7	60.1	78.9	64.7	55.7
18:47:00	18:47:00	61.5	80.6	68	57.8	61.5	80.6	67.9	57.8
18:48:00	18:48:00	61.1	78.8	65.7	58.1	61	78.8	65.7	58.1
18:49:00	18:49:00	60.7	77.5	64.5	56.5	60.7	77.5	64.5	56.5
18:50:00	18:50:00	61.5	81.5	64.8	59.3	61.5	81.5	64.7	59.3
18:51:00	18:51:00	61.7	77.3	64.7	57.4	61.7	77.3	64.7	57.4
18:52:00	18:52:00	61.1	79	65.4	56.6	61.1	79	65.3	56.6
18:53:00	18:53:00	64	86.2	73.1	58.8	64	86.2	73.1	58.7
18:54:00	18:54:00	63.9	83.2	69.8	58.4	63.9	83.2	69.7	58.4
18:55:00	18:55:00	60.9	84.1	67.3	56.1	60.8	84.1	67.2	56.1
18:56:00	18:56:00	59.7	77	63.9	55.1	59.6	77	63.9	55.1
18:57:00	18:57:00	63.4	85.3	71.4	58.3	63.4	85.3	71.4	58.3
18:58:00	18:58:00	63	84.1	68.3	58.7	63	84.1	68.2	58.7
18:59:00	18:59:00	64.6	82.3	71.1	59.8	64.6	82.3	71.1	59.8
19:00:00	19:00:00	62.9	84.5	69	58.6	62.8	84.5	69	58.6
19:01:00	19:01:00	63.7	84.6	71.3	57.5	63.7	84.6	71.3	57.4
19:02:00	19:02:00	63.7	88	73.4	57.9	63.7	87.9	73.3	57.9
19:03:00	19:03:00	62.3	83	70	58.7	62.3	83	69.9	58.6
19:04:00	19:04:00	62	82.1	68.2	57.9	61.9	82	68.2	57.9
19:05:00	19:05:00	63.2	81.1	69	56.7	63.2	81.1	69	56.6
19:06:00	19:06:00	63.8	84.1	71	56.9	63.8	84.1	71	56.9
19:07:00	19:07:00	61.7	83.7	68.7	57.5	61.6	83.6	68.7	57.5
19:08:00	19:08:00	62.1	82.9	69.8	58.2	62.1	82.9	69.7	58.2
19:09:00	19:09:00	63.7	86	71.4	58.5	63.7	86	71.4	58.5
19:10:00	19:10:00	58.7	77.1	61.6	54.8	58.7	77.1	61.5	54.8
19:11:00	19:11:00	60.2	79	64.9	55.5	60.2	79	64.9	55.5
19:12:00	19:12:00	59.3	74.8	62.3	57.3	59.3	74.7	62.3	57.2
19:13:00	19:13:00	61.9	86.1	72.5	56.9	61.9	86.1	72.5	56.8

19:14:00	19:14:00	61.5	78.7	64.5	58.8	61.5	78.6	64.5	58.8
19:15:00	19:15:00	65.5	81.9	68.7	63.1	65.5	81.8	68.7	63.1
19:16:00	19:16:00	65.2	84.7	70.1	60.9	65.2	84.7	70.1	60.9
19:17:00	19:17:00	62.2	82	66.6	58.1	62.2	82	66.5	58.1
19:18:00	19:18:00	62.3	82.4	69.2	58.3	62.2	82.4	69.2	58.2
19:19:00	19:19:00	62.8	81.8	69	57.2	62.8	81.8	68.9	57.2
19:20:00	19:20:00	63.5	82	68.5	58.5	63.5	81.9	68.5	58.5
19:21:00	19:21:00	60.3	88.5	75.3	53.9	60.3	88.5	75.2	53.9
19:22:00	19:22:00	64.6	86.3	75.3	59.4	64.5	86.2	75.3	59.4
19:23:00	19:23:00	62.4	81.6	68.9	58.3	62.4	81.5	68.9	58.3
19:24:00	19:24:00	64.9	86.5	72.7	58.6	64.8	86.5	72.7	58.6
19:25:00	19:25:00	63.1	82.9	70.6	56.2	63.1	82.9	70.6	56.1
19:26:00	19:26:00	64	81.6	67.2	61.6	64	81.6	67.2	61.5
19:27:00	19:27:00	64.4	84.7	71.4	58.9	64.4	84.7	71.4	58.9
19:28:00	19:28:00	62.6	84.2	70.7	57	62.6	84.2	70.7	57
19:29:00	19:29:00	62.5	82	68	57.2	62.5	82	67.9	57.2
19:30:00	19:30:00	62.2	77.6	64.7	59.1	62.1	77.6	64.6	59.1
19:31:00	19:31:00	62.1	79.1	68.9	58.1	62.1	79.1	68.8	58.1
19:32:00	19:32:00	62.5	81.5	68.9	59	62.5	81.5	68.8	59
19:33:00	19:33:00	62.4	82	68.3	58.2	62.4	82	68.2	58.2
19:34:00	19:34:00	63.1	83.9	69.7	58.5	63	83.9	69.6	58.5
19:35:00	19:35:00	61.9	83	69.9	56	61.9	83	69.8	56
19:36:00	19:36:00	60	77.1	64.7	55.7	60	77.1	64.6	55.7
19:37:00	19:37:00	62	82.5	67.5	55.8	62	82.5	67.5	55.7
19:38:00	19:38:00	59.3	82.5	68.9	53.1	59.3	82.5	68.9	53.1
19:39:00	19:39:00	60.5	81	67.1	55.6	60.5	81	67.1	55.6
19:40:00	19:40:00	62.8	86.4	70.3	55.4	62.8	86.4	70.3	55.4
19:41:00	19:41:00	60.8	80	68.3	57	60.8	80	68.2	56.9
19:42:00	19:42:00	58.7	78.9	65	55.4	58.7	78.9	65	55.4
19:43:00	19:43:00	61.9	82.1	69.4	55.4	61.9	82.1	69.4	55.4
19:44:00	19:44:00	63.9	83.6	70.4	57.5	63.9	83.6	70.3	57.4
19:45:00	19:45:00	58.9	80.5	66.7	55.1	58.9	80.5	66.7	55.1
19:46:00	19:46:00	59.5	80.2	66.5	55.3	59.5	80.2	66.5	55.3
19:47:00	19:47:00	57.9	79.5	65.5	53.6	57.9	79.5	65.5	53.6
19:48:00	19:48:00	60.7	83	68.6	53.9	60.7	82.9	68.6	53.9
19:49:00	19:49:00	63.6	87.2	73.4	57	63.6	87.2	73.4	57
19:50:00	19:50:00	64.9	87.3	73.8	56.9	64.9	87.3	73.8	56.9
19:51:00	19:51:00	62.2	83.8	71	54.4	62.2	83.8	70.9	54.3
19:52:00	19:52:00	61.6	84.1	70.9	56.1	61.6	84	70.9	56.1
19:53:00	19:53:00	62.3	82.6	69.4	53.9	62.3	82.5	69.4	53.9
19:54:00	19:54:00	62.4	82.5	68.7	54.1	62.4	82.5	68.6	54
19:55:00	19:55:00	60.8	80.5	66.4	55	60.8	80.4	66.4	55
19:56:00	19:56:00	67	88.5	75.6	55.6	67	88.5	75.6	55.6
19:57:00	19:57:00	61.5	84.5	69.6	56.7	61.5	84.4	69.6	56.7
19:58:00	19:58:00	62.5	81.8	68.5	56.2	62.5	81.8	68.4	56.1
19:59:00	19:59:00	61	87.9	69.2	55.6	61	87.9	69.2	55.5
20:00:00	20:00:00	62.3	83.6	69.4	55.2	62.3	83.5	69.4	55.2
20:01:00	20:01:00	63	83.7	70.3	55.2	63	83.7	70.3	55.2
20:02:00	20:02:00	63.2	81.9	68.4	56.5	63.2	81.9	68.4	56.4
20:03:00	20:03:00	61.7	83.1	68.8	56.5	61.7	83	68.7	56.5
20:04:00	20:04:00	61.3	80	67.8	55.7	61.2	79.9	67.8	55.7
20:05:00	20:05:00	65.8	87.5	73.8	58.1	65.7	87.5	73.8	58.1
20:06:00	20:06:00	62.2	82.2	68.2	56.7	62.2	82.1	68.1	56.7
20:07:00	20:07:00	63.2	83.1	70.2	54.4	63.2	83.1	70.2	54.4
20:08:00	20:08:00	61.6	81.8	68.8	55.1	61.6	81.8	68.8	55.1
20:09:00	20:09:00	64.3	84.2	71.4	57.4	64.3	84.1	71.4	57.4
20:10:00	20:10:00	60.7	78.1	66.1	56.8	60.7	78.1	66.1	56.8
20:11:00	20:11:00	60.6	80.6	66.1	54.2	60.5	80.6	66.1	54.2
20:12:00	20:12:00	62.6	82.2	69.1	58	62.6	82.2	69.1	58
20:13:00	20:13:00	59.7	77	63.2	56.9	59.7	77	63.2	56.8
20:14:00	20:14:00	61.7	82.5	69.1	56.9	61.7	82.5	69.1	56.9
20:15:00	20:15:00	61.6	81.3	68	53.9	61.6	81.3	68	53.9
20:16:00	20:16:00	63.8	83.2	69.1	58.6	63.8	83.2	69.1	58.6
20:17:00	20:17:00	58.3	76.1	62.4	54.6	58.3	76.1	62.4	54.6
20:18:00	20:18:00	60.2	81.6	67.6	54.1	60.2	81.6	67.6	54
20:19:00	20:19:00	62.6	81.7	69	57.1	62.6	81.7	69	57
20:20:00	20:20:00	61.7	81.5	68.5	55.7	61.7	81.5	68.5	55.7
20:21:00	20:21:00	59.9	81	65.7	54.9	59.9	80.9	65.7	54.9
20:22:00	20:22:00	60.3	78.6	65.1	54.8	60.3	78.6	65.1	54.8
20:23:00	20:23:00	62.8	83.8	70.5	56.8	62.8	83.8	70.5	56.7
20:24:00	20:24:00	60.2	82.4	68.2	56.4	60.2	82.4	68.1	56.4
20:25:00	20:25:00	61.7	81.8	68.9	56.4	61.7	81.8	68.9	56.4
20:26:00	20:26:00	60.7	74.9	62.1	59.5	60.7	74.8	62.1	59.5
20:27:00	20:27:00	61.6	85.9	68.7	56.7	61.5	85.8	68.7	56.7
20:28:00	20:28:00	60.1	75.6	62.7	55.8	60.1	75.6	62.7	55.8
20:29:00	20:29:00	59.9	76.3	63.5	57.3	59.8	76.3	63.5	57.3
20:30:00	20:30:00	61.6	82.5	68.3	57.5	61.6	82.5	68.2	57.5
20:31:00	20:31:00	62.6	83.9	70.3	56.4	62.6	83.9	70.3	56.4

20:32:00	20:32:00	62.3	82.7	69.5	58.9	62.3	82.7	69.5	58.9
20:33:00	20:33:00	65.3	88.8	74.7	57.2	65.2	88.8	74.7	57.2
20:34:00	20:34:00	65.1	83.2	70.4	58.2	65	83.2	70.4	58.2
20:35:00	20:35:00	62.9	83.2	69.5	57.2	62.9	83.2	69.5	57.2
20:36:00	20:36:00	63.2	84.7	70.5	55.7	63.2	84.7	70.4	55.7
20:37:00	20:37:00	60.6	83.7	69.1	56.5	60.5	83.6	69.1	56.5
20:38:00	20:38:00	62.3	84.2	70.6	58.5	62.3	84.2	70.6	58.5
20:39:00	20:39:00	63.2	84.8	70.6	56.6	63.2	84.8	70.5	56.6
20:40:00	20:40:00	61.1	81.3	67.8	55.6	61.1	81.3	67.8	55.5
20:41:00	20:41:00	62.6	86.9	72.6	54.8	62.6	86.9	72.6	54.8
20:42:00	20:42:00	61.4	81.1	68.2	55.1	61.4	81.1	68.2	55.1
20:43:00	20:43:00	62.6	82.3	68.7	58	62.6	82.3	68.7	58
20:44:00	20:44:00	65.1	86.3	72.1	57.8	65.1	86.3	72.1	57.8
20:45:00	20:45:00	63.2	83	67.3	58.4	63.2	83	67.3	58.4
20:46:00	20:46:00	60.7	79.2	66.1	55.8	60.7	79.1	66.1	55.8
20:47:00	20:47:00	62	83.5	70.8	54.3	61.9	83.5	70.8	54.2
20:48:00	20:48:00	63.5	84.9	71.5	56.9	63.5	84.9	71.5	56.9
20:49:00	20:49:00	63.4	87.8	74.5	55.9	63.4	87.8	74.4	55.9
20:50:00	20:50:00	61.5	84.4	69	56.7	61.5	84.4	69	56.7
20:51:00	20:51:00	66.1	89.1	71.8	57.5	66.1	89	71.8	57.5
20:52:00	20:52:00	64.6	86.3	72.4	58.1	64.6	86.3	72.3	58.1
20:53:00	20:53:00	61.9	81	66.1	58.6	61.8	81	66	58.6
20:54:00	20:54:00	62.3	85.4	68.7	57.5	62.3	85.3	68.7	57.5
20:55:00	20:55:00	62.6	80.8	69.6	56.4	62.6	80.8	69.5	56.4
20:56:00	20:56:00	65.2	89.5	74	58.2	65.2	89.4	74	58.1
20:57:00	20:57:00	61.6	86.3	72.4	56.7	61.5	86.2	72.4	56.6
20:58:00	20:58:00	63.4	83.2	69.9	54.1	63.4	83.2	69.9	54.1
20:59:00	20:59:00	63.6	86.4	72.9	55.4	63.5	86.3	72.9	55.3
21:00:00	21:00:00	61.7	81.1	67.6	56.3	61.7	81.1	67.5	56.3
21:01:00	21:01:00	62.3	80.4	66.8	57.7	62.3	80.3	66.8	57.7
21:02:00	21:02:00	62.6	85.8	72	54.6	62.6	85.8	72	54.6
21:03:00	21:03:00	61.6	84.6	69.3	57	61.6	84.6	69.2	56.9
21:04:00	21:04:00	60.4	81.5	67.2	57	60.4	81.5	67.2	57
21:05:00	21:05:00	62	84.8	68.1	58.1	62	84.8	68.1	58.1
21:06:00	21:06:00	61.2	82.9	69.4	54.6	61.1	82.8	69.4	54.6
21:07:00	21:07:00	62.3	83.9	71.3	56.5	62.3	83.9	71.3	56.5
21:08:00	21:08:00	64.6	94.3	76.8	57.7	64.6	94.3	76.8	57.7
21:09:00	21:09:00	63.1	86	72.7	55.2	63.1	86	72.7	55.2
21:10:00	21:10:00	59.5	77.1	64.9	55.1	59.4	77.1	64.9	55.1
21:11:00	21:11:00	64	86	73.6	54.8	64	86	73.6	54.8
21:12:00	21:12:00	62.8	82.9	70	55.1	62.8	82.9	69.9	55.1
21:13:00	21:13:00	59.6	80	66.7	53.2	59.6	80	66.7	53.1
21:14:00	21:14:00	63.5	82.1	69.8	58.1	63.5	82.1	69.8	58.1
21:15:00	21:15:00	63.6	87.2	72.7	56.3	63.6	87.2	72.7	56.3
21:16:00	21:16:00	61.4	82.2	68.8	55.7	61.3	82.2	68.7	55.7
21:17:00	21:17:00	63	87.6	71	52.9	63	87.6	71	52.9
21:18:00	21:18:00	64.1	87.3	73.2	56.3	64.1	87.3	73.2	56.2
21:19:00	21:19:00	64.3	89.1	75.4	57.5	64.2	89	75.3	57.4
21:20:00	21:20:00	61.4	81.6	73.6	54.4	61.3	81.6	73.6	54.3
21:21:00	21:21:00	61.7	82.1	69.4	54.6	61.7	82.1	69.4	54.6
21:22:00	21:22:00	60.4	77.4	64.6	54.2	60.4	77.4	64.6	54.2
21:23:00	21:23:00	59.9	82.5	68	55.8	59.9	82.5	68	55.7
21:24:00	21:24:00	61.8	82.7	69.4	56.1	61.8	82.7	69.4	56.1
21:25:00	21:25:00	61.8	82.2	68.7	57.5	61.7	82.2	68.7	57.5
21:26:00	21:26:00	63.2	84.5	71.3	57.7	63.2	84.5	71.3	57.7
21:27:00	21:27:00	62.5	83.6	70.8	56.4	62.4	83.5	70.8	56.3
21:28:00	21:28:00	58.5	81.6	68	54.6	58.5	81.6	68	54.6
21:29:00	21:29:00	61.6	80	67.5	56.5	61.6	79.9	67.5	56.5
21:30:00	21:30:00	60.5	81.6	68.6	54.2	60.5	81.6	68.5	54.2
21:31:00	21:31:00	62.4	83	68.6	54.8	62.4	83	68.6	54.8
21:32:00	21:32:00	58.6	82.3	68.4	52.8	58.6	82.2	68.4	52.8
21:33:00	21:33:00	61.6	80.6	68.5	53.4	61.6	80.6	68.5	53.4
21:34:00	21:34:00	60.8	81.1	67.2	53.5	60.8	81.1	67.2	53.5
21:35:00	21:35:00	62.5	85.7	69.3	54.2	62.4	85.7	69.3	54.2
21:36:00	21:36:00	62.7	81.4	67.6	56	62.7	81.4	67.6	55.9
21:37:00	21:37:00	62.4	81.7	69.2	57	62.4	81.7	69.2	57
21:38:00	21:38:00	59.3	81	67.2	54.9	59.3	80.9	67.2	54.8
21:39:00	21:39:00	60.8	80.1	67.7	53.6	60.7	80.1	67.6	53.6
21:40:00	21:40:00	61.5	89	70	55.3	61.5	88.9	70	55.3
21:41:00	21:41:00	62.6	83.2	69.9	54.9	62.6	83.2	69.9	54.9
21:42:00	21:42:00	63	89	73.6	52.2	63	89	73.6	52.2
21:43:00	21:43:00	62.3	83.7	68.8	53.2	62.3	83.7	68.8	53.1
21:44:00	21:44:00	57.4	79.7	66.2	52.5	57.4	79.6	66.2	52.4
21:45:00	21:45:00	60.8	83.9	69.5	50.8	60.8	83.9	69.4	50.7
21:46:00	21:46:00	60.7	80.4	67.3	52.3	60.6	80.4	67.3	52.3
21:47:00	21:47:00	60.5	81.9	67.9	53.1	60.5	81.9	67.9	53.1
21:48:00	21:48:00	61	83.6	68.6	51.1	61	83.6	68.5	51.1
21:49:00	21:49:00	59.1	78.5	64.5	53.5	59	78.5	64.5	53.4

21:50:00	21:50:00	60.3	79.2	66.6	54.5	60.3	79.2	66.6	54.5
21:51:00	21:51:00	60	81	67.8	51.4	60	81	67.8	51.4
21:52:00	21:52:00	61.3	82.9	69.4	53.2	61.3	82.9	69.4	53.2
21:53:00	21:53:00	60.8	82.7	68.7	53.1	60.7	82.7	68.6	53.1
21:54:00	21:54:00	61.4	83.6	69.9	53.8	61.4	83.6	69.8	53.8
21:55:00	21:55:00	59.5	81.7	67.6	54.1	59.4	81.6	67.6	54
21:56:00	21:56:00	60.3	83.3	68.7	52.3	60.3	83.3	68.7	52.3
21:57:00	21:57:00	60.3	85	70.9	51.7	60.3	85	70.9	51.7
21:58:00	21:58:00	56.6	78.9	59.9	52.8	56.6	78.8	59.9	52.8
21:59:00	21:59:00	58.1	81	66.5	50.9	58.1	80.9	66.5	50.9
22:00:00	22:00:00	57.8	81.9	65.8	51	57.8	81.9	65.8	51
22:01:00	22:01:00	56	77.6	63.5	50.8	56	77.6	63.5	50.8
22:02:00	22:02:00	61	82.1	69.2	52.8	61	82	69.2	52.7
22:03:00	22:03:00	57.4	78.6	63.6	52.8	57.4	78.6	63.6	52.8
22:04:00	22:04:00	56.3	81.4	63.4	51.1	56.3	81.4	63.3	51.1
22:05:00	22:05:00	57.5	78.3	64.7	51.6	57.4	78.2	64.7	51.6
22:06:00	22:06:00	60.6	84.2	70.1	50.8	60.6	84.1	70.1	50.8
22:07:00	22:07:00	62.3	84.6	72.2	51.3	62.2	84.6	72.2	51.3
22:08:00	22:08:00	57.1	75.9	64	52.5	57.1	75.9	64	52.5
22:09:00	22:09:00	60.8	83.8	68.5	51.2	60.7	83.7	68.5	51.1
22:10:00	22:10:00	60.5	80.4	67.3	52.1	60.4	80.4	67.2	52.1
22:11:00	22:11:00	56.8	73.8	61	52.5	56.8	73.7	60.9	52.5
22:12:00	22:12:00	61.5	84.5	70.6	50.8	61.5	84.5	70.5	50.7
22:13:00	22:13:00	56.8	80.5	64.9	51.4	56.7	80.5	64.8	51.4
22:14:00	22:14:00	62.4	83.2	67.8	54.2	62.3	83.2	67.8	54.2
22:15:00	22:15:00	59.1	82.9	67.8	52.6	59.1	82.9	67.8	52.5
22:16:00	22:16:00	59.1	79	65.6	52.6	59.1	79	65.6	52.6
22:17:00	22:17:00	62.9	86.6	71.6	50.8	62.8	86.6	71.6	50.8
22:18:00	22:18:00	60.8	86.2	70.4	52.5	60.7	86.1	70.4	52.5
22:19:00	22:19:00	57.9	81.1	66.6	51.4	57.9	81.1	66.5	51.4
22:20:00	22:20:00	60.3	83.1	68.8	52.2	60.3	83.1	68.8	52.2
22:21:00	22:21:00	59.7	80.4	66.9	52.9	59.7	80.3	66.9	52.9
22:22:00	22:22:00	55.8	83	63.3	51.6	55.8	83	63.3	51.5
22:23:00	22:23:00	58.5	77.8	63.8	50.7	58.4	77.8	63.8	50.7
22:24:00	22:24:00	58.4	80.3	67.1	50.9	58.4	80.3	67.1	50.9
22:25:00	22:25:00	61.5	83.2	69	53.5	61.4	83.2	69	53.5
22:26:00	22:26:00	60.2	85.1	69.5	52.8	60.2	85	69.5	52.8
22:27:00	22:27:00	62.7	84.1	70.7	51.7	62.7	84.1	70.6	51.7
22:28:00	22:28:00	58.1	81.5	67.6	50.4	58	81.5	67.6	50.4
22:29:00	22:29:00	60.3	80.6	67.9	51.7	60.3	80.5	67.9	51.7
22:30:00	22:30:00	61.3	81.5	68.1	51.6	61.3	81.5	68.1	51.6
22:31:00	22:31:00	59.9	79.7	67.7	51.2	59.9	79.7	67.6	51.2
22:32:00	22:32:00	61.7	85.7	74.1	50.8	61.7	85.7	74.1	50.8
22:33:00	22:33:00	60.7	82.7	69.7	51.5	60.7	82.7	69.7	51.5
22:34:00	22:34:00	61.6	84.2	71.1	53.3	61.6	84.1	71.1	53.3
22:35:00	22:35:00	59.5	82	68	53.2	59.5	82	68	53.2
22:36:00	22:36:00	57.2	75.3	61.7	53.6	57.2	75.3	61.7	53.6
22:37:00	22:37:00	62	86.7	71.8	52.7	62	86.7	71.8	52.7
22:38:00	22:38:00	63.2	85.9	72.6	55.8	63.2	85.9	72.6	55.8
22:39:00	22:39:00	58.8	79.7	66.7	51.9	58.7	79.7	66.6	51.9
22:40:00	22:40:00	59.3	78.2	65.1	52.6	59.3	78.1	65.1	52.6
22:41:00	22:41:00	58	83	67.3	53.5	58	82.9	67.2	53.5
22:42:00	22:42:00	60.1	79.6	66	53.3	60.1	79.5	66	53.3
22:43:00	22:43:00	61.7	81.7	69.2	51.8	61.7	81.7	69.2	51.8
22:44:00	22:44:00	66.8	87.6	74.8	53.9	66.8	87.6	74.8	53.9
22:45:00	22:45:00	60.1	82.2	68.2	52.7	60.1	82.2	68.2	52.6
22:46:00	22:46:00	58.7	80.4	67	52	58.6	80.4	67	52
22:47:00	22:47:00	56.3	76.6	63.8	50.3	56.3	76.6	63.8	50.3
22:48:00	22:48:00	61.1	80.1	67.3	54	61.1	80.1	67.3	54
22:49:00	22:49:00	59.3	81.2	67.7	52.4	59.3	81.1	67.6	52.4
22:50:00	22:50:00	61.3	80.4	67.1	55.4	61.3	80.4	67.1	55.3
22:51:00	22:51:00	61.2	84.9	71.2	51.4	61.2	84.9	71.2	51.4
22:52:00	22:52:00	58.1	79.9	65.8	53.7	58	79.9	65.8	53.7
22:53:00	22:53:00	61.3	81.7	68.5	53.1	61.3	81.7	68.5	53.1
22:54:00	22:54:00	60.9	82.3	69.1	51.3	60.9	82.3	69.1	51.3
22:55:00	22:55:00	59.4	83.6	70.7	51	59.3	83.6	70.6	51
22:56:00	22:56:00	61.1	82.8	67.6	52.9	61.1	82.8	67.6	52.9
22:57:00	22:57:00	60.3	83.5	69.9	51.2	60.2	83.5	69.8	51.2
22:58:00	22:58:00	64.2	87.2	74.4	50.6	64.2	87.2	74.3	50.6
22:59:00	22:59:00	57.2	87.4	66.7	52.4	57.2	87.4	66.7	52.4
23:00:00	23:00:00	63.1	85	70	53.9	63.1	85	70	53.8
23:01:00	23:01:00	60	80.3	66.3	52.2	60	80.2	66.3	52.1
23:02:00	23:02:00	57.8	77.8	61.6	53	57.8	77.8	61.6	53
23:03:00	23:03:00	59.5	79.1	65.1	52.8	59.5	79.1	65.1	52.8
23:04:00	23:04:00	60.2	82.2	66.5	54.4	60.2	82.1	66.5	54.4
23:05:00	23:05:00	61.2	81.7	68	55.3	61.2	81.6	68	55.2
23:06:00	23:06:00	57.1	73.6	62.5	52.2	57.1	73.6	62.5	52.2
23:07:00	23:07:00	60.4	83	68.8	52.8	60.4	83	68.8	52.8

23:08:00	23:08:00	60.6	81.6	69	53.9	60.6	81.6	69	53.9
23:09:00	23:09:00	56.3	77.9	65	51.1	56.3	77.9	65	51.1
23:10:00	23:10:00	62	82	67.9	54.1	62	82	67.9	54
23:11:00	23:11:00	61.1	81.1	67.2	54.5	61.1	81.1	67.2	54.4
23:12:00	23:12:00	59.4	81.6	67.7	52.8	59.4	81.5	67.6	52.8
23:13:00	23:13:00	58.3	80.4	65.7	51.9	58.2	80.4	65.7	51.9
23:14:00	23:14:00	59.4	82.2	67.8	50.6	59.4	82.1	67.8	50.6
23:15:00	23:15:00	57.5	75.5	63.4	52.5	57.5	75.5	63.4	52.4
23:16:00	23:16:00	61.1	81.9	71.1	53.3	61.1	81.8	71.1	53.2
23:17:00	23:17:00	63.7	90.2	74.7	53.5	63.7	90.2	74.7	53.5
23:18:00	23:18:00	58.5	78.7	65.7	51.9	58.5	78.7	65.7	51.9
23:19:00	23:19:00	63.9	87.3	73.9	53.5	63.9	87.2	73.9	53.5
23:20:00	23:20:00	60.9	82.1	68.6	54.3	60.9	82.1	68.5	54.3
23:21:00	23:21:00	64.1	85	71.9	53	64	85	71.9	53
23:22:00	23:22:00	60.1	81.2	68.9	52.5	60.1	81.2	68.8	52.5
23:23:00	23:23:00	61.7	81.2	67.4	53	61.6	81.2	67.4	53
23:24:00	23:24:00	62.8	82.7	69.3	53.3	62.8	82.7	69.3	53.3
23:25:00	23:25:00	57	74.5	60.2	52.9	56.9	74.5	60.2	52.8
23:26:00	23:26:00	60.1	77.2	65	55	60.1	77.2	65	55
23:27:00	23:27:00	58.2	80.5	65.2	52.2	58.2	80.4	65.2	52.2
23:28:00	23:28:00	60.8	81.5	67.1	55.2	60.8	81.4	67	55.2
23:29:00	23:29:00	64.3	86.6	73.6	48.4	64.2	86.6	73.5	48.4
23:30:00	23:30:00	62.7	84.9	68.8	54.2	62.7	84.8	68.8	54.2
23:31:00	23:31:00	60.7	81.1	66	54.4	60.6	81	66	54.3
23:32:00	23:32:00	64.3	92.6	76	52.2	64.3	92.6	76	52.2
23:33:00	23:33:00	62.7	87.2	73.2	51.6	62.7	87.2	73.2	51.5
23:34:00	23:34:00	61	82.1	68.4	52.5	61	82.1	68.4	52.5
23:35:00	23:35:00	60.6	81.4	68.4	54.4	60.6	81.4	68.4	54.4
23:36:00	23:36:00	61.9	81.8	69.4	55.2	61.9	81.8	69.4	55.2
23:37:00	23:37:00	62.1	82.7	67.9	53.5	62	82.7	67.9	53.4
23:38:00	23:38:00	61.3	85	71.2	52.4	61.2	84.9	71.2	52.4
23:39:00	23:39:00	63.5	90	75.2	53	63.5	90	75.2	53
23:40:00	23:40:00	57	73.3	61.5	50.1	57	73.3	61.5	50
23:41:00	23:41:00	61.8	82.5	68.1	51.9	61.8	82.4	68.1	51.8
23:42:00	23:42:00	61.3	81.4	67.9	52.8	61.2	81.4	67.8	52.8
23:43:00	23:43:00	58.2	82.2	66.5	51.2	58.2	82.2	66.5	51.1
23:44:00	23:44:00	63.6	85.8	72	54.7	63.6	85.7	72	54.7
23:45:00	23:45:00	83.7	111.4	97.7	56	83.7	111.4	97.7	55.9
23:46:00	23:46:00	58.6	78.1	64.4	51.9	58.6	78.1	64.3	51.9
23:47:00	23:47:00	59.5	79.7	67	52.9	59.5	79.7	67	52.8
23:48:00	23:48:00	60.9	81.6	69.1	52.6	60.9	81.5	69.1	52.6
23:49:00	23:49:00	58.9	81	67.7	51.5	58.8	81	67.7	51.5
23:50:00	23:50:00	60.8	79.5	66.2	53.9	60.8	79.5	66.1	53.9
23:51:00	23:51:00	60	80.8	67.1	50.1	59.9	80.7	67.1	50.1
23:52:00	23:52:00	60.4	85.5	69.8	52	60.4	85.5	69.8	52
23:53:00	23:53:00	59.1	83.2	68	51.3	59.1	83.1	67.9	51.2
23:54:00	23:54:00	59.1	80.5	65.9	53.4	59.1	80.5	65.9	53.3
23:55:00	23:55:00	60.7	80.3	66.1	53.1	60.7	80.2	66.1	53.1
23:56:00	23:56:00	62	82	68.4	52.9	61.9	82	68.3	52.9
23:57:00	23:57:00	61	83.6	69.5	52.7	61	83.6	69.5	52.7
23:58:00	23:58:00	60.3	83.2	68.4	52.2	60.3	83.2	68.4	52.2
23:59:00	23:59:00	59.6	81.2	67	51.4	59.6	81.2	66.9	51.3
24:00:00	24:00:00	61	82	68.5	51.2	61	82	68.5	51.2

Attachment 3
Applicable Noise References

Relationship Between Indoor and Outdoor Levels

The contribution of outdoor noise to indoor noise levels is usually small. That part of a sound level within a building caused by an outdoor source obviously depends on the source's intensity and the sound level reduction afforded by the building. Although the sound level reduction provided by different buildings differs greatly, dwellings can be categorized into two broad classes-- those built in warm climates and those built in cold climates. Further, the sound level reduction of a building is largely determined by whether its windows are open or closed. Table II shows typical sound level reductions for these categories of buildings and window conditions, as well as an approximate national average sound level reduction.

Table II
Typical Sound Level Reductions of Buildings

	Windows Opened	Windows Closed
Warm Climate	12dB	24dB
Cold Climate	17dB	27dB
Approximate National Average	15dB	25dB

Sample measurements of outdoor and indoor noise levels during 24-hour periods are depicted in Figure 7. Despite the sound level reduction of buildings, indoor levels are often comparable to or higher than levels measured outside. Thus, indoor levels often are influenced primarily by internal noise sources such as appliances, radio and television, heating and ventilating equipment, and people. However, many outdoor noises may still annoy people in their homes more than indoor noises do. Indeed, people sometimes turn on indoor sources to mask the noise coming from outdoors.

An example of the range of hourly sound levels measured inside living areas is plotted for each hour of the day in Figure 8. The figure shows the median levels and the range of levels observed for 80% of the data. During late night hours the typical hourly sound level was approximately 36 dB. This level was probably dominated by outdoor noise. However, during the day, the hourly average levels ranged from about 40 to 70 dB, indicating the wide range of activities in which people engage.

INDIVIDUAL NOISE EXPOSURE PATTERNS

During a 24-hour period, people are exposed to a wide range of noises, including noise at home, work, school, places of recreation, shopping establishments, and while enroute to these or other locations. Clearly, no single exposure pattern can be typical of all people, or even of those people who follow a common life style. Figure 9 shows hypothetical exposure patterns for broad classes of people. From these levels and some assumptions about the hours spent at different daytime activities, 24-hour average sound levels can be estimated for factory and office workers, housewives, and preschool and school-age children. Estimates based on these assumptions are found in Table III.

3.5.1 Barrier Design Goals and Insertion Loss.

The first step in barrier design is to establish the design goals. Design goals may not be limited simply to noise reduction at receivers, but may also include other considerations of safety and maintenance as well. These other considerations are discussed later in Sections 4 through 13.

In this section, the acoustical design goals of noise reduction will be discussed. Acoustical design goals are usually referred to in terms of barrier *Insertion Loss* (IL). IL is defined as the sound level at a given receiver before the construction of a barrier minus the sound level at the same receiver after the construction of the barrier. The construction of a noise barrier usually results in a partial loss of soft-ground attenuation. This is due to the barrier forcing the sound to take a higher path relative to the ground plane. Therefore, barrier IL is the net effect of barrier diffraction, combined with this partial loss of soft-ground attenuation.

Typically, a 5-dB(A) IL can be expected for receivers whose line-of-sight to the roadway is just blocked by the barrier. A general rule-of-thumb is that each additional 1 m of barrier height above line-of-sight blockage will provide about 1.5 dB(A) of additional attenuation (see Figure 13).

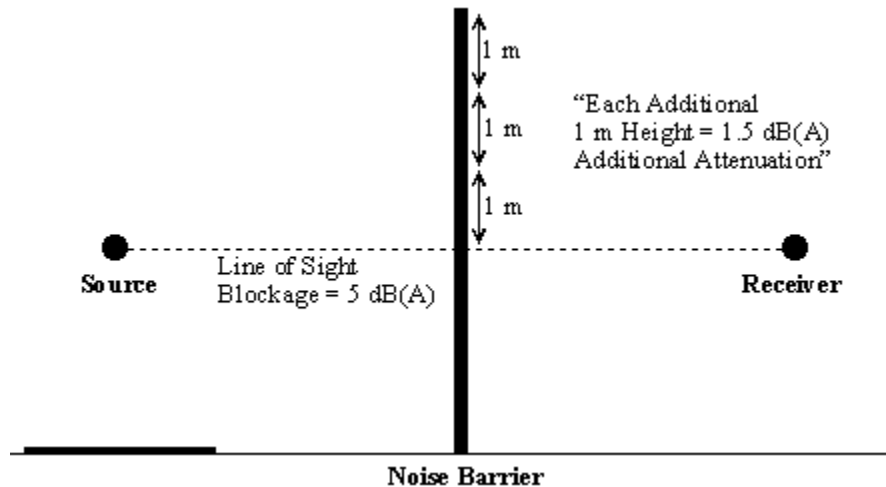


Figure 13. Line-of-sight

Properly-designed noise barriers should attain an IL approaching 10 dB(A), which is equivalent to a perceived halving in loudness for the first row of homes directly behind the barrier. For those residents not directly behind the barrier, a noise reduction of 3 to 5 dB(A) can typically be provided, which is just slightly perceptible to the human ear. Table 4 shows the relationship between barrier IL and design feasibility.

Table 4. Relationship between barrier insertion loss and design feasibility.

Barrier Insertion Loss	Design Feasibility	Reduction in Sound Energy	Relative Reduction in Loudness
5 dB(A)	Simple	68%	Readily perceptible
10 dB(A)	Attainable	90%	Half as loud
15 dB(A)	Very difficult	97%	One-third as loud
20 dB(A)	Nearly impossible	99%	One-fourth as loud

Table 3.10-9
Typical Noise Attenuation Methods to Insulate the Noise Receiver

Noise Level Reduction	Typical Mitigation Methods
	<i>Mitigation 1, 2, and 3</i>
15-20 dBA	1. Air conditioning or mechanical ventilation. 2. Double-paned glass. 3. Solid core doors with weather stripping and seals.
	<i>Mitigation 1, 2, and 3 plus</i>
20-25 dBA	4. Stucco or brick veneer exterior walls or wood siding w/one-half inch thick fiberboard underlayer. 5. Glass portions of windows/doors not to exceed 20 percent. 6. Exterior vents facing noise source shall be baffled.
	<i>Mitigation 1 through 6 plus</i>
25-30 dBA	7. Interior sheetrock of exterior wall attached to studs by resilient channels or double walls. 8. Window assemblies, doors, wall construction materials, and insulation shall have a lab-tested STC rating of 30 or greater.

- Where uses, particularly habitable structures, are planned near noise-generating sources, future projects may be required to use a combination of the following architectural treatments or alternative methods to bring interior noise levels to below 45 dBA or 50 dBA for specified uses as indicated in **Table 3.10-7**:
 - Installation of sound barriers (masonry walls or walls with earth berms) between habitable space and noise sources,
 - Installation of double-paned or similar sound rated windows,
 - Provision of sound insulating exterior walls and roofing systems,
 - Location or design of attic vents to minimize sound propagation into structures,
 - Provision of forced-air ventilation systems,
 - Use of building setbacks to increase distance between noise sources and receivers,
 - Placing noise tolerant land uses such as parking lots, maintenance facilities, and utility areas between noise sources and receptors, or
 - Orienting or clustering buildings to shield outdoor spaces from noise sources.
- Future development projects that are located in an Airport Influence Area must use feasible noise attenuation methods in order to meet acceptable interior noise levels for the use and provide avigation easements consistent with adopted Airport Land Use Compatibility Plans. Prior to approval of any entitlement for a future project, the City will identify any noise impacts and measures to reduce such in accordance with City, Airport Land Use Commission, state, and federal regulations.
- All non-emergency construction activity for future projects must comply with the limits (maximum noise levels, hours and days of activity) established in State and City noise regulations (Title 24 California Code of Regulations, San Diego Development Code and Chapter 5, Article 9.5 of the Municipal Code). Proposed industrial or commercial projects located near residential areas must demonstrate that the project, when constructed, will meet City noise reduction requirements.

Attachment 4
Resume – Scott Cohen, P.E., C.I.H.

EDUCATION

UNIVERSITY OF CALIFORNIA, SANTA BARBARA Santa Barbara, CA
B. S. Mechanical Engineering June 1993

WORK HISTORY

SESPE CONSULTING, INC. Ventura, CA; San Diego, CA
Principal Engineer May 2019 – Present
Project Manager III June 2009 – May 2019

COUNTY OF SAN DIEGO. San Diego, CA
Air Pollution Control District Hearing Board Member September 2014 – September 2018

WEST COAST ENVIRONMENTAL AND ENGINEERING Ventura, CA; San Diego, CA
Managing Engineer 1996 – May 2009

LOS ALAMOS NATIONAL LABORATORY Los Alamos, NM
Hazardous Waste Technician IV 1994 – 1995
Graduate Research Assistant, Hydrology Group 1993 – 1994

Recent work history includes:

- Provision of EH&S permitting and compliance services for industrial and municipal clientele.
- Management of southern California branch office(s) and staff including acquisition of office space, furniture, equipment, and consumables; installation and maintenance of network infrastructure and information systems; human resource functions such as hiring, firing, and policy enforcement; transitional duties during acquisition of another small consulting company; and interface with property manager(s).
- Management of multiple, simultaneous consulting projects of various sizes, durations, locations, complexities, and subject matter. Tasks include proposal scoping, costing, writing and interviewing; primary contact for client, agency staff and other stakeholders; budget and schedule tracking; invoice preparation and distribution.
- Interpretation and tracking of regulatory, planning and legal developments and documentation to identify potential opportunities and challenges; ensure that work product is prepared using the most current and defensible method available; and illuminate alternative and/or novel approaches that may be implemented.
- Marketing through active participation in various associations and other groups including volunteering to serve as chair, secretary, host, or another role in committees and for meetings; public speaking, booth attendance, and entertainment of clients during conferences; writing articles for trade journals; and donation of professional services as may be needed to track issues, attend meetings, strategize and communicate when an undesirable restriction has been proposed.

- Using and learning to use computers to most efficiently accomplish work at-hand including specialized software (e.g., AERMOD, HARP, EMFAC, CalEEMod, GIS, RTNM, SoundPlan, AggFlow); office productivity software (e.g., Word, Excel, Access, VBA); graphics software (e.g., Photoshop/Illustrator, 2D CAD, etc.); networking software (e.g., LAMP stack).
- Technical support and process development for publishing large environmental documents (EIRs).
- Core skill set includes:
 - Project Management
 - Technical Writing
 - Air Quality and Greenhouse Gases
 - Noise and Vibration
 - CEQA/NEPA
 - Dispersion Modeling and Health Risk Assessment
 - Construction and Mining
 - Industrial Hygiene

EXPERIENCE

Technical Analysis for CEQA/NEPA and Special Studies

- Practiced in the subject areas of air quality, health risk assessment, climate change, noise, vibration, and hazardous materials. Emphasis in assessing fugitive dust and diesel exhaust.
- Applied CEQA requirements in light of existing case law to assess baseline, cumulative effects, and project fair share of mitigation for cumulative effects.
- Developed feasible, enforceable mitigation measure language including some creative solutions.
- Successfully defended work-product through litigation of several project EIRs by supporting efforts of legal counsel in the analysis of opposition arguments and the development counter arguments.
- Experienced a variety of project types including mining, asphalt, ready mix concrete, residential/commercial developments, arterial-freeway interchange improvements, and a university long range development plan.

Industrial Environmental Compliance and Permitting

- Involved in most aspects of environmental compliance for industrial clients including development of management systems and policy.
- Permitted air emissions sources in local and federal (Title V) programs including all aspects of new source review, emissions calculations and modeling, health risk assessment, best available control technology (BACT) cost effectiveness, and portable equipment regulation.
- Permitted industrial process water discharge to land under National Pollutant Discharge Elimination System (NPDES) and to sewer.

- Prepared storm water pollution prevention plans (SWPPP) and related documents including notices of intent, annual reports, and notification to regional water board of illicit discharges.
- Performed services related to characterization and management of hazardous materials and wastes including:
 - Release investigation and sampling.
 - Storage, use and transport as regulated by EPA, OSHA, DOT and the Uniform Fire Code.
 - Risk management plans (RMPs) for facilities with acutely hazardous material.
 - Emergency response plans and spill pollution control and countermeasures (SPCC) plans for facilities with bulk petroleum storage.

Air Quality Expertise

- Prepared air permit applications and negotiated conditions on permits to construct and operate various types of sources and facilities (including those in Title V) in each major California air district, some smaller districts, and several states. Work included each facet of new source review including cost effectiveness and feasibility for BACT, offsets, modeling and coordination of start-up/initial source testing.
- Prepared air dispersion models using AERMOD and assessed health risk using CARB HARP software for many projects and purposes including as part of air permitting and CEQA impact analysis.
- Represented California Mining Association and provided consultation to Arizona Rock Products Association during fugitive dust rulemaking in South Coast AQMD (Rule 1157) and Maricopa County (Rule 316).
- Prepared various compliance reporting documents and provided consultation related to compliance issues. Specifically, emissions inventory (GHG, criteria and air toxics) protocols and reporting; violation response and negotiation, and annual compliance certifications/renewals under Title V.

Worker Safety and Industrial Hygiene

- Provided regulatory analysis and technical support to clients with issues in the areas of indoor air quality (IAQ) and other employee exposure investigations.
- Process hazard analysis, injury and illness prevention (IIPP), safety program management, OSHA violation response, employee training, hazard communication (HAZCOM), personal protective equipment (PPE) selection, confined space, lockout/tagout, health risk assessment, noise, and fall protection.

REGISTRATIONS AND CERTIFICATIONS

Registered Mechanical Engineer: California M30545

Certified Industrial Hygienist: 8162CP

County of San Diego CEQA Air Quality and Noise Consultant Lists

PUBLISHED ARTICLES AND PRESENTATIONS

California Construction and Industrial Mineral Association Education Conference or Meeting
The Air UP There – Positive Health Impacts from Industry’s Investments in Diesel Truck Engines (2018).
Distance Matters – Assessing Regional Air and GHG Impacts of Mining Projects Under CEQA (2015).
Industrial Hygiene Statistics and Exposure Assessment (H&S Committee Meeting, 7/2015).
Navigating the Rocky Road to Portable Permitting in California (2013).
Community Noise Impact Assessment Primer (2011).
Portable Plant Air Permitting, What You Need to Know (2009).
Case Study – CEQA Analysis of Air Quality, Greenhouse Gas, and Health Risk Impacts (2008).

Industrial Environmental Association Education Conference or Meeting
Air Permitting 101 & 102 (2015 & 2016).
California Health Risk Assessment Methodology Changes (Air Committee Meeting, 4/2014).

California Asphalt Magazine
Health Risk Assessment – What to Expect and How to Prepare (July 2017).
Portable Equipment Air Permitting and Compliance Status Update (July 2012).
Can California Afford its Climate Change Policies? (July 2011).

California Precast Concrete Association (CPCA) Member Meeting
Current Air Quality Issues Facing Processors of Non-Metallic Minerals (November 2005).

AFFILIATIONS AND MEMBERSHIPS

California Construction and Industrial Materials Association Member and Associate of the Year in 2015
California Asphalt Pavement Association Environmental Committee Co-chair (2010 to present)
Industrial Environmental Association Member
Industrial Minerals Association of North America Member
American Industrial Hygiene Association Member
San Diego APCD Air Pollution Permit Streamlining Committee/Compliance Improvement Team (APPS/CIT)
Meeting Chair (7/2012 to 7/2017)