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May 6, 2025

Project No. 544-22471
25-05-232

JT Santorini Villa LLC
c/o Kim Chen
1751 Colorado Boulevard, #333
Los Angeles, California 90041

Project: Proposed Joshua Tree Estates
APN 0605-051-01
SEC East Broadway Street & Laferney Avenue
Tentative Tract Map No. 20668
Joshua Tree Area
San Bernardino County, California

Subject: Geotechnical & Sewage Disposal Feasibility Report

Ref: Geotechnical Investigation report prepared by Sladden Engineering dated January 5, 2023; Project No. 544-22471, Report No. 23-01-005
Percolation Testing for Onsite Sewage Disposal Feasibility prepared by Sladden Engineering dated January 10, 2023; Project No. 544-22471, Report No. 23-01-015

In accordance with your request, we have reviewed the above referenced reports as they relate to the design and construction of the proposed Joshua Tree Estates. The project site (identified as APN 0605-051-01) is located on the southeast corner of East Broadway Street & Laferney Avenue in the Joshua Tree area of San Bernardino County, California. It is our understanding that the proposed residential structures will be of relatively lightweight wood-frame construction and will be supported by conventional shallow spread footings and concrete slabs on grade.

The referenced reports include recommendations pertaining to the design and construction of residential structure foundations. Based upon our review of the referenced reports, our previous experience on the project site and our understanding of the proposed construction, it is our opinion that the structural values and remedial grading recommendations included in the Geotechnical Investigation report remain applicable for use in the design and construction of the proposed residential structures, except as amended herein.

The proposed residential structures may be supported upon conventional shallow spread footings. All footings should be founded upon properly compacted engineered fill soil and should have a minimum embedment depth of 12 inches measured from the lowest adjacent finished grade. Continuous footings and isolated pad footings should have minimum widths of 12 inches and 24 inches, respectively. Continuous footings and isolated pad footings supported upon properly compacted engineered fill soil may be designed using allowable (net) bearing pressures of 1800 and 2000 pounds per square foot (psf), respectively. Allowable increases of 200 psf for each additional 1 foot of width and 250 psf for each additional 6 inches of depth may be used, if desired. The maximum allowable bearing pressure should be 2500 psf. The allowable bearing pressures are intended for combined dead and sustained live loads. The allowable bearing pressures may be increased by one-third when considering transient live loads, including seismic and wind forces.

Static settlement resulting from the anticipated foundation loads should be tolerable provided that the recommendations included in this report are considered in foundation design and construction. The ultimate static settlement is expected to be less than 1.0 inch when using the recommended allowable foundation bearing pressures. As a practical matter, differential static settlement between footings can be assumed as one-half of the total static settlement.

Lateral forces may be resisted by friction along the base of the foundations and passive resistance along the sides of the footings. A friction coefficient of 0.45 times the normal dead load forces is recommended for use in design. Passive resistance may be estimated using an equivalent fluid weight of 250 pcf. If used in combination with the passive resistance, the frictional resistance should be reduced by one third.

The surface soil is non-expansive and falls within the "very low" expansion category in accordance with 2022 California Building Code (CBC) classification criteria. Slab thickness and reinforcement should be determined by the structural engineer. We recommend a minimum floor slab thickness of 4.0 inches and minimum reinforcement of #3 bars at 24 inches on center in both directions. All slab reinforcement should be supported on concrete chairs to ensure that reinforcement is placed at slab mid-height.

Slabs with moisture sensitive surfaces should be underlain with a moisture vapor retarder consisting of a polyvinyl chloride membrane such as 10-mil Visqueen, or equivalent. All laps within the membrane should be sealed and at least 2 inches of clean sand should be placed over the membrane to promote uniform curing of the concrete. To reduce the potential for punctures, the membrane should be placed on a pad surface that has been graded smooth without any sharp protrusions. If a smooth surface cannot be achieved by grading, consideration should be given to placing a thin leveling course of sand across the pad surface prior to placement of the membrane.

Minor retaining walls may be necessary to accomplish the proposed construction. Lateral pressures for use in retaining wall design can be estimated using an equivalent fluid weight of 35 pcf for level drained native backfill conditions. For walls that are to be restrained at the top, the equivalent fluid weight should be increased to 55 pcf for level drained native backfill conditions. Back drains should be provided for the full height of the walls. Seismic pressures should be incorporated into any retaining walls greater than 6 feet in height. Seismic design pressures may be provided once specific wall heights and locations are known.

The seismic design category for a structure may be determined in accordance with Section 1613 of the 2022 CBC or ASCE7-16. According to the 2022 CBC, Site Class D measured may be used to estimate design seismic loading for the proposed structures. The 2022 CBC seismic design parameters are attached. The project Structural Engineer should verify that the design parameters provided are applicable for the subject project.

To provide firm and uniform foundation bearing conditions, the primary foundation bearing soil should be over-excavated and recompacted. Over-excavation should extend to a minimum depth of 3 feet below existing grade or 2 feet below the bottom of the footings, whichever is deeper. Once adequate removals have been verified, the exposed native soil should be moisture conditioned to near optimum moisture content and compacted to at least 90 percent relative compaction. The previously removed material may then be placed in thin lifts at near optimum moisture content and compacted to at least 90 percent relative compaction. Removals should extend at least 5 feet laterally beyond the footing limits.

In addition, we have reviewed the referenced Percolation Testing for On-site Sewage Disposal Feasibility report as it relates to septic system design. Based upon our review of the referenced report and the current project plans, it is our opinion that the leach line design criteria remain applicable.

Standard Design (3 Ft of Gravel Below Leach Lines)

Number of Bedrooms	1-2	3	4	5-6
Application Rate (ft ² /gal/day)	0.83	0.83	0.83	0.83
Gallons of Effluent Per Day	500	670	800	1,000
Gallons of Septic Tank Capacity	750	1,000	1,200	1,500
Absorption Area (ft ²):	415	556	664	830
Trench Credit (ft ² per ft):	7	7	7	7
Total Leach Line Length (ft)	60	80	95	119
Number of Leach Lines	2 @ 30 Ft.	2 @ 40 Ft.	2 @ 48 Ft.	3 @ 40 Ft.

May 6, 2025

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Project No. 544-22471
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We appreciate the opportunity to provide service to you on this project. If you have any questions regarding this letter or the referenced report, please contact the undersigned.

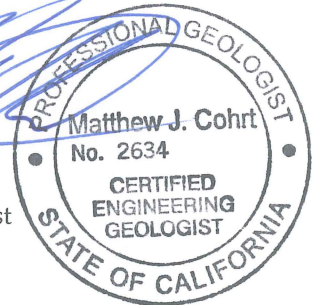
Respectfully submitted,
SLADDEN ENGINEERING

Brett L. Anderson
Principal Engineer

SER/cg



Matthew J. Cohrt
Principal Geologist



Copies: pdf/ Addressee

SITE-SPECIFIC GROUND MOTION ANALYSIS
(ASCE 7-16)

Project: East Broadway Street, Joshua Tree; APN 0605-051-01
 Project Number: 544-22471
 Client: Four Star Realty, c/o Kim Chen
 Site Lat/Long: 34.1623/-116.2690
 Controlling Seismic Source: Pinto Mountain

REFERENCE	NOTATION	VALUE	REFERENCE	NOTATION	VALUE	REFERENCE	NOTATION	VALUE
Site Class	C, D, D default, or E	D measured	Fv (Table 11.4-2)[Used for General Spectrum]	F _v	1.7	0.2*(S _{D1} /S _{D5})	T ₀	0.124*
Site Class D - Table 11.4-1	F _a	1.0	Design Maps	S _s	1.960	S _{D1} /S _{D5}	T _s	0.619*
Site Class D - 21.3(ii)	F _v	2.5	Design Maps	S ₁	0.714	Equation 11.4-4 - 2/3*S _{M1}	S _{D1}	0.8092*
0.2*(S _{D1} /S _{D5})	T ₀	0.182	Equation 11.4-1 - F _A *S _s	S _{MS}	1.960*	Equation 11.4-2 - F _v *S ₁	S _{M1}	1.2138*
S _{D1} /S _{D5}	T _s	0.911	Equation 11.4-3 - 2/3*S _{MS}	S _{D5}	1.307*			
Fundamental Period (12.8.2)	T	Period	Design Maps	PGA	0.845			
Seismic Design Maps or Fig 22-14	T _L	8	Table 11.8-1	F _{PGA}	1.1			
Equation 11.4-4 - 2/3*S _{M1}	S _{D1}	1.1900	Equation 11.8-1 - F _{PGA} *PGA	PGA _M	0.93*			
Equation 11.4-2 - F _v *S ₁ ¹	S _{M1}	1.7850	Section 21.5.3	80% of PGA _M	0.744			
¹ - F _v as determined by Section 21.3			Design Maps	C _{RS}	0.909			
			Design Maps	C _{R1}	0.9			
<u>RISK COEFFICIENT</u>								
Cr - At Periods <=0.2, Cr=C _{RS}	C _{RS}	0.909				Cr - At Periods between 0.2 and 1.0 use trendline formula to complete	Period	Cr
Cr - At Periods >=1.0, Cr=C _{R1}	C _{R1}	0.9					0.200	0.909
							0.300	0.908
							0.400	0.907
							0.500	0.906
							0.600	0.905
							0.680	0.904
							1.000	0.9

* Code based design value. See accompanying data for Site Specific Design values.

Mapped values from <https://hazards.atcouncil.org/>
<https://www.seismicmaps.org/>



PROBABILISTIC SPECTRA¹
2% in 50 year Exceedence

Project No: 544-22471

Period	UGHM	RTGM	Max Directional Scale Factor ²	Probabilistic MCE
0.010	0.858	0.828	1.19	0.985
0.100	1.454	1.419	1.19	1.689
0.200	1.897	1.876	1.20	2.251
0.300	2.162	2.064	1.22	2.518
0.500	2.114	1.961	1.23	2.412
0.750	1.740	1.598	1.24	1.982
1.000	1.479	1.334	1.24	1.654
2.000	0.802	0.721	1.24	0.894
3.000	0.524	0.469	1.25	0.586
4.000	0.364	0.325	1.25	0.406
5.000	0.271	0.240	1.26	0.302

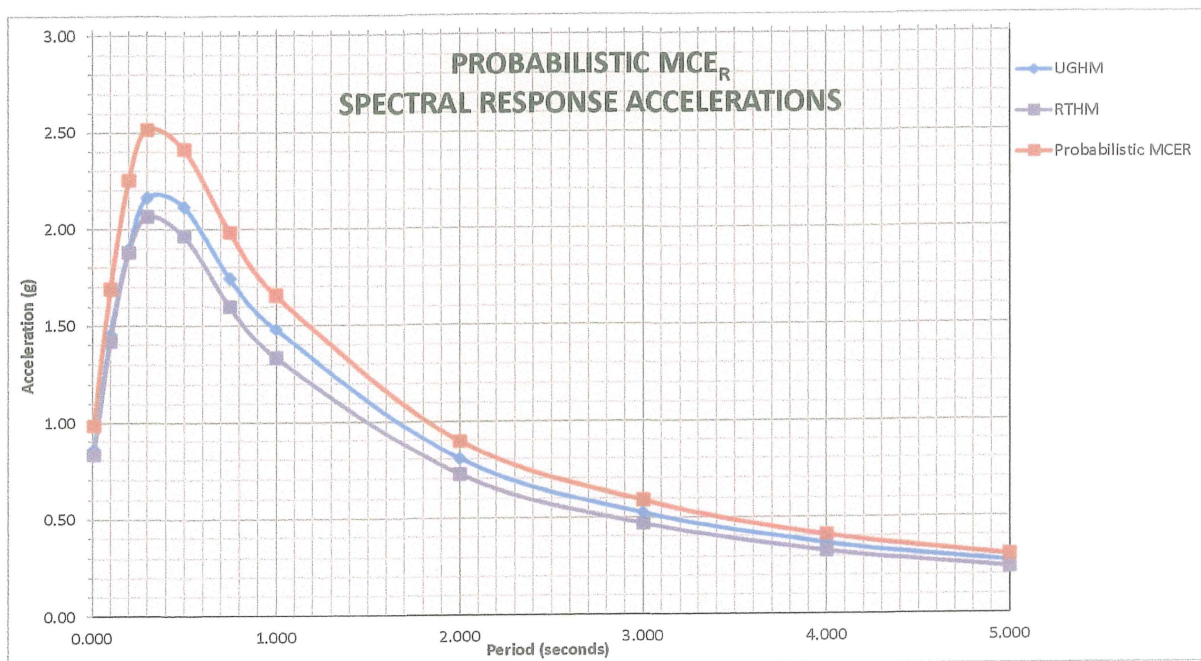
¹ Data Sources:

<https://earthquake.usgs.gov/hazards/interactive/>

<https://earthquake.usgs.gov/designmaps/rtgm/>

² Shahi-Baker RotD100/RotD50 Factors (2014)

Probabilistic PGA: 0.858
Is Probabilistic $S_{a(max)} < 1.2F_a$? **NO**



DETERMINISTIC SPECTRUM

Largest Amplitudes of Ground Motions Considering All Sources Calculated using Weighted Mean of Attenuation Equations¹

Controlling Source: Pinto Mountain

Is Probabilistic $S_{a(max)} < 1.2F_a$? NO

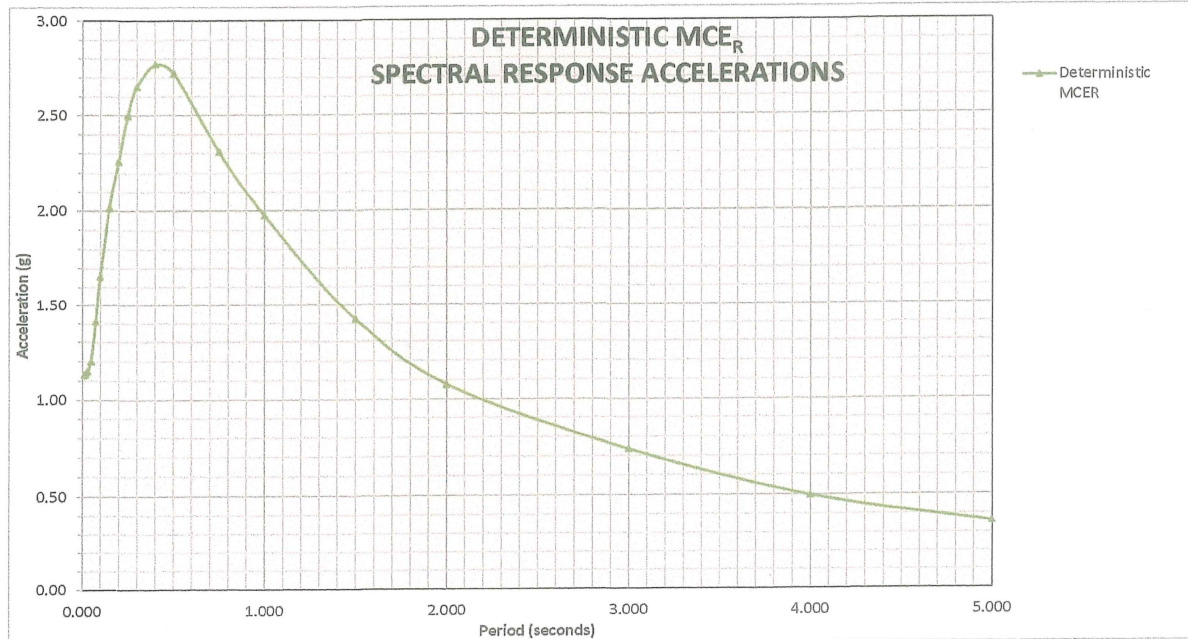
Period	Deterministic PSa Median + 1.0σ for 5% Damping	Max Directional Scale Factor ²	Deterministic MCE	Section 21.2.2 Scaling Factor Applied
0.010	0.949	1.19	1.129	1.129
0.020	0.953	1.19	1.134	1.134
0.030	0.964	1.19	1.148	1.148
0.050	1.007	1.19	1.199	1.199
0.075	1.186	1.19	1.411	1.411
0.100	1.391	1.19	1.655	1.655
0.150	1.680	1.20	2.016	2.016
0.200	1.883	1.20	2.260	2.260
0.250	2.066	1.21	2.499	2.499
0.300	2.174	1.22	2.652	2.652
0.400	2.252	1.23	2.770	2.770
0.500	2.213	1.23	2.722	2.722
0.750	1.860	1.24	2.306	2.306
1.000	1.592	1.24	1.974	1.974
1.500	1.146	1.24	1.421	1.421
2.000	0.867	1.24	1.075	1.075
3.000	0.587	1.25	0.734	0.734
4.000	0.396	1.25	0.495	0.495
5.000	0.286	1.26	0.360	0.360

Project No: 544-22471

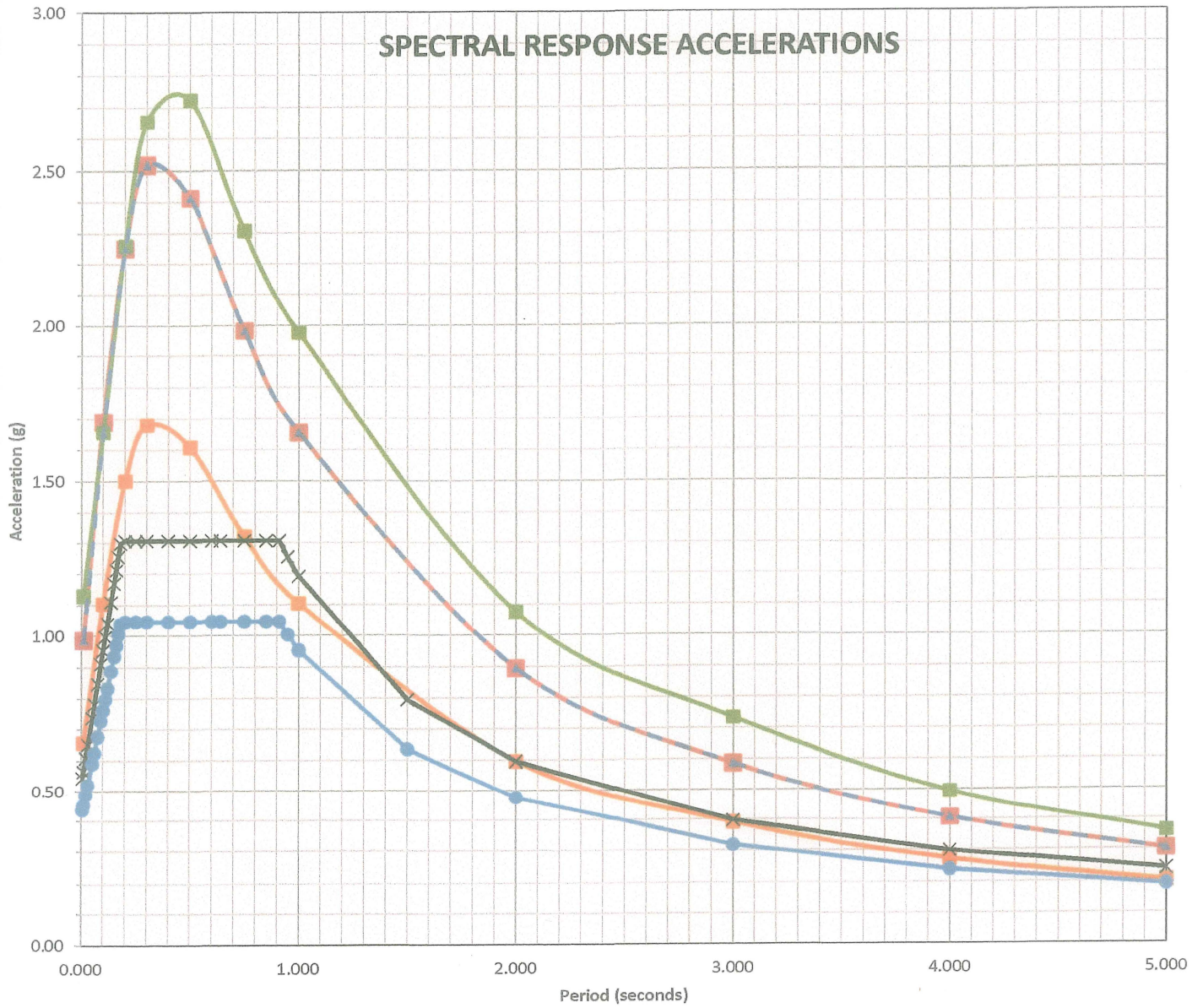
Is Deterministic $S_{a(max)} < 1.5 * F_a$? NO
 Section 21.2.2 Scaling Factor: N/A
 Deterministic PGA: 0.949
 Is Deterministic PGA $\geq F_{PGA} * 0.5$? YES

¹ NGAWest 2 GMPE worksheet and Uniform California Earthquake Rupture Forecast, Version 3 (UCERF3) - Time Dependent Model

² Shahi-Baker RotD100/RotD50 Factors (2014)



SPECTRAL RESPONSE ACCELERATIONS



- Probabilistic MCE
- Deterministic MCE
- Site-Specific MCE
- Design Response Spectrum
- ASCE 7 Section 21.3 General Spectrum
- 80% General Response Spectrum

JOSHUA TREE ESTATES

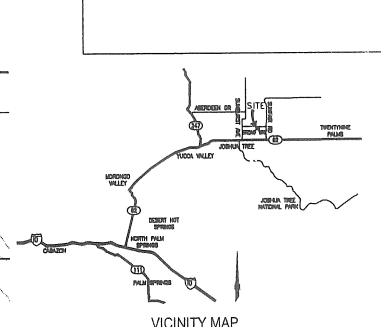
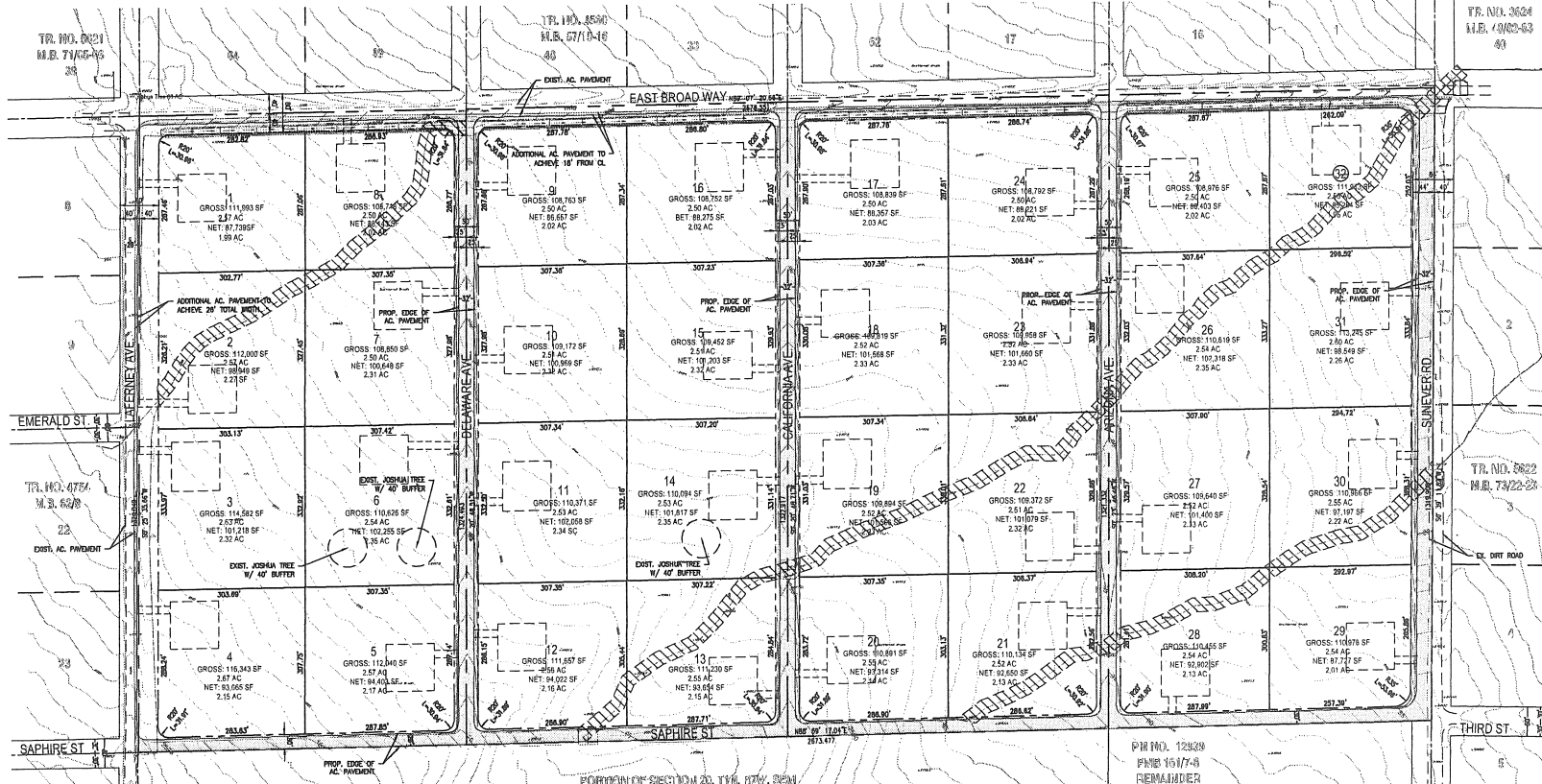
IN UNINCORPORATED TERRITORY OF SAN BERNARDINO COUNTY, STATE OF CALIFORNIA

TENTATIVE TRAC.T No. 20668

BEING A PROPOSED SUBDIVISION OF THE NORTH ONE-HALF OF THE NORTHEAST ONE-QUARTER OF SECTION 20, TOWNSHIP 1 NORTH, RANGE 7 EAST, SAN BERNARDINO MERIDIAN IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA ACCORDING TO THE OFFICIAL PLAT THEREOF.

JULY 2024

FOR OFFICIAL USE ONLY



LEGEND

PROJECT BOUNDARY
 EXISTING RIGHT-OF-WAY
 PROPOSED RIGHT-OF-WAY
 STREET CENTERLINE
 EXISTING MAJOR CONTOUR
 EXISTING MINOR CONTOUR
 PROPOSED CONTOUR
 EXIST. FLOW LINE & DIRECTION
 PROPOSED SHOLE
 PROPOSED SLOPE 1/4% INTO
 FLOW DIRECTION
 PROPOSED CHANNEL CROSSING
 10,000 S.F. BLDG. DEVELOP. AC. PROP.

ABBREVIATIONS

FISH SURFACE ELEVATION
 HIGH POINT
 LOW POINT
 HEIGHT OF HILL OR O.P.
 TOP OF GRADE ALLET
 TOP OF SLOPE
 CRUCE BENCH
 PLUMBLINE
 PAV. BOOK
 MAILED
 MAP BOOK
 PAV. MAP BOOK
 STREET
 BOUNDARY
 CENTERLINE
 ME
 DIST. ROAD
 NORTHERLY
 SOUTHERLY
 EASTERLY
 WESTERLY
 ASPHALT CONCRETE
 PROPOSED

LEGAL DESCRIPTION

NORTH ONE-HALF OF NORTHEAST ONE-QUARTER OF SECTION 20, TOWNSHIP 1 NORTH, RANGE 7 EAST, SAN BERNARDINO MERIDIAN, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA.
 ASSESSOR'S PARCEL NUMBER 0605-051-01

UTILITY PROVIDERS

SEWER: SAN BERNARDINO CALIFORNIA CSEW COMPANY
 725 S. 11400
 SANTA ANA, CA 92711
 (714) 798-8929

WATER: JOSHUA BASIN WATER DIST.
 8750 COLTON RD.
 JOSHUA TREE, CA 92252
 (760) 338-8438

TRASH SERVICES: 4878 NEWTON ROAD
 YUCCA VALLEY, CA 92284
 (760) 340-2113

SCHOOL DISTRICT: UNIFORMED SERVICES UNIVERSITY HEALTH SERVICES
 5719 UTAH TRAIL
 THERMOPHORE PALMS, CA 92277
 (760) 397-9191

POWER: SOUTHERN CALIFORNIA GAS COMPANY
 (800) 427-2200
 WORKER WILL USE PROPRIETARY

SITE SUMMARY

SITE AREA (GROSS): 91.2 AC.
 R.A.W. TO BE DESIGNATED: -11.0 AC.
 SITE AREA (NET): 70.2 AC.

TOTAL NUMBER OF RESIDENTIAL LOTS: 33
 LINEAR FEET OF NEW STREETS: 6,642 LF

SITE INFORMATION

ASSESSOR'S PARCEL NUMBER: 0605-051-01
 TRACT NUMBER: 20668
 EXISTING ZONING: A/R (JOSHUA TREE/RURAL LAND)
 PROPOSED ZONING: NO CHANGE
 EXISTING LAND USE: VACANT
 PROPOSED LAND USE: DRP
 PROJECT TYPE: DEVELOPER BUILD OUT
 LEG: ALL ADJACENT PARCELS ARE ZONED A/R

EARTHWORK

	CU (+)	CU (-)
RAW EARTHWORK:	14.00	7.00
OVERLAY & RECONSTRUCT SURFACE (10.75) :	20.20	25.20
SUBTOTAL:	34.20	32.20
EXCESS FILL (2.00) :	2.00	0.00
SURFACE DRAINAGE & OTHER LOSSES:	37.00	32.80
TOTAL:	37.00	32.80
NET IMPORT/EXPORT = 0 (C.I.) :	0	0

ENGINEER'S STATEMENT

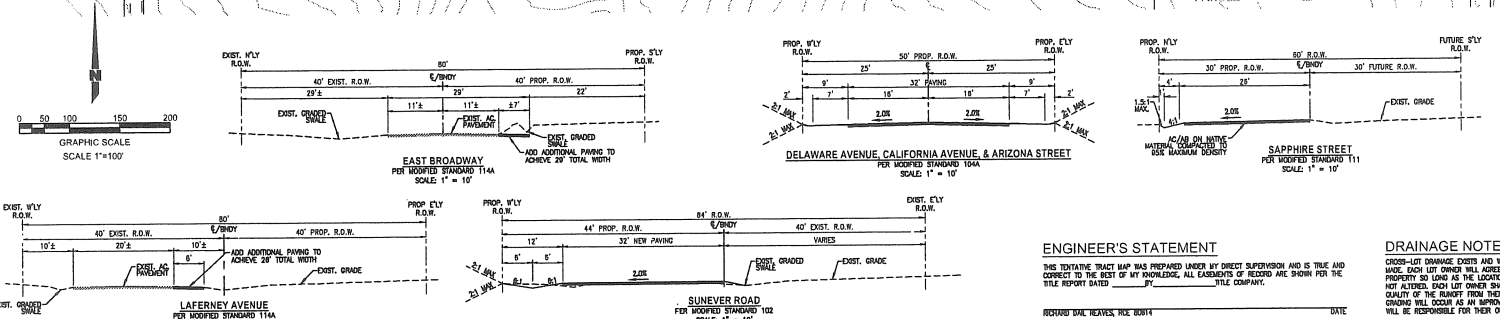
THIS TENTATIVE TRAC.T MAP WAS PREPARED UNDER MY DIRECT SUPERVISION AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE. ALL EASEMENTS OF RECORD ARE SHOWN FOR THE TITLE REPORT DATED _____ BY _____ TITLE COMPANY.

DRAINAGE NOTE

CROSS-LOT DRAINAGE DISTS AND WILL REMAIN AFTER PUBLIC IMPROVEMENTS ARE MADE. EACH LOT OWNER WILL BE RESPONSIBLE TO ACCEPT DRAINAGE FROM THE ADJACENT PROPERTY SO LONG AS THE LOCATION OF THE FLOW OR CONCENTRATED DRAINAGE IS NOT ALTERED. EACH LOT OWNER SHALL BE RESPONSIBLE TO MAINTAIN THE QUANTITY OR QUALITY OF THE DRAINAGE FROM THEIR LOT INTO THE ADJACENT PROPERTY. NO LOT DRAINAGE WILL OCCUR AS AN IMPROVEMENT OF THIS DEVELOPMENT. EACH LOT OWNER WILL BE RESPONSIBLE FOR THEIR OWN PAVING, DRAINS AND DRAINAGE UTILITY.

ENGINEER
 ADAM DOWNS
 8078 IMPERIAL DRIVE
 CHICO, CA 95926
 CONTACT: RICHARD REAVES
 PHONE: (916) 884-8114
 EMAIL: REAVES@ADAMDN.COM

OWNER/APPLICANT
 RIN CHOI
 411 SUTTON HILLS LDC
 1701 COLORADO BLVD., #333
 LOS ANGELES, CA 90011
 PHONE: (818) 873-3872
 EMAIL: rinchoi@reavesdew.com



Underground Service Alert
 Call TOLL FREE
 1-800-227-2800
 TWO WORKING DAYS BEFORE YOU DIG

PREPARED BY:
Adrian Engineers
 Civil Engineering & Surveying
 8871 Engineers Drive, Suite 200
 Fontana, CA 92335
 (951) 836-9241, Fax (951) 836-9299

RESUBMIT REAVES, INC. 06/14/24
 DATE: 07/03/24

NO.	DATE	REVISIONS	APPROVED

COUNTY OF SAN BERNARDINO
 DEPARTMENT OF LAND USE SERVICES

APPROVED BY: _____ DATE: _____

TENTATIVE TRAC.T MAP
 TRAC.T No. 20668
 APN: 0605-051-01
 JOSHUA TREE

DATE PREPARED: 7/19/2024
 DATE: _____
 FILE NO. _____
 SHEET 1 OF 1